TAKING THE PULSE ON GAMBLING AND PROBLEM GAMBLING IN NEW ZEALAND: A REPORT ON PHASE ONE OF THE 1999 NATIONAL PREVALENCE SURVEY

Report Number Three of the New Zealand Gaming Survey

Max Wenden Abbott
Rachel Ann Volberg
In association with Statistics New Zealand

June 2000

Acknowledgments

The contribution of the thousands of New Zealanders who participated in the national survey and associated pilot studies reported in this volume is acknowledged with appreciation.

Chief Executive's Foreword

Taking the Pulse on Gambling and Problem Gambling in New Zealand is the third, and perhaps most significant, report from the New Zealand Gaming Survey.

This first phase of a two-phase national prevalence study of problem gambling is based on interviews with a sample of 6,452 adults conducted by Statistics New Zealand. Phase two will report on the results of more in-depth interviews with selected sub-samples of phase one respondents.

The 1999 national prevalence study is the first ever national "replication" study. It was undertaken primarily to provide reliable information on the extent and nature of problem gambling in New Zealand, and to assess the impact of changes in the New Zealand gaming sector including the substantial growth in gambling opportunities, since the last national prevalence study conducted in 1991/1992. The phase one results are interesting, unexpected in some cases, and certainly thought-provoking. I am sure they will engender further analysis and debate for some years to come.

The full suite of seven reports from the New Zealand Gaming Survey will comprise:

- A critical review of international literature on gambling participation and problem gambling prevalence.
- Results from fresh interviews with people who participated in Phase 2 of a previous national survey in 1991/1992.
- Results of the 1999 two-phase national prevalence study.
- A survey in two reports of the gambling behaviour of recently incarcerated prisoners.
- A synthesis of all aspects of the research project.

I applaud the efforts of Professor Max Abbott, Dr Rachel Volberg, and Statistics New Zealand for their work in producing this important report. It is readily apparent that a great deal of attention was devoted to identifying the best possible survey methodology to produce high quality information on gambling in New Zealand. I am confident that this objective has been achieved.

The Department would like to acknowledge the assistance of Associate Professor Stephen Haslett, Director of the Statistics Research and Consulting Centre at Massey University, who reviewed the statistical treatment of data as part of the Department's critiquing process.

Finally, I would like to thank the 6,452 participants who agreed to be interviewed by Statistics New Zealand. Their patience and co-operation has ensured that there is now up to date information on gambling and gambling related problems in New Zealand.

TABLE OF CONTENTS

TABLES

FIGURES

EXECUTIVE SUMMARY

Background

A national study of gambling participation and problem gambling was conducted in New Zealand during 1991. This was the first national prevalence study internationally to use a validated measure of problem gambling.

During the three years before 1991, new forms of gambling had been introduced and New Zealand per capita gambling expenditure doubled. Throughout the ten-year period prior to this, inflation-adjusted per capita expenditure had changed very little.

The 1991 national survey involved two phases. In the first phase, 4,053 adults were interviewed by telephone to determine the degree of gambling involvement and estimate the prevalence of problem gambling in the community. The second phase involved a smaller number of in-depth, face-to-face interviews with sub-samples drawn from the phase one sample. Phase two enabled more extensive information to be gathered from participants with gambling problems as well as from participants who gambled weekly or more and did not experience gambling-related problems.

Since 1991 there has been further growth in gambling availability and expenditure in New Zealand, albeit that expenditure has increased at a lower rate than it did from 1987 to 1991. New forms of gambling have been introduced, including casinos in Auckland and Christchurch. Gaming machines outside of casinos have increased in number. In 1991, total national expenditure on the main legal forms of gambling was NZ$575 million. In 1998, the corresponding total was NZ$1,045 million.

The New Zealand Gaming Survey (NZGS)

This report outlines and discusses the findings of a major component of a programme of research, the New Zealand Gaming Survey (NZGS), commissioned by the Department of Internal Affairs. In broad terms, the purpose of the overall research programme is to investigate the impact that this recent increase in gambling involvement has had on the lives of New Zealanders and advance scientific understanding of gambling and problem gambling. Other objectives are to:
- Provide information that will assist in the development of gaming and related health and social policy
- Contribute to robust frameworks for future studies of the prevalence and wider economic and social impacts of gambling and problem gambling
- Provide a solid baseline to enable assessments of future changes in the prevalence of problem gambling and gambling participation to be made.

The National Prevalence Survey (NPS)

This report is based on information gathered from a national sample of 6,452 adults aged 18 years and older, interviewed during 23 January to 21 March 1999. This component of the NZGS is referred to as Phase One of the National Prevalence Survey (NPS-1). The great majority of interviews were conducted via telephone and the procedures used and

questions asked of participants were broadly comparable to those employed in phase one of the 1991 national survey.

Survey participants, aged 18 years and over, were randomly selected from households that had telephone numbers listed in current electronic telephone directories. The response rate was 75 percent, comparable to that of the recent Swedish national survey (72%) and substantially higher than rates for previous community gambling surveys conducted in New Zealand and other parts of the world. The resulting survey data were subsequently weighted to scale the sample to represent the whole adult population, account for different probabilities of respondent selection and account for different rates of non-response between sub-populations.

A stratified, two-stage sample design was used. Sample complexity associated with this design was taken into account in estimating sample errors and confidence intervals and in undertaking statistical analyses by using a variety of special procedures. Appropriate procedures were also used to provide confidence intervals for measures (such as problem gambling) with low proportions. Standard statistical methods, although used in previous population surveys of gambling and problem gambling, are inappropriate in these situations and can lead to incorrect conclusions.

While the methods used in this study resulted in a sound probability survey, it should be noted that certain groups were excluded from the sample frame. Excluded groups include people who reside in non-residential dwellings such as hospitals and prisons, residents of households without telephones and people with unlisted telephone numbers. In addition, response rates for some groups including young adults and Pacific Islanders were lower than those of other respondents. Although weighting of the data adjusts for this lower representation, it cannot correct for differences in gambling participation and problems (if they are present) between survey participants and non-participants in these groups.

The 1999 NPS-1 was primarily undertaken to provide reliable estimates of problem gambling in the adult New Zealand population, as well as to provide estimates of the proportions of adults who engage in different forms of gambling at varying levels of intensity. The survey was also designed to generate a wide range of additional information about gambling and problem gambling at a lower level of precision. This included consideration of reported changes in gambling participation and in the prevalence of problem and probable pathological gambling since the 1991 national survey.

The NPS-1 is the first national level 'replication' study to have been conducted internationally, allowing changes to be examined, over time, in the same population.

As with the 1991 survey, the 1999 National Prevalence Survey involved a second phase (NPS-2) in which selected sub-samples of Phase One respondents were interviewed, face-to-face, in more depth. Selecting and recruiting participants for this follow-on study was a further important objective of the Phase One survey. Phase Two is intended to provide more detailed information about problem gamblers, including their comparison with non-problem gamblers on a variety of relevant measures. The findings from this part of the 1999 National Prevalence Survey will be presented in a separate report.

Other Relevant Studies

Three further components of the NZGS are relevant to the findings outlined and discussed in the present report, namely:

The Literature Review (Abbott & Volberg, 1999) provides a critical overview of previous surveys of gambling and problem gambling conducted internationally, with an emphasis on New Zealand, Australian and North American research. This review provides a background and context within which the findings of the present report can be considered.

The Longitudinal Follow-up (Abbott, Williams & Volberg, 1999) is based on follow-up interviews with 143 people who originally participated in phase two of the 1991 national survey. The report on this study presents information about the definition and measurement of gambling and problem gambling and stability and change in these behaviours. It also identifies factors that are associated with this stability and change. This study, by following the same individuals over time, provides a different and complementary perspective on some of the matters considered in the present report. The Longitudinal Follow-up report findings assist with interpretation of a number of the 1999 NPS results.

The Prison Study, based on surveys of a number of New Zealand prisons, provides information about gambling and problem gambling in one of the sectors of the adult population that was not included in the NPS sample frame. Like other general population studies, the NPS was confined to people living in residential dwellings. Among other things, findings of the Prison Study will assist in establishing a more accurate estimate of problem gambling in the total adult population. This study will be reported in two separate publications.

A further national study, recently completed in Sweden, also has relevance to the present survey in that it uses similar methodology and was conducted in a country with per capita gambling expenditure that approximates that of New Zealand (Rönnberg, Volberg & Abbott et al, 1999).

Major Findings

Gambling

Gambling Participation

In 1999, 94.0 percent (93.4-94.6%) of New Zealand adults said that they had participated in at least one type of gambling activity at some time in their lives. The percentages given in brackets indicate the confidence interval surrounding the point prevalence estimate of 94 percent. There is a 95 percent probability that the true estimate for the adult population falls between 93.4 and 94.6 percent.

The 94.0 percent lifetime gambling participation rate is similar to that of the 1991 national survey (95%) and comparable to rates obtained in recent Australian, Canadian and Swedish surveys. It is higher than United States participation rates.

Lifetime participation in New Zealand is highest for Lotto (85.9%; 84.9-86.9%), followed by other lotteries or raffles (76.8%; 75.6-78%), Instant Kiwi (61.4%: 60.1-62.7%), betting on horse or dog races (48.1%; 46.6-49.6%), gaming machines outside casinos (37.1%;

35.6-38.6%), casino gaming machines (35.7%; 34.4-37.0%), money bets with friends or work-mates (34.3%; 32.9-35.7%) and TeleBingo (25.8 %; 24.6-27.0%). Lifetime rates are below 25 percent for other types of gambling.

Past six months participation in at least one form of gambling (86.2%; 85.2-87.2%) is high by international standards, although somewhat lower than was reported in the 1991 national survey (90%). Only three gambling activities (Lotto, other lotteries or raffles and Instant Kiwi) are engaged in this frequently by more than 25 percent of adult New Zealanders.

Weekly participation in at least one form of gambling (40.8%; 39.2-42.4%), although also high by international standards, is largely confined to people who purchase Lotto tickets. Over a third of adults (35.0%; 33.6-36.4%) report weekly Lotto participation. Once a week or more frequent involvement in other forms of gambling are: TeleBingo (6.2%; 5.4-7.0%), Instant Kiwi (5.9%; 5.2-6.6%), other lotteries or raffles (3.1%; 2.6-3.6%), betting on horse or dog races (2.7%; 2.2-3.2%) and gaming machines-outside casinos (2.0%; 1.5-2.5%). Weekly rates for other forms fall below two percent.

Where a form was available in both 1991 and 1999, lower weekly participation rates were reported in 1999 (except for housie, with a one percent weekly rate in both surveys). However, not all of these differences are likely to be statistically significant.   Of the recently introduced forms, TeleBingo ranks second in 1999 after Lotto. Daily Keno, with a rate of one percent, is less popular.

People who gambled weekly or more were considered further by allocating them to one of two mutually exclusive categories – regular non-continuous gamblers or regular continuous gamblers. Regular non-continuous gamblers participate frequently in Lotto and/or other forms of gambling where winnings cannot be re-invested shortly after a win. Regular continuous gamblers participate frequently in one or more forms of gambling such as gaming machines, track betting and casino table games where winnings can be readily re-invested.   These gambling activities generally also involve an element of skill or perceived skill and have been shown by previous research to be more strongly associated with the development of problem gambling than is the case with non-continuous activities. Regular continuous gamblers may also engage weekly or less frequently in non-continuous forms of gambling.   While regular non-continuous gamblers may engage infrequently in continuous forms, if they do so weekly or more they are excluded from this category and classified as continuous gamblers.

In 1999, it is estimated that 30.3 percent (28.9-31.7%) of New Zealand adults are regular non-continuous gamblers and that another 10.5 percent (9.6-11.4%) are regular continuous gamblers. In 1991, a similar percentage (30%) was classified as regular non-continuous gamblers. However, in the 1991 survey, the continuous estimate was higher (18%). This suggests that while there has been no change in the proportion of regular non-continuous gamblers, there has been a reduction in the proportion that gambles regularly on continuous forms.

A recent national Australian survey found that approximately 40 percent of Australian adults gamble weekly or more on at least one type of gambling activity (Productivity Commission, 1999). This figure is similar to the weekly participation rate in Sweden (42%) and the New Zealand point estimate (40.8%). However, the Australian estimate for regular continuous gamblers (20%), is approximately double that of its 1999 New Zealand counterpart.

The Sociodemographic Profile of Gamblers and Non-Gamblers

The sociodemographic profile of people who have gambled as a whole broadly reflects the profile of the New Zealand adult population. This is expected given the high levels of lifetime and past six months participation in at least some form of gambling. However, sociodemographic profiles are more distinct for people who never or rarely gamble and for regular (weekly or more) continuous gamblers.

In 1999 the following groups, relative to others within the same grouping of sociodemographic categories, contain relatively large proportions of people who take part weekly or more in <u>continuous</u> forms of gambling:

- Males
- People aged 55-64 years
- Mäori
- People without formal educational qualifications
- Employed people
- People with lower status occupations
- Roman Catholics
- Christchurch residents.

The following groups have 25 percent or more people who have never gambled or who did not gamble in the past six months:

- Asians
- People born in countries other than New Zealand, Europe, Australia and North America
- People who had lived in New Zealand less than four years
- Students
- Other Christians (i.e. Christians not in the major denominations)
- Other religions (i.e. people of religions other than Christian).

People who are unemployed or not in the labour force also contain relatively large proportions (exceeding 20%) of non-gamblers and occasional gamblers.

The sociodemographic profiles of gamblers vary across the different forms of gambling. For example, with respect to past six months or more frequent participation:

Lotto participants are:
- more likely to be employed and lack degree or higher qualifications

- less likely to be aged 18-24 years, to have lived in New Zealand for less than four years, to be of a religion other than Christian or a Christian who does not belong to one of the major denominations.

Instant Kiwi participants are:
- more likely to be employed, to be female or aged under 45 years (with particularly high levels of participation on the part of people aged 18-24 years)

- less likely to be Pacific Islanders, to have lived in New Zealand for less than four years, be of a religion other than Christian or a Christian who does not belong to one of the major denominations.

Track betters are:
- more likely to be employed, to have no school or other qualifications, to be male, aged 25-34 years, to be Mäori, to be a Roman Catholic and live in Wellington or Christchurch

- less likely to be aged 18-24 years, to be Asian, to live in a household with an income of NZ$40,001-NZ$50,000, to be of a religion other than Christian or a Christian who does not belong to one of the major denominations.

TeleBingo participants are:
- more likely to be female, to be aged over 34 years, to be Mäori or Pacific Islanders, to lack a degree or higher qualifications, to be married or living in a defacto relationship

- less likely to be of a religion other than Christian or a Christian who does not belong to one of the major denominations, to have lived in New Zealand for less than four years, to have a household income over NZ$50,000 and to live in Auckland or Christchurch.

Gaming machine (outside casino) participants are:
- more likely to be male, to be employed, to lack a degree or higher qualifications, to be Mäori, to be aged under 35 years, and to be never married

- less likely to be of a religion other than Christian or a Christian who does not belong to one of the major denominations, to be an Auckland resident, to live alone, and have a household income of NZ$20,001-NZ$30,000 or NZ$50,001-NZ$70,000.

Casino gaming machine participants are:
- more likely to be employed, to be Pacific Islanders, to live in Christchurch or Auckland, to be born outside Europe, Australia or North America and to have a household income over NZ$70,000

- less likely to be a Christian who does not belong to one of the major denominations, live in a household of five or more, and have a household income of NZ$30,000 or less.

Other casino games participants are:
- more likely to be male, employed, aged 25-34 years, live in Christchurch or Auckland and to be born in Europe, Australia or North America

- less likely to be a Christian who does not belong to one of the major denominations, to have school qualifications only and to have a household income of $NZ30,000 or less.

The 1991 survey did not examine the sociodemographic profiles for different forms of gambling in as much detail as the 1999 study did. However, there appear to be some changes over time, the most notable being a substantial reduction in the proportion of unemployed people who participate in a number of forms of gambling including Instant Kiwi, track betting and gaming machines. Pacific Islanders also appear to have substantially lower levels of involvement in Instant Kiwi and track betting. Although gender differences remain with respect to forms of gambling that were available in both 1991 and 1999, women have similar or higher levels of involvement in casino gaming machines and TeleBingo. Both of these forms were introduced after 1991.

Gambling Expenditure

Typical monthly gambling expenditure was calculated for survey participants who reported having gambled on at least one form of gambling in the past six months. Based on this information, the estimated annual expenditure for New Zealand adults was NZ$1,162 million (NZ$993-1,331 million). This is similar to the Department of Internal Affairs 1998 actual net expenditure figure of NZ$1,045 million for major forms of legal gambling.

The 1999 mean (average) reported monthly expenditure per adult was NZ$41. The comparable 1991 survey estimate was NZ$37.

Of the total reported gambling expenditure, Lotto takes the largest share (36.0%; 30.9-41.1%), followed by track betting (18.4%; 10.5-26.3%), gaming machines-outside casinos (6.8%; 5.2-8.4%), other lotteries or raffles (6.5%; 5.0-8.0%), Instant Kiwi (5.9%; 5.0-6.8%) and gaming machines-in casinos (5.7%; 4.1-7.3%). None of the other forms, individually, accounted for more than five percent of total reported expenditure.

The 1999 expenditure percentages for Lotto, track betting, gaming machines-outside casinos and other lotteries or raffles are similar to those obtained in the 1991 national survey. Instant Kiwi accounted for a larger percentage of total reported expenditure in 1991 (9%), as did betting on card games (15%).

Although the total reported gambling expenditure estimate is very close to 1998 official total gambling expenditure for major forms of legal gambling, the reported estimates for gaming machines and casino gambling are much lower than the official figures. Underestimates of expenditure of these forms of gambling have been noted in studies in Australia and North America. The estimates for Lotto and other types of lotteries and raffles, on the other hand, are higher than the official figures for these activities. It is likely

that the Lotto/lottery estimates are high because most respondents do not factor winnings into their calculation of 'expenditure'. It is less certain why gaming machine and casino estimates differ from official expenditure records. Participants in these forms of gambling may be unaware of the full extent of their losses and/or be reluctant to report them. In contrast to the situation with other major forms of gambling, reported expenditure on horse and dog betting was similar to official expenditure figures.

Most adults report spending small amounts on gambling activities. The majority of New Zealand adults (53%) report gambling less than NZ$20 per month. This is also typical of surveys conducted in other countries. For example, the recent Swedish national survey found that 58 percent of the population reported this level of expenditure. A smaller percentage report moderate to high levels of expenditure. In 1999, 23 percent of New Zealand adults report spending NZ$40 or more per month.

When the various forms of gambling are considered separately, it is evident that the average reported typical monthly expenditure for people who participate in each activity is highest for card games, followed by track betting, casino games, housie and Internet-other sports betting. These are all continuous forms of gambling and some also involve a degree of skill.

On average, regular continuous gamblers report spending NZ$152 (NZ$105-200) per month. **Although only 10.5 percent of adults are classified as regular continuous gamblers, they account for nearly a third (32.1%; 29.4-34.8%) of people who report spending NZ$40 per month or more on gambling activities. Seventy-one percent of regular continuous gamblers are in this high expenditure category.** There is also wide variability in expenditure within this expenditure group, with a moderate proportion of continuous gamblers reporting very high monthly expenditure.

Regular non-continuous gamblers report, on average, spending NZ$42 (NZ$40-44) per month on gambling. Relative to the regular continuous gamblers, there is much less variability in expenditure levels within this group.

People who report having bet in the past six months, but not on a weekly basis, account for the great majority of people who spend less than NZ$20 per month. The average monthly reported expenditure for this group of infrequent gamblers is NZ$15 (NZ$14-17). As with regular non-continuous gamblers, this group displays little variability in their reported expenditure.

Although gambling is widespread throughout the population, there are significant differences between social and demographic groups with respect to gambling expenditure.

Over 25 percent of people in the following groups report spending NZ$40 or more per month on gambling activities:
- Males
- People aged 45-64 years
- Pacific Islanders
- Mäori
- People born in countries other than New Zealand, Europe, Australia and North America
- Migrants resident for four years or more
- People without formal qualifications

- Employed people
- People in the following occupations:
    Elementary occupations
    Plant and machine operators and assemblers
    Trades workers
    Legislators, administrators and managers
    Clerks
- Catholics
- Presbyterians
- People of 'other religions'
- People with a household income of NZ$70,001 or more
- People with a household income of NZ$40,001 to NZ$50,000
- Auckland residents.

From inspection of this list and the list of people who did not gamble in the last six months (see page 5), it is evident that two groups - people born in countries other than New Zealand, Europe, Australia or North America and people of 'other religions' - have bimodal distributions. In other words, they contain relatively large proportions of both high spending gamblers and people who do not gamble or have low levels of expenditure. Pacific Islanders also have a bimodal distribution with approximately 40 percent spending less than NZ$10 per month and over 40 percent spending more than NZ$40 per month. These appear to be groups that have recently been introduced to gambling or have recently increased their gambling involvement.

In 1999, the reported average monthly gambling expenditure for men was NZ$53. The average for women was NZ$30. In 1991, the respective averages for these groups were NZ$55 and NZ$20. This suggests that there has been little or no change for men but that for women there has been an increase in their average expenditure from 1991 to 1999.

In 1999, the oldest and youngest age groups report the lowest average monthly gambling expenditure (NZ$31 and NZ$30 respectively). People aged 45-54 years report the highest expenditure (NZ$58). The other age groups range between NZ$40 and NZ$44. In 1991, the oldest age group also reported the lowest expenditure (NZ$20). However, at that time, the youngest age group, along with people aged 30-39 years, reported the highest expenditure (NZ$46**). This suggests that there has been a substantial reduction in average expenditure among people aged 18-24 years and a moderate increase among people aged 65 years and older.**

In 1999, reported average monthly gambling expenditure for the major ethnic groupings were:

- Pacific Islanders NZ$62
- Mäori NZ$49
- Europeans NZ$40
- Asians NZ$38
- Other ethnic groups NZ$26.

Comparable figures were not provided in the 1991 national survey report.

Gambling Preferences

In 1999, approximately three-quarters of the 94 percent of the adult population that report ever having gambled indicate that they have a favourite or preferred form of gambling. Only 26.4 (25.2-27.6) percent of adults do not report having a preference for a particular type. These percentages are the same as those given in the 1991 national survey report.

Consistent with the gambling participation and expenditure findings, Lotto is the most preferred form of gambling, with 24.4 (23.2-25.6) percent stating that this is their favourite gambling activity. Of the remaining forms of gambling, only betting on horse or dog races (9.7%; 8.8-10.6%), Instant Kiwi (6.2%; 5.5-6.9%) and TeleBingo (5.4%; 4.7-6.1%) are favoured by more than five percent of New Zealand adults.

In 1991, 28 percent of adults favoured Lotto, 12 percent betting on horse or dog races and seven percent Instant Kiwi. While these three forms of gambling retain the same ranking in 1999, all appear to have declined somewhat in absolute terms.

Regular gamblers, especially regular continuous gamblers, are much more likely than less frequent gamblers to report having a favourite form. Almost a quarter of <u>regular continuous</u> gamblers favour betting on horse or dog races. Instant Kiwi and gaming machines-outside casinos are the other forms of continuous gambling favoured by people in the regular continuous category. A relatively large number also favour Lotto, a non-continuous form of gambling. Lotto is by far the most frequently mentioned preference for <u>regular</u> <u>non</u>-<u>continuous</u> gamblers, favoured by over 40 percent.

Men more often than women favour betting on horse and dog races, other sports betting, taking money bets with friends and work-mates and card games for money. Women more frequently than men favour Instant Kiwi, TeleBingo and housie. There is little or no gender difference for other preferences, including preferences for Lotto, gaming machines and casino table games.

Younger adults (under 35 years) more often than other adults report that they have a favourite form of gambling. They more frequently favour Instant Kiwi, gaming machines (both in and outside casinos), other sports betting and money bets with friends and work-mates. Older adults more often favour Lotto.

With respect to gambling preferences, only three ethnic groupings were considered - European, Mäori and other ethnic groups. The latter, while predominantly consisting of a variety of Pacific Island and Asian ethnicities, includes all New Zealand residents who are not Mäori or European. Consequently, it may obscure differences between groups within this broad category.

Of the three ethnic categories, Mäori most frequently indicate that they have a favourite gambling activity. Europeans more often express a preference for horse or dog racing than people in the other groupings. Mäori, relative to the other two groups, prefer gaming machines outside casinos. People in the 'other' category appear to more often favour casino table games although large absolute and relative sampling errors for this and most other gambling activities preclude meaningful examination of apparent preference differences between the ethnic groups.

Reasons for Gambling

In 1999, the majority of people (53.4%; 51.9-54.9%) indicate that they gamble to win money. This was also the main reason given in 1991 (57%).

The other reasons given for gambling in 1999, in descending order, include: entertainment/fun (37.2%; 35.9-38.5%), to support worthy causes (27.7%; 26.4-29.0%), socialising (15.3%; 14.4-16.2%) and excitement/challenge (12.8%; 11.9-13.7%). Other particular reasons are given by less than five percent of the population.

In 1991, similar proportions of the population said they gambled to socialise (15%) or for excitement/challenge (15%). Smaller proportions said they gambled to support worthy causes (19%) or for entertainment/fun (33%).

In 1999, <u>regular</u> <u>non-continuous</u> gamblers are more likely than the other major gambling participation groups to say they gamble to win money. They are less likely to say they gamble to socialise.

<u>Regular</u> <u>continuous</u> gamblers are more likely to report gambling for entertainment/fun, for excitement/challenge, to socialise or because it is a hobby or habit.

Males more frequently than females say they gamble to socialise and less frequently give supporting a good cause as a reason for gambling. These gender differences were also apparent in 1991. In 1991, males were more likely than females to say they gambled for excitement/challenge and for entertainment/fun. In 1999, males and females differ very little with respect to these two reasons.

Adults aged under 35 years are more likely than other adults to indicate that they gamble to socialise, for excitement/challenge and for entertainment/fun. They are less likely to report gambling to support worthy causes. Similar age differences were found in 1991 for excitement/challenge and entertainment/fun. In 1991, but not in 1999, younger adults were more likely to report gambling to win money.

Problem Gambling

Problem and Probable Pathological Gambling

Problem gambling refers to patterns of gambling behaviour that compromise, disrupt or damage health, personal, family or vocational pursuits. While the individual experiencing the problem, family members and close friends and associates are most likely to experience harm, adverse effects can extend to the wider community.

Problem gambling is typically regarded in one of two different ways:

(1)   as a <u>continuum</u>, with people experiencing one or a small number of minor, transient problems at one end, through to people experiencing a cluster of serious gambling-related problems of prolonged duration at the other;

(2)   as a <u>mental</u> <u>disorder</u> that is assessed on the basis of individuals meeting diagnostic criteria established by organisations such as the American Psychiatric Association and accepted by health authorities including the World Health Organisation and the New Zealand Ministry of Health.

In the present report problem gambling is conceptualised both as a continuum and as a mental disorder, with pathological gamblers regarded as a sub-set of problem gamblers. Pathological gamblers suffer from severe problems and can be identified using official diagnostic criteria.

The Measurement of Problem and Probable Pathological Gambling

In the National Prevalence Survey (NPS), problem and pathological gambling are measured using a revised version of the South Oaks Gambling Screen (SOGS-R). This screen was developed for the 1991 New Zealand national survey (Abbott & Volberg, 1991; 1996). This revised screen, or adaptations of it, has subsequently been used in the majority of problem gambling prevalence studies conducted throughout the world. The original SOGS was based on the official psychiatric definition of pathological gambling as a chronic or chronically relapsing mental disorder. People who acknowledge that they have, at some time in their lives, experienced five or more of 20 symptoms are classified as probable pathological gamblers. Those who report that they have experienced three or four symptoms are also differentiated and referred to as problem gamblers. The remainder, who report having experienced two or fewer symptoms, are referred to as non-problem gamblers.

The SOGS-R differs from the original version in that the 20 'clinical' questions are presented in both lifetime (ever experienced) and current (experienced in the past six months) formats. This lifetime-current distinction is based on the premise that pathological and problem gambling are not, invariably, life-long conditions. It is assumed that for some people they will be chronic. For others, it is assumed that they will either fluctuate over time or be transient states not prone to relapse. These assumptions have been corroborated by the findings of the recent longitudinal follow-up study of problem gamblers and regular non-problem gamblers who were included in the 1991 national survey (Abbott, Williams & Volberg, 1999).

The term 'probable pathological gambler' is used to distinguish people identified on the basis of their scores on screening instruments such as the SOGS-R from people diagnosed following clinical assessments conducted by clinical psychologists or psychiatrists.

Research has shown that the original SOGS and lifetime SOGS-R screens are very good at detecting serious gambling problems among people who have been independently diagnosed as pathological gamblers. However, like screens for other clinical conditions, in general population surveys they typically do this at the expense of generating a substantial number of <u>false</u> <u>positives</u> (people who are classified as having a disorder but who do <u>not</u> have it when assessed clinically). False positives may or may not be counterbalanced by <u>false</u> <u>negatives</u> (people who are not classified as having a disorder but who <u>are</u> found to have it when assessed clinically). The current SOGS-R, relative to the lifetime measure, appears to produce fewer false positives but substantially more false negatives. Consequently, the current measure probably provides a weaker screen for identifying people with serious gambling problems and under-estimates the prevalence of problem and probable pathological gambling when used in community settings. This concern has led most investigators since 1991 to extend the timeframe used in the current SOGS-R to 12 months. However, it has yet to be determined whether or not this modification reduces the number of false negatives or changes the number of false positives.

In the present study, although it is noted that the six-month version of the SOGS-R may under-estimate current prevalence, this timeframe is retained to facilitate comparison with the findings of the 1991 'baseline' survey.

Problem and Probable Pathological Gambling Prevalence Estimates

<u>Prevalence</u> refers to the proportion of the population or a sector of the total population with serious gambling-related problems. It can be thought of as a measure of 'stock' - the number of cases present at a given point in time. In the NPS, both lifetime and past six months prevalence timeframes are used. The former refers to the number of adults presently living in the community who have ever experienced serious gambling-related problems. The latter refers to the number experiencing such problems currently. <u>Incidence</u>, in contrast to prevalence, refers to the number of new cases that develop during a fixed period of time. It can be regarded as a measure of flow (or, more precisely, in-flow) rather than stock.

The NPS provides prevalence estimates. Incidence cannot be directly assessed by studies of this type. The estimation of incidence requires longitudinal surveys that follow large numbers of the same individuals over time. To date, there have been no incidence studies of problem gambling that involve a representative sample drawn from a general population.

From the present survey, it is concluded that even though approximately 94 percent of New Zealand adults report having gambled at some time, the great majority of adults (83.1%; 81.9-84.3%) have never experienced any of the symptoms or gambling-related problems included in the SOGS-R.

On the basis of the SOGS-R, it is estimated that between 38,300 (1.4%) and 68,600 (2.5%) New Zealanders aged 18 years and older can be classified as <u>lifetime</u> problem gamblers and that an additional 19,700 (0.7%) to 39,100 (1.4%) can be classified as <u>lifetime</u> probable pathological gamblers.

The lifetime estimates include current problem and probable pathological gamblers as well as people who report having problems in the past but not currently.

It is estimated that between 15,400 (0.6%) and 30,700 (1.1%) New Zealand adults can be classified as <u>current</u> problem gamblers and that an additional 7,300 (0.3%) to 20,100 (0.7%) can be classified as <u>current</u> probable pathological gamblers. The current estimate is based on behaviour reported in the past six months.

For a variety of reasons discussed in the body of this report, it is considered that all of these estimates are probably conservative and possibly highly conservative (i.e. they <u>under</u>-<u>estimate</u> the number of people with serious gambling-related problems).

The Stability of Problem and Probable Pathological Gambling

Because the current probable pathological gambling prevalence rate is approximately half its lifetime counterpart, it would appear that about a half of all people who have experienced serious gambling-related problems at some time in their lives no longer

experience problems of this severity. This finding is consistent with the findings of many other surveys that have used the SOGS-R, including those of the 1991 New Zealand national survey. However, the 1999 longitudinal survey (Abbott, Williams & Volberg, 1999) found that over two-thirds of respondents who scored as <u>lifetime</u> probable pathological gamblers in 1991 no longer scored five or more on the <u>lifetime</u> SOGS-R when they were re-assessed in 1998. In other words, many people significantly under-report past gambling-related problems, especially people who no longer (currently) experience such problems. Consequently, it can be concluded that the SOGS-R provides a highly conservative indication of <u>lifetime</u> probable pathological gambling.

In the present context, given the instability in lifetime SOGS-R scores, it is likely that the actual lifetime rates are at least twice as high as reported above. If so, it also means that the degree of problem reduction inferred from the lifetime-current difference is an underestimate. This further suggests that, for some probable pathological gamblers, their problems may be more transient than has previously been considered to be the case.

There are indications, from both the present survey and the longitudinal follow-up study, that problem gamblers who score three or four on the SOGS-R are more prone to problem reduction over time than probable pathological gamblers are. However, it was also found in the longitudinal study that a significant minority (18%) of 1991 problem gamblers progressed to probable pathological gambling status when re-assessed seven years later. Put another way, while this labile problem gambling group may be regarded as being at high risk for the development of pathological gambling, its members are much more likely to overcome their problems.

Swedish and Australian Comparisons

The 1999 <u>lifetime</u> probable pathological gambling point prevalence estimate of one percent is somewhat lower than that obtained in the recent Swedish national survey (1.5%). The <u>current</u> probable pathological gambling point prevalence estimate of 0.5 percent is similar to the Swedish rate (0.6%). Both the New Zealand and Swedish current rates are substantially lower than the national probable pathological gambling estimate obtained from a recent Australian survey (2.1%). However, they are comparable with prevalence estimates for Western Australia (0.7%) and Tasmania (0.4%), the states with the lowest per capita gambling expenditures (Productivity Commission, 1999). The Australian survey did not include a lifetime measure. Both the Australian and Swedish studies used a 12 month measure of current probable pathological gambling status. The 12 month time-frame probably yields slightly higher estimates than the six month frame used in the NPS-1 although this has yet to be determined.

Other Indicators of Problem Gambling

Apart from the aggregate SOGS-R measures of problem and probable pathological gambling, a number of other questions included in the questionnaire have some relevance to gauging the extent of gambling-related problems in New Zealand. Specifically, respondents were asked:

- If they had ever felt nervous about the amount of money gambled

- Whether they personally considered that they had a problem with gambling (currently and/or in the past)

- If they had ever wanted help to stop gambling

- Whether they had ever tried to get help to stop gambling

- Whether they think someone else in their life has a problem with gambling.

Seven percent of adults report that they had felt nervous about the amount of money they spent gambling.

One-point-six percent of adults indicate that they, themselves, considered that they had a problem with gambling in the past and 0.5 percent consider that they have a problem currently. The current estimate is the same as the SOGS-R current probable pathological gambling point prevalence rate. The lifetime estimate is somewhat higher than the SOGS-R lifetime probable pathological gambling point prevalence rate. These questions were also asked in the 1991 survey. In 1991 two percent said that they had had a problem at some time; just under one percent indicated they had a problem currently.

This question was also included in the recent Swedish and Australian national surveys. In Sweden, 0.3 percent considered that they had a problem with gambling in the past year. In Australia, 6.3 percent considered that they had a problem currently.

One percent of New Zealand adults said that at some stage in their lives they had wanted help to stop gambling. This is the same as the 1999 SOGS-R lifetime probable pathological gambling point prevalence rate.

Zero-point-four percent of adults indicated that they had tried to get help to stop gambling, 40 percent of those who said they had wanted to obtain this type of assistance. This is approximately 9,500 people, slightly more than the number (approximately 8,500) that have sought professional assistance from specialist problem gambling help-line and counselling services since they commenced in the early 1990s.

Questions concerning help seeking were also included in the Australian national survey. However, reported findings are not directly comparable to those of the NPS because they are confined to the past 12 months. In Australia, 0.8 percent said they wanted help in the past 12 months for problems related to gambling, 0.3 percent said they had tried to get help during this time period and 0.2 percent said they had received it.

In the NPS 3.6 percent of adults said they thought that their father may have or may have had a gambling problem. One-point-five percent thought likewise with respect to their mother. These percentages are somewhat higher than self-ratings of problem gambling and suggest that people may be more willing to recognise and/or report other peoples' problem gambling than their own. In 1991, four percent of respondents said they considered that one or both of their parents had sometime had a problem with gambling.

In 1999, 9.5 percent also said that they thought another close family member may have or may have had a gambling problem. Eighteen-point-four percent said likewise for a friend or someone else of their acquaintance. These questions were not asked in the 1991 survey.

The 1991 Survey and Consideration of Factors that Influence Changes in Prevalence

The authors of the 1991 national study (Abbott & Volberg; 1991, 1996) concluded that the survey was picking up some of the early consequences of a recent rapid expansion in gambling availability and participation. They observed that large numbers of people had only relatively recently started to participate in continuous forms of gambling on a regular basis and that it usually takes many years for serious gambling problems to develop. The 1991 survey found very high prevalence rates of problem gambling among young adults, Mäori and Pacific Islanders. Demographic projections indicated that during the next two decades, Mäori and Pacific Islanders would make up a growing proportion of the adult population. Abbott and Volberg expected that as the young adult cohort aged, many of the SOGS-R defined problem gamblers would become pathological gamblers and that, over time, the adult population as a whole would contain more pathological gamblers. It was also expected that the next cohort of young adults would have problem gambling rates that were similar to or higher than those of their 1991 counterparts.

From the above considerations, Abbott and Volberg envisaged a 'pipeline' effect whereby a large number of people who were at-risk for, or in the early stages of, problem gambling development would, over time, be added to those in the population who had already developed serious problems. They further anticipated that if new forms of gambling such as casinos were introduced and other continuous forms of gambling became more widely available, there would be a further increase in the number entering the 'pipeline'. In other words, it was concluded that the incidence rate would rise and hypothesised that, during the next decade, the prevalence of problem and probable pathological gambling would increase.

However, prevalence (the total stock of cases) is not totally determined by incidence (the inflow of new cases). Prevalence is also determined by the duration of the illness or disorder in question. This may also be thought of as outflow - the rate at which people cease to be cases. Outflow can occur through self-recovery, successful treatment, emigration or death. In the case of prevalence assessed from community household surveys, outflow can also occur if significant numbers are hospitalised, imprisoned or reside in other institutional settings.

At the time of the 1991 national survey, while Abbott and Volberg were of the view that serious problem gambling may be more transient than was generally considered to be the case, they did regard pathological gambling as a chronic or chronically relapsing disorder for the majority. They also considered it likely that the majority of less serious problem gamblers (who made up nine percent of the 18-24 years age cohort in 1991) would become pathological gamblers. In 1991 there were no specialist counselling, treatment or public education programmes for problem gambling. If such services did become available, previous research with related disorders such as alcohol dependence had shown that most people in the community with problems do not access them and, of those who do, many are treatment failures. Although some overseas research had found high rates of suicidal ideation and suicide attempts among pathological gamblers, it was thought that only a small minority of pathological gamblers would kill themselves. For these reasons, Abbott and Volberg considered it most unlikely that the outflow or stock reduction would do more than partially offset an increasing inflow of new cases of problem and probable pathological gambling.

From the above considerations and a review of relevant international research concerning changes in problem gambling prevalence over time and associations between gambling participation, expenditure and problem gambling, Abbott and Volberg predicted at the

outset of the 1999 survey that 1999 prevalence rates would be substantially higher than in the 1991 survey.

The 1991 and 1999 Prevalence Rates Compared

The 1991 <u>lifetime</u> <u>problem</u> gambling prevalence rate for the total adult population was 4.3 percent (3.6-5.0%). The <u>lifetime</u> <u>probable</u> <u>pathological</u> gambling prevalence was 2.7 percent (2.2-3.3%). These rates are higher than the 1999 prevalence estimates which were respectively 1.9 percent (1.4-2.5%) and one percent (0.7-1.4%).

In 1991, the <u>current</u> <u>problem</u> gambling prevalence rate was 2.1 percent (1.7-2.7%). The <u>current</u> <u>probable</u> <u>pathological</u> gambling prevalence was 1.2 percent (0.9-1.6%). Again, these rates are higher than the 1999 estimates of 0.8 percent (0.6-1.1%) and 0.5 percent (0.3-0.7%).

These findings fail to corroborate the hypothesis that prevalence rates would be higher in 1999. Thus, a conservative conclusion is that there is no evidence of an increase in the prevalence of problem gambling and probable pathological gambling since 1991.

At this point, a cautionary note needs to be made concerning comparison of these and other findings from the 1991 and 1999 surveys. Although similar procedures and questionnaires were used, the methodologies and statistical treatment of the data from the two studies are not identical. For the most part these differences arose from the objective, in 1999, to conduct a high quality probability survey and obtain a response rate in excess of 70 percent. The differences and their implications for interpretation of the findings from the two studies are discussed in the body of this report. While it is likely that methodological factors had an influence on the prevalence estimates obtained, it is considered unlikely that they would be sufficient to fully account for differences of the magnitude reported above. Nevertheless, it remains a possiblity that the difference between the prevalence estimates is an artefact of methodological differences between the two studies.

It should also be noted that information from two surveys is not sufficient to determine trends over time. This requires at least three data points, preferably more, obtained from surveys using identical or very similar methodologies. On the basis of the findings of the 1991 and 1999 surveys alone, it would be premature to conclude that the prevalence of problem and probable pathological gambling has levelled out or declined in New Zealand. However, the findings do suggest that this <u>might</u> be the case and both hypotheses should be addressed in future studies.

Irrespective of the effects of using slightly different methodologies in 1991 and 1999, it is considered that the 1999 survey is more robust technically and provides more accurate information about gambling participation and serious problem gambling than the 1991 survey does.

Gambling Expenditure by Problem Gamblers and Non-problem Gamblers

The average reported monthly gambling expenditure for current problem and probable pathological gamblers combined is NZ$526 (NZ$176-876) and for non-problem gamblers is NZ$34 (NZ$32-36). Apart from indicating a large difference between the two groups in average expenditure, these figures also show that there is considerable variation in expenditure among problem gamblers and much less variation among those without significant problems.

Although current problem and probable pathological gamblers constitute about only 1.3% of the total adult population, this group is responsible for approximately 19 percent of total reported monthly gambling expenditure. This estimate is likely to be conservative, in large part because gaming machine expenditure is under-reported.

Prevalence by Category and Type of Gambling

People who report participating regularly (weekly or more) in continuous forms of gambling and who report spending NZ$40 per month or more on gambling have substantially higher rates of both current and lifetime problem and probable pathological gambling.

Twenty-six percent of people who report weekly or more frequent participation in gaming machines outside casinos and 18 percent of people who report betting this often on horse or dog races are <u>lifetime</u> problem or pathological gamblers. Rates for <u>current</u> problem or pathological gambling are 19 percent and 13 percent respectively.

Regular continuous gambling involvement and frequent participation in gaming machine and track betting were also strongly linked to problem gambling in 1991.

In 1999, apart from regular gaming machine participation outside casinos and track betting, participation in gaming machines at casinos, other casino games and TeleBingo are also associated with both current and lifetime problem and pathological gambling. Taking money bets with friends or work-mates is also linked to current problem and probable pathological gambling. Playing card games for money is an additional risk factor for lifetime problem and probable pathological gambling.

Gambling Preferences of Problem and Probable Pathological Gamblers

The gambling preferences of current problem and probable pathological gamblers were compared with those of non-problem gamblers. Relative to the non-problem group, the combined problem groups are much more likely to say that they have a preferred form of gambling. Consistent with the participation information just presented, problem gamblers are much more likely to report that they prefer betting on horse or dog races and playing gaming machines outside casinos. While a substantial number also favour Lotto, they are much less likely to do so than non-problem gamblers.

Sociodemographic Risk Factors

Considered **individually**, the factors most strongly associated with **lifetime** problem and probable pathological gambling **in 1999** are gender, ethnicity, age, household size and location. Specifically, males, Mäori and Pacific Islanders, people aged 25-34 years, people living in households of five or more and Auckland residents are significantly more likely than others within these sociodemographic categories to have lifetime SOGS-R scores of three or more.

Males, Mäori and Pacific Islanders, people living in households of five or more and Auckland residents were also high-risk groups for both lifetime and current problems in 1991. At that time, people aged 18-24 years and unemployed people were additional high-risk groups. People in lower status occupations and lacking school qualifications were also at somewhat higher risk.

In 1999, the individual risk factors most strongly associated with current problem and probable pathological gambling are ethnicity (Mäori and Pacific Islanders have very high prevalence rates relative to other groups), labour force status (employed people have higher prevalence rates than those unemployed or not in the labour force), and education (people with no qualifications or vocational or trade qualifications have higher rates than those with school qualifications only or degree or higher qualifications).

Although Auckland or Christchurch residence is also associated with higher current problem and probable pathological gambling, these associations are of marginal significance statistically.

The 1999 risk factors for lifetime problem and probable pathological gambling are more similar to 1991 risk factors than the 1999 risk factors for current problem and probable pathological gambling are. This is what would be expected if there was a change in risk factors over time. While having some shortcomings as a lifetime measure of problem gambling, lifetime SOGS-R scores are more of an indicator of past gambling problems than current SOGS-R scores are.

Considered overall, the 1991 and 1999 national survey data suggest that there have been some significant changes over time with respect to risk factors for problem and pathological gambling, particularly for people with current problems.

In 1991, large percentages of current problem and probable pathological gamblers were male, aged under 30 years, Pacific Islanders, Mäori and unemployed. In 1999, Mäori and Pacific Islander representation (44%) is similar to what it was in 1991. However, notable differences are evident for the other groups. Specifically, in 1999:

- **Male probable pathological gamblers no longer outnumber females, although there remains a gender difference with respect to problem gambling**. In 1991, 80% of current probable pathological gamblers and 55% of current problem gamblers were males

- **People aged 18-24 years, previously the age group with the highest prevalence rate, have the second lowest rate after people aged 65 or older**

- **No unemployed people are identified as current probable pathological gamblers and only 0.2 percent are problem gamblers.** In 1991 29 percent of current probable pathological gamblers were unemployed and 12 percent of unemployed people were current problem or probable pathological gamblers.

Inter-relationships between Risk Factors

Many of the sociodemographic risk factors are correlated. For example, Mäori and Pacific Islanders are more likely to be young, have lower levels of formal education and lower incomes, be unemployed and live in Auckland. For this reason, considering individual sociodemographic or other risk factors in isolation can give a misleading account of their relative importance. In the present study, this matter was addressed by undertaking multivariate analyses (logistic regression and correspondence analysis) that examined groups of risk factors together.

With respect to <u>lifetime</u> problem and probable pathological gambling, the individual risk factors considered above were confirmed as significant predictors in one or both of the multivariate analyses conducted. Some additional risk factors emerged from these analyses. In both analyses, <u>Catholics</u> were at somewhat higher risk than people of other religions as were <u>people born outside</u> New <u>Zealand</u>, <u>Europe</u>, <u>Australia and North America</u>. In the logistic regression analysis, people <u>lacking formal qualifications</u> were also at somewhat greater risk. Both <u>Auckland</u> and <u>Christchurch residence</u> were associated with higher problem and probable pathological gambling prevalence.

With respect to <u>current</u> problem and probable pathological gambling, Mäori and Pacific Island ethnicity emerged as very strong predictors in both the logistic regression and correspondence analyses. Being born outside New Zealand, Europe, Australia or North America was also confirmed as a significant predictor in one of the analyses. In contrast to the situation with lifetime problem and probable pathological gambling, a number of additional predictors emerged in the multivariate analyses. In two of the analyses, <u>Catholicism</u> and <u>living in a household with an income of NZ$40,001-50,000</u> were significant. In the logistic regression, <u>Christchurch residence</u> also emerged as a relatively strong predictor and <u>other Christians</u> were found to be at relatively low risk. <u>Males</u> and people with <u>vocational or trade qualifications</u> also appeared to be at somewhat greater risk.

The finding of higher prevalence rates in some analyses for people living in Auckland and Christchurch relative to other parts of the country is consistent with the hypothesis that the introduction of urban casinos to these cities would generate additional gambling problems.

Other Risk Factors

A number of additional factors were examined to determine whether or not they differentiated problem and probable pathological gamblers from non-problem gamblers. In these analyses, the two problem groups were combined. As with the gambling participation risk factors, multivariate procedures were used and both current and lifetime problem gambling were considered.

From logistic regression analyses, risk factors that have the strongest relationship with both current and lifetime problem gambling include:

- Gambles as a hobby or habit
- Usually gambles alone
- Someone in the respondent's life has a gambling problem.

The factors associated with a <u>low</u> probability of both current and lifetime problem gambling include:

- Usually gambles with friends or co-workers
- Usually gambles for less than one hour.

In the case of lifetime but not current problem gambling, there appears to be a high risk associated with first commencing gambling before the age of 13 years or at 25 years or older. Gambling for excitement or challenge, usually gambling with other family members, and reporting first gambling in a casino or on gaming machines and first playing cards for money, are further risk factors for lifetime problem gambling.

In the case of current but not lifetime problem gambling, first purchasing Instant Kiwi tickets was an additional risk factor.

Cautionary Note

In a cross sectional survey of the type conducted here, it is not generally possible to clarify the temporal sequence of events and determine cohort effects. Additionally, statistical associations do not necessarily mean that variables are causally linked. Further research using stronger designs (e.g. longitudinal surveys and quasi-experimental studies) is required to examine the relationship between variables identified as risk factors and the development of problem gambling.

1. OVERVIEW AND PURPOSE OF THE STUDY

1.1 Introduction

This report outlines and discusses the main findings from phase one of the National Prevalence Survey (NPS), a major component of the 1998-1999 New Zealand Gaming Survey. Chapter One provides background information, an outline of the major survey objectives and definitions of some of the key terms used.

The New Zealand Gaming Survey (NZGS) was commissioned by the Department of Internal Affairs (DIA). The Department administers New Zealand's three pieces of gaming legislation and services the Lottery Grants Board, which distributes the profits from the Lotteries Commission to the community. Most of the funding for the NZGS research programme derives from the undistributed profits of the Lotteries Commission (applied to the project at the direction of the Minister of Internal Affairs). Some funding also comes from the Committee on Problem Gambling Management (COPGM), an organisation with representation from all major sectors of the gaming industry and problem gambling treatment providers. Notwithstanding the sources of funding, the project director's contract is with the Crown through the DIA and neither the Department nor any other organisation is empowered to control the research or to exercise editorial control over the publication of the research findings.

The other components of the NZGS include:
- Literature Review
- Longitudinal Followup
- National Prevalence Survey: Phase Two
- Prison Study
- Synthesis Report and Framework for Future Studies.

The terms of reference for the NZGS were developed by the DIA in consultation with a wide variety of statutory, industry and national voluntary sector organisations. The intent of the research is to inform government policy on gaming and responses to problem gambling and contribute to local and international scientific knowledge concerning aspects of gambling and problem gambling. It is also expected to provide information that has relevance to a variety of other stakeholder and end-user organisations with an interest in gambling and/or problem gambling.

The NZGS project director is Professor Max Abbott. He and Dr Rachel Volberg are the principal investigators, responsible for the overall design, execution and reporting on all phases of the research programme. Professor Abbott and Dr Volberg are part of a larger consortium that is undertaking the NZGS. In the case of phase one of the National Prevalence Survey (NPS-1), consortium partner Statistics New Zealand (SNZ) played a substantial role. SNZ involvement included developing aspects of the methodology, pre-testing the questionnaire developed by Professor Abbott and Dr Volberg, conducting the interviews, and producing output tables and data analysis in consultation with Professor Abbott.

Dr Volberg and Professor Abbott are also the principal investigators, with Professor Sten Rönnberg, in a similar national survey in Sweden. The report on the first phase of this

survey was formally launched in Stockholm at the end of May 1999 by the Swedish National Institute of Public Health (Rönnberg, Volberg & Abbott et al, 1999). Sweden, like New Zealand, has recently introduced a number of new forms of gambling and has similar per capita gambling expenditure to that of New Zealand. Some comparisons will be made between the findings of the Swedish and New Zealand surveys in this report. More detailed comparisons will be made following completion of the second phases of both studies.

A previous DIA commissioned national gambling and problem gambling prevalence study was completed in New Zealand during 1991 (Abbott & Volberg, 1991; 1992; 1996: Volberg & Abbott, 1994). Since the 1991 survey, there has been an increase in the number of different types of legal gambling available in New Zealand. Gambling expenditure has also increased significantly. This raises questions about the impacts of these changes on gambling participation and problem gambling within the general population. While differing in some respects methodologically, the 1991 and 1999 national surveys are sufficiently similar to enable some comparisons to be made between their major findings.

Although there have now been 14 follow-up or 'replication' surveys of community gambling participation and problem gambling prevalence conducted internationally, this is the first replication that is national in scope. It also differs from previous studies of this type in that the sample size is much larger and both the 1991 baseline and 1999 repeat surveys involve two phase or double sampling designs.

The large sample used in the present study allows increased numbers of comparisons to be made between subgroups and facilitates the examination of relationships between variables of theoretical and/or practical interest. It also increases the confidence that can be placed in the major findings of the survey such as estimates of participation in particular forms of gambling and problem gambling prevalence.

Repeat surveys involve an initial (baseline) study followed by one or more subsequent surveys, typically some years apart, using similar or identical methods. This type of investigation, by providing probes of the population at different points of time, gives an indication of stability or change over time in the numbers and characteristics of people who engage in different types of gambling and/or who report experiencing problems associated with their gambling. While repeat surveys and longitudinal surveys both examine change over time, longitudinal surveys differ in that they study the same individuals on two or more occasions. The NZGS includes a longitudinal follow-up of 1991 national survey phase two participants (Abbott, Williams & Volberg, 1999). Reference will be made to some of the findings of this longitudinal study in the present report.

The first phase of a two-phase survey or double sampling investigation is often the same as that of other prevalence surveys. It involves gathering information from a sample of respondents drawn from the general population, typically by telephone or face-to-face interviews. In the present study, consistent with the 1991 national survey, telephone interviews were used in phase one. This was followed by a second phase of data collection from a sub-sample of first phase participants. Second phase data collection usually involves face-to-face interviewing. In addition to interviewing, second (or subsequent) phases may involve the completion of written questionnaires or psychological tests.

Two-phase designs facilitate the collection of more detailed information from respondents of particular interest. In phase two of the National Prevalence Survey, sub-samples of

problem and probable pathological gamblers, frequent continuous, frequent non-continuous and infrequent gamblers have been re-interviewed face-to-face. By supplementing the initial problem gambling screening test with fuller clinical examination or additional measures of problem gambling, two-phase designs also have the potential to increase understanding of how performance on the screen relates to similar measures. In some situations it is possible to use this information to refine problem gambling prevalence estimates obtained from first phase surveys (Abbott & Volberg, in press; Gambino, in press).

Two phase investigations are widely advocated and are not uncommon within the general field of epidemiology. However, apart from the initial 1991 New Zealand national survey, the current Swedish national survey and a small scale study in Alberta, Canada (Wynne, Smith & Volberg, 1994), the present study appears to be the only other two-phase investigation in the gambling field. Data from phase two will be published in a separate report.

1.2 Gambling and Problem Gambling

Gambling

Gambling or gaming (these terms are used interchangeably throughout this report and in other NZGS reports) refer to a variety of activities which have in common the risking of something of value in exchange for something of greater value (Thompson, 1997). These activities are also generally widely regarded as forms of gambling within the community and/or are defined as such for regulatory or taxation purposes. More detailed consideration of the definition and characteristics of gambling is provided in Abbott and Volberg (1999).

There is archaeological and historical evidence of gambling activities in many ancient civilisations and in most parts of the world. However, some tribal societies do not appear to have had a history of gambling prior to colonial times (Abbott & Volberg, 1999). Relevant to the present study, there are indications that Mäori and some Pacific Island societies are in this category. A number of Polynesian languages do not have a word for gambling (North Health, 1996).

Attitudes towards gambling and the degree of control exercised by state and other authorities over gambling have varied considerably between different countries and over time within countries (Abbott & Volberg, 1999). Within most Western societies, gambling has long been condoned among the upper classes. Despite the efforts of reformers, similar activities have been broadly tolerated among the working and lower classes. However, until the latter part of the 20th century, gambling was discouraged among the middle classes (Rosecrance, 1988). It is likely that the growth of the middle classes, associated with urbanisation and the enfranchisement of women, played a significant part in the late 19th-early 20th Century prohibition movement that focussed on curbing the excesses of both alcohol and gambling (Grant, 1994; Phillips, 1987). Considering the expansion and influence of the middle classes, growing acceptance of gambling by this socioeconomic group has very likely been a major factor in the legitimisation of gambling worldwide (Rosecrance, 1988).

During the past twenty years there has been a rapid proliferation of legal gambling. With the exception of many Islamic states, gambling is now a popular pastime in most parts of the world, and official and public attitudes are generally more accepting than they were ten or more years ago. However, as was the case during earlier periods of gambling expansion, there is evidence of growing public and governmental concern about perceived and actual adverse social impacts in a number of countries including New Zealand (Abbott & Volberg, 1999).

Abbott and Volberg (1999) identify a number of emerging, inter-related trends that they expect will continue to influence the future evolution and expansion of gambling. While noting previous phases of expansion and contraction in particular cultures and societies, Abbott and Volberg suggest that these trends make the present global spread of gambling qualitatively different from what has occurred before. They argue that these changes blur traditional distinctions between various forms of gambling and make them difficult to regulate.

During the present expansionary era, until quite recently, the legalisation of gambling proceeded with little consideration of the potential negative impacts that gambling can have on individuals, families and communities (Volberg & Dickerson, 1996). During the past decade there has been increased awareness that gambling-related problems exist and may be exacerbated by policies that promote or allow the expansion of gambling opportunities. Some governments, including the New Zealand government, have facilitated the development of services for people who experience gambling-related problems and commissioned research to provide information about the number of people in the community who have such problems (Abbott & Volberg, 1999; Volberg, Dickerson, Ladouceur & Abbott, 1996).

As implied above, gambling is a broad concept. It includes a wide variety of activities, conducted in a diversity of settings, appealing to different sorts of people and perceived in various ways by participants and observers. Differentiation between various forms of gambling within the market place is recognised by gaming industry and marketing executives. Lack of appreciation of this diversity limits both the scientific understanding of gambling and the assessment of the possible adverse and positive social impacts of various forms of gambling.

A number of different classification frameworks have been developed for gambling activities. One that has wide acceptance emphasises the degree of skill and luck involved (Volberg & Banks, 1994; Walker, 1992). Activities such as housie (bingo) and lotteries as well as the traditional casino game of roulette are located at the pure chance or luck end of the skill-luck continuum. Chess or dart games lie near the skill end of the continuum. Many forms of gambling involve a combination of skill and luck, e.g. card games such as baccarat, blackjack and poker. Other activities in this category include track and sports betting. Some forms including gaming machines and roulette involve an element of 'perceived skill', in that players believe they can influence the outcome through skill even though the game is based on pure chance.

Event frequency - the number of opportunities to gamble in a specified period of time - is another important feature that has been used to differentiate gambling activities (Griffiths, 1998a). A number of forms of gambling, e.g. video gaming machines, involve rapid cycles of stake, play and determination. These forms have been referred to as continuous types (Abbott & Volberg, 1992). Others are much slower and have been referred to as non-

<u>continuous</u>. As with the skill-luck dimension, gambling activities can be ranked along a continuum ranging from very rapid to infrequent (Abbott & Volberg, 1999; Griffiths, 1998a).

Walker (1992), among others, has argued that gambling activities involving an intermediate mix of skill and luck provide opportunities for escalating the size of bets, chasing losses and both betting and losing more than intended. For this reason, these forms are considered to be more likely than others to lead to problems among regular participants. Findings from a number of studies are consistent with this proposed linkage (Abbott & Volberg, 1999; Walker, 1992). Research also suggests that 'continuous' forms of gambling are associated with problem gambling development (Abbott & Volberg, 1999). Although many of these latter forms involve little or no skill, as indicated, many participants believe that they do.

Abbott and Volberg (1999) and Griffiths (1998a) have argued that with the advent of new technologies and the rapid evolution of gambling, past distinctions between major forms of gambling are starting to break down. Austrin (1998) illustrates how traditional distinctions between track betting, lotteries, gaming machines and casinos are becoming blurred in New Zealand and argues that these changes are likely to lead to a major reorganisation of the gambling industry. In addition, almost every type of gambling currently offers faster cycling games with increasing levels of play and this is a trend that is expected to continue (Griffiths, 1998b).

Problem Gambling

Most people who take part in gambling activities presumably do so because they derive some form of satisfaction from their participation. Although little investigated, some patterns of gambling involvement may contribute to personal wellbeing, self-esteem and mental health (Volberg, Reitzes & Boles, 1997). Whether or not gambling contributes to wellbeing, the majority of people who gamble are social gamblers who usually do not risk more than they can afford to lose. If they do 'chase' losses to get even, this is done briefly. However, as with alcohol and other forms of drug use, a minority of people who gamble develop problems of varying severity and duration. Some experience debilitating, enduring gambling-related problems that also generally result in harm to people close to them and to the wider community.

Although there are numerous historical and literary references to problem gambling, until relatively recently, it was widely regarded as a character flaw or moral vice rather than a mental disorder (Abbott & Volberg, 1999; Wildman, 1998). In this regard it is similar to the excessive use of alcohol and some other substances that are now considered to be mental disorders.

In 1977 <u>pathological</u> <u>gambling</u> was included in the Ninth Edition of the International Classification of Diseases (ICD 9) and, in 1980, in the third edition of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-III) (American Psychiatric Association, 1980). As with other psychiatric disorders, the specific diagnostic criteria for pathological gambling have changed somewhat in subsequent editions of the DSM. These changes are outlined in Figure 1.

Currently, essential features of pathological gambling are deemed to include:

- A continuous or periodic loss of control over gambling;

- A progression, in gambling frequency and amounts wagered, in the preoccupation with gambling and in obtaining monies with which to gamble; and
- Continuation of gambling involvement despite adverse consequences (American Psychiatric Association, 1994).

A formal diagnosis of pathological gambling is arrived at by an appropriately qualified and experienced clinician (typically a psychiatrist or clinical psychologist) following an extensive clinical interview with a client or patient. Clinical interviews include taking a detailed life history, asking questions and making observations specific to pathological gambling and undertaking similar examinations with respect to other aspects of mental health status.

Often, this information is supplemented by an interview with family members or other people who know the patient well and examination of previous relevant clinical documentation.

To make a diagnosis of pathological gambling, the clinician is required to determine that a patient has met a specified minimum number of the diagnostic indicators listed in the DSM, with this number being five in the case of the DSM IV.

With many DSM-IV disorders, the diagnostician must establish that the particular pattern of signs and symptoms were met within a specified time period. This is not the case with pathological gambling. With pathological gambling, it is not necessary for the five or more relevant diagnostic indicators to have been present for a finite interval (e.g. during the past 12 months) or to have clustered together at some time in the past. The diagnosis is made on the basis of the patient's cumulative experience of gambling-related problems. This rests on the assumption that pathological gambling, like many forms of drug dependence, is a chronic or relapsing disorder.

Prior to the inclusion of pathological gambling in the major international classifications of diseases and mental disorders, severe forms of problem gambling were widely referred to as 'compulsive gambling'. In clinical and scientific contexts in most parts of the world, including New Zealand, the diagnostic term 'pathological gambling' has superceded its older counterpart (Ministry of Health, 1996).

The term 'problem gambling' is used in a variety of ways. In this report, consistent with the United States National Council on Problem Gambling usage, it refers to all of the patterns of gambling behaviour that compromise, disrupt or damage personal, family or vocational pursuits (Cox, Lesieur, Rosenthal & Volberg, 1997). With respect to this usage, pathological gambling can be regarded as a sub-category of problem gambling, referring to those problem gamblers at the extreme end of a problem gambling continuum who meet five or more of the DSM-IV diagnostic criteria.

Figure 1: American Psychiatric Association Pathological Gambling Criteria

DSM-III Criteria (1980)

A. The individual is chronically and progressively unable to resist impulses to gamble.

B. Gambling compromises, disrupts, or damages family, personal and vocational pursuits, as indicated by at least three of the following:

1. Arrest for forgery, fraud, embezzlement; or income tax evasion because of attempts to obtain money for gambling

2. Default on debts or other financial responsibilities

3. Disrupted family or spouse relationship because of gambling

4. Borrowing of money from illegal sources (loan sharks)

5. Inability to account for loss of money or to produce evidence of winning money, if this is claimed

6. Loss of work because of absenteeism to pursue gambling activity

7. Necessity for another person to provide money to relieve a desperate financial situation

C. The gambling is not caused by Antisocial Personality Disorder.

DSM-III-R Criteria (1987)

Maladaptive gambling behaviour as indicated by at least four of the following:

1. Frequent preoccupation with gambling or with obtaining money to gamble

2. Frequent gambling of large amounts of money or over a longer period of time than intended

3. A need to increase the size or frequency of bets to achieve the desired excitement

4. Restlessness or irritability if unable to gamble

5. Repeated loss of money by gambling and returning another day to win back losses ('chasing')

6. Repeated efforts to reduce or stop gambling

7. Frequent gambling when expected to meet social or occupational obligations

8. Sacrifice of some important social, occupational, or recreational activity to gamble

9. Continuation of gambling despite inability to pay mounting debts, or despite other significant social, occupational, or legal problems that the person knows to be exacerbated by gambling.

DSM-IV Criteria (1994)

A. Persistent and recurrent maladaptive gambling behaviour as indicated by five (or more) of the following:

1. Is preoccupied with gambling (e.g. preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)

2. Needs to gamble with increasing amounts of money in order to achieve the desired excitement

3. Has repeated unsuccessful efforts to control, cut back or stop gambling

4. Is restless or irritable when attempting to cut down or stop gambling

5. Gambles as a way of escaping from problems or relieving a dysphoric mood (e.g. feelings of helplessness, guilt, anxiety, depression)

6. After losing money gambling, often returns another day to get even ('chasing' one's losses)

7. Lies to family members, therapists, or others to conceal the extent of involvement with gambling

8. Has committed illegal acts such as forgery, fraud, theft or embezzlement in order to finance gambling

9. Has jeopardised or lost a significant relationship, job or educational or career opportunity because of gambling

10. Relies on others to provide money to relieve a desperate financial situation caused by gambling

B. The gambling is not better accounted for by a manic episode.

Problem gambling will also be used in this report to specify those people who fail to satisfy these criteria yet experience at least three gambling-related problems as assessed by a clinical interview or psychometric test. The alternate meanings should be evident from the context in which the term is used.

Measuring Problem Gambling

Since pathological gambling was included in psychiatric diagnostic classifications, a number of methods have been developed to measure problem and pathological gambling. These methods are outlined and discussed in Abbott and Volberg (1999) and Rönnberg, Volberg and Abbott et al (1999). They vary with respect to the degree to which their psychometric properties, including validity and reliability, have been formally assessed.

The first screen developed to measure pathological gambling was part of the comprehensive Diagnostic Interview Schedule (DIS), designed to provide diagnoses for a wide variety of mental disorders in community surveys. The DIS was first used in the Epidemiological Catchment Area Studies in the United States during the early 1980s and subsequently employed in a number of other countries. The pathological gambling component of the DIS was used in only a few of these general psychiatric epidemiological surveys. It is mentioned here because it was included in a survey of this type in Christchurch, New Zealand, conducted in 1986 (Wells et al, 1989; 1992). The early version that was used in Christchurch involved only a small number of items and was not adequately validated or assessed as a psychometric instrument.

The most widely used measure based on DSM criteria is the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987) and subsequent modifications to it, particularly the SOGS-R (Abbott & Volberg, 1991; 1992; 1996). The original SOGS was developed in the United States for use as a screening instrument in clinical settings. Soon after its development, it was adapted for use in community surveys and has since been widely used for clinical purposes and in community surveys of problem gambling in a number of different countries (Volberg & Dickerson, 1996).

The SOGS was based on DSM-III criteria and validated against the DSM-III-R. It has high test-retest reliability and internal consistency and its diagnostic efficiency was impressive in the original validation groups, namely Gamblers Anonymous members, university students and hospital workers.

The original SOGS was modified for the 1991 New Zealand National Survey of Problem and Pathological Gambling to provide a measure of both <u>current</u> (past six months) and <u>lifetime</u> problem and probable pathological gambling. The addition of a current measure in the revised SOGS (SOGS-R) arose from the concern of the investigators to bring problem gambling studies into line with the epidemiological investigation of most other psychiatric disorders. While there is some interest in how many people in the population have ever experienced a particular disorder, there is generally more concern to know how many people there are who currently experience it. Current prevalence estimates are of greater relevance for the planning of prevention or treatment programmes. The six-month timeframe was chosen because it is commonly employed in the epidemiological investigation of other mental disorders. This elaboration of the SOGS is, however, a departure from the way pathological gambling is conceptualised and diagnosed in the DSM-III, DSM-III-R and DSM-IV. In contrast to the DSM assumption that pathological gambling is a chronic or progressive disorder, implicit in the SOGS-R is the possibility that

the course of pathological gambling can be variable or episodic and, for some people, is transient.

Reference was made in the last paragraph to <u>probable</u> pathological gambling. Use of this term indicates that the people thus classified have been identified on the basis of their score on a screening assessment rather than diagnosed by a clinical interview conducted by a mental health professional.

Since the SOGS-R was developed in 1991 there have been over 40 prevalence surveys that have used this instrument or alternatives based closely on it (Abbott & Volberg, 1999). However, other than the 1991 New Zealand national study, one survey in South Dakota in the United States and state level surveys in Australia, these prevalence surveys have used a 12 rather than six month time frame for the current measure. Only the present study, its 1991 counterpart, and the recent Swedish (Rönnberg, Volberg & Abbott et al, 1999) and Australian (Productivity Commission, 1999) surveys, have been national in scope.

A major reason why the SOGS and SOGS-R have been so widely used in both clinical and epidemiological research is that the use of a standard measure facilitates comparisons across different populations and over time within the same population. Walker and Dickerson (1996) contend that the SOGS is the only currently validated measure available for this purpose.

The SOGS has been shown to have a high level of diagnostic accuracy when used in clinical contexts. However, apart from the 1991 New Zealand national survey that provided some relevant information, the diagnostic efficiency of the SOGS and SOGS-R has not been fully established in community surveys. Without this validation, it is unclear to what extent population prevalence estimates correspond to what would be obtained from psychiatric diagnostic interviews (Abbott & Volberg, 1999).

Despite this lack of full validation in population research, the SOGS and SOGS-R remained the de facto 'gold standard' in studies of adult problem gambling until the late 1990s. During the past few years, some concerns have been expressed about these measures and, following publication of the DSM-IV, a number of new measures have been developed (Abbott & Volberg, 1999). With regard to this matter, Abbott, Williams & Volberg (1999) comment:

> Despite the recent proliferation of measures of problem gambling, including at least five based on DSM-IV criteria, in contrast to the SOGS and SOGS-R, the psychometric properties of these tools have yet to be fully examined. None of them has, to date, been adequately assessed for their differential performance in clinical settings, programme evaluation or survey research. A further concern is that only a few studies have used the new measures alongside the SOGS or SOGS-R. Although these studies generally obtained high correlation between one of the new measures, namely the Fisher DSM-IV Screen, and the SOGS-R (suggesting that they are measuring essentially the same thing) a great deal more investigation of this type is required. Without this calibration of different measures, it will not be possible to link research that incorporates these new instruments with the large international body of SOGS and SOGS-R based research (p.18).

In their critical review and meta-analysis of North American problem gambling prevalence studies, Shaffer, Hall and Vander Bilt (1997) concluded that problem gambling is a 'robust phenomenon' in that broadly consistent findings have emerged from studies undertaken by

a variety of investigators using different measures of varying quality. The present authors (Abbott & Volberg, 1999) recently concluded that this assessment also holds for the wider international problem gambling prevalence literature.

Figure 2 summarises Abbott and Volberg's (1999) conceptualisation or model of problem gambling. It also relates problem gambling definitions to measures that operationalise these constructs. The model adds a temporal dimension and rests on the assumption that people can move either way along problem gambling severity continua. Not all of the categories indicated can be readily assessed by current diagnostic or screening measures and the allocation of people to some of these categories requires longitudinal study and repeat assessment.

1.3 Gambling in New Zealand

Origins

The first thoroughbred horse was imported to New Zealand in 1840, the year in which the Treaty of Waitangi was signed and New Zealand became a colony of Great Britain. Well-attended horse races and betting on their outcomes were recorded during the 1840s (Grant, 1994). As in the earlier frontier settlement of North America, Australia and many other parts of the world, gambling and alcohol consumption played an important role in the lives of the new settlers. Despite efforts on the part of missionaries and some Mäori tribal leaders to restrict gambling participation, gambling also appears to have been rapidly adopted by Mäori who did not apparently have a prior history of gambling (Grant, 1994).

As in North America and many European countries during the latter part of the 19th Century, legislative and other measures were taken in New Zealand to attempt to curtail gambling. This is reflected in the title of New Zealand's first significant gambling legislation, passed in 1881, namely 'An Act for the suppression of Gaming and Betting Houses and the more effectual abolition of Lotteries'.

Although variably enforced, further legal restrictions were introduced during the early decades of the twentieth century. However, a state lottery (Art Union) was established in 1929 and, from the 1930s, legislation gradually became more permissive. O'Sullivan and Christoffel (1992) outline how the government's emphasis shifted over time from attempting to ban most forms of gambling to ensuring that revenue went to non-profit-making organisations.

Relative to the United States and most other Western societies, New Zealand has had a relatively tolerant approach to gambling, although less so than that of most if not all of the Australian states (Abbott & Volberg, 1999).

Figure 2: Classification of Problem Gambling

Shaffer, Hall & Vander Bilt (1997) Levels	Abbott & Volberg (1999) Framework	SOGS/SOGS-R DSM-IV score
Level One	**Non-gambler or Non problem Gambler[a]**	
Represents the proportion of the population that does not experience problems	NG Never gambled	
	NP1 Non–problem gambler currently and in past	0-2 current 0-2 lifetime
	NP2 Non-problem gambler currently but a problem gambler in the past	0-2 current 3-4 lifetime
	NP3 Non-problem gambler currently but a probable pathological gambler in the past	0-2 current 5+ lifetime
Level Two	**Problem Gambler**	
Represents gamblers with sub-clinical levels of gambling problems	PG1 Problem gambler currently but not in the past [b]	3-4 current 0-2 lifetime
	PG2 Problem gambler currently and a problem gambler in the past[b]	3-4 current 3-4 lifetime
	PG3 Problem gambler currently and a probable pathological gambler in the past[b]	3-4 current 5+ lifetime
Level Three	**Probable Pathological Gambler**	
Represents the most severe form of disordered gambling[c]	PPG1 Probable pathological gambler currently but not in the past[b]	5+ current 0-4 lifetime
	PPG2 Probable pathological gambler currently and in the past[b]	5+ current 5+ lifetime
	PathG Pathological gambler diagnosed as a pathological gambler by a clinician using current diagnostic criteria	5+ current and/or lifetime

Note

[a] All categories can also be subdivided into those where the respondent states that he or she has a gambling problem and those where the respondent does not.

[b] Separation of these categories requires longitudinal study with repeated assessments or the development of a questionnaire or interview schedule that allows past or 'lifetime' assessment independently of current state.

Measuring Gambling Participation and Expenditure

In recent times, two general approaches have been used to assess gambling participation within populations, namely the collection and examination of aggregate expenditure data and undertaking general population surveys.

The first method uses financial information from government or industry sources. Information on turnover (total expenditure) and consumer losses (net expenditure) are available in New Zealand. Although accessible, this type of information is of variable accuracy and the specific definitions used vary over time. Internationally, different jurisdictions use somewhat different methods of data collection and classification. For these reasons, caution is required when making comparisons over time or between different countries.

The second method involves general population surveys that ask respondents which forms of gambling they participate in, how often they participate and how much they spend. Survey information is subject to errors from sampling and measurement. Since samples and methodology differ between studies, sometimes markedly, considerable caution is necessary when the findings of such studies are compared.

Between 1985 and 1996, a number of relevant gambling participation studies were conducted in New Zealand, including the 1991 national survey referred to above.

An overview of gambling in New Zealand, based on official data sources, is provided here. The major findings from New Zealand population surveys are summarised and discussed in Chapter Two.

Recent Gambling Expenditure

During the 1970s and most of the 1980s, legal gambling in New Zealand was largely confined to on- and off-course betting on horse and dog races and the state lottery, Golden Kiwi. Significant numbers of people also engaged in housie (bingo), charitable raffles and 'casino' evenings, prize competitions and a variety of other forms of gambling, both legal and illegal. Most expenditure, probably 70 to 80 percent, went on track betting. Throughout this period, legal gambling expenditure remained fairly constant, in most years making up slightly less than one percent of total household expenditure (Department of Internal Affairs, 1990).

During the latter years of the 1980s, prior to the 1991 national survey, a number of new forms of gambling were introduced. Lotto was launched in 1987. Gaming machines were licensed to operate in hotels and clubs during 1988 although, at the time of their licensing, large numbers were already operating illegally (Department of Internal Affairs, 1995b). In 1989, Instant Kiwi (an instant scratch lottery) was added. The introduction of these new types of gambling was associated with a rapid rise in gambling expenditure. From 1987 to 1990, expenditure increased by just over 100 percent and, in the 1989/1990 financial year, accounted for 1.5 percent of household expenditure (Department of Internal Affairs, 1995b).

Since the 1991 national survey was conducted, a number of additional forms of gambling have been introduced. These forms include:

- Daily horse/dog racing on a [track-side] free to air national television channel combined with facilities for telephone betting
- Hotel/pub TABs
- Urban casinos in the major metropolitan centres in the North and South Island, namely Christchurch (in 1994) and Auckland (in 1996)
- Daily Keno
- TeleBingo
- Sports betting
- 0900 telephone 'competitions'.

Apart from the introduction of new forms of gambling, the number of gaming machines has steadily increased. In January 1995 there were 8,303 machines located outside casinos. The number had risen to 12,454 by January 1998. During this period, machines per venue and the size of prizes and jackpots also increased. More recently, the Internet has provided access to a wide variety of gambling activities.

In the year that the 1991 national survey was conducted, national annual expenditure on major forms of legal gambling was NZ$575 million. In 1998, annual expenditure was just over NZ$1 billion. Turnover exceeded NZ$6 billion. This indicates significant growth in expenditure since 1990. However, the rate of this growth was slower than the doubling that was evident during the three years immediately prior to the 1991 survey. Expenditure on major forms of gambling from 1979 to 1998 is outlined in Table 1. Total and relative expenditure on major forms of gambling for the years 1984, 1991 and 1998 is illustrated in Figure 3.

From Table 1 and Figure 3 it is evident that in 1984, track betting (betting on horse and dog races) was the dominant form of legal gambling. In 1991, at the time of the national survey, lotteries (primarily Lotto) and track betting accounted for the great majority of expenditure. In 1998, each of the four major categories of gambling accounted for significant portions of expenditure with gaming machines and lotteries receiving top rankings, followed by casinos and track betting.

1.4 Gambling: Some International Comparisons

In their report on the Swedish National Survey of Gambling and Problem Gambling, Rönnberg, Volberg and Abbott (1999) provide 1997 comparative data on gambling expenditure and participation in the United States, Australia and New Zealand. A summary of these comparisons is included here.

United States

In 1997, gambling turnover totalled US$639 billion and net expenditure totalled US$51 billion. This represents a mean expenditure of approximately US$255 for each adult during that year. Casino turnover exceeded turnover of all other forms of gambling combined. The other major categories, in descending rank order, were Native American gaming, lotteries, horse betting, video lotteries, charitable games and greyhound betting.

Figure 3: Total Gambling Expenditure and Relative Expenditure on Major Forms of Gambling in New Zealand: 1984, 1991, and 1998

1991

1984

Gaming
Machines
19%

Lotteries 20%

Lotteries
42%

Racing
80%

Racing
39%

Total $191 million

Total $575 million

1998

Casinos
23%

Lotteries
28%

Gaming
Machines
28%

Racing
21%

Total $1045 million
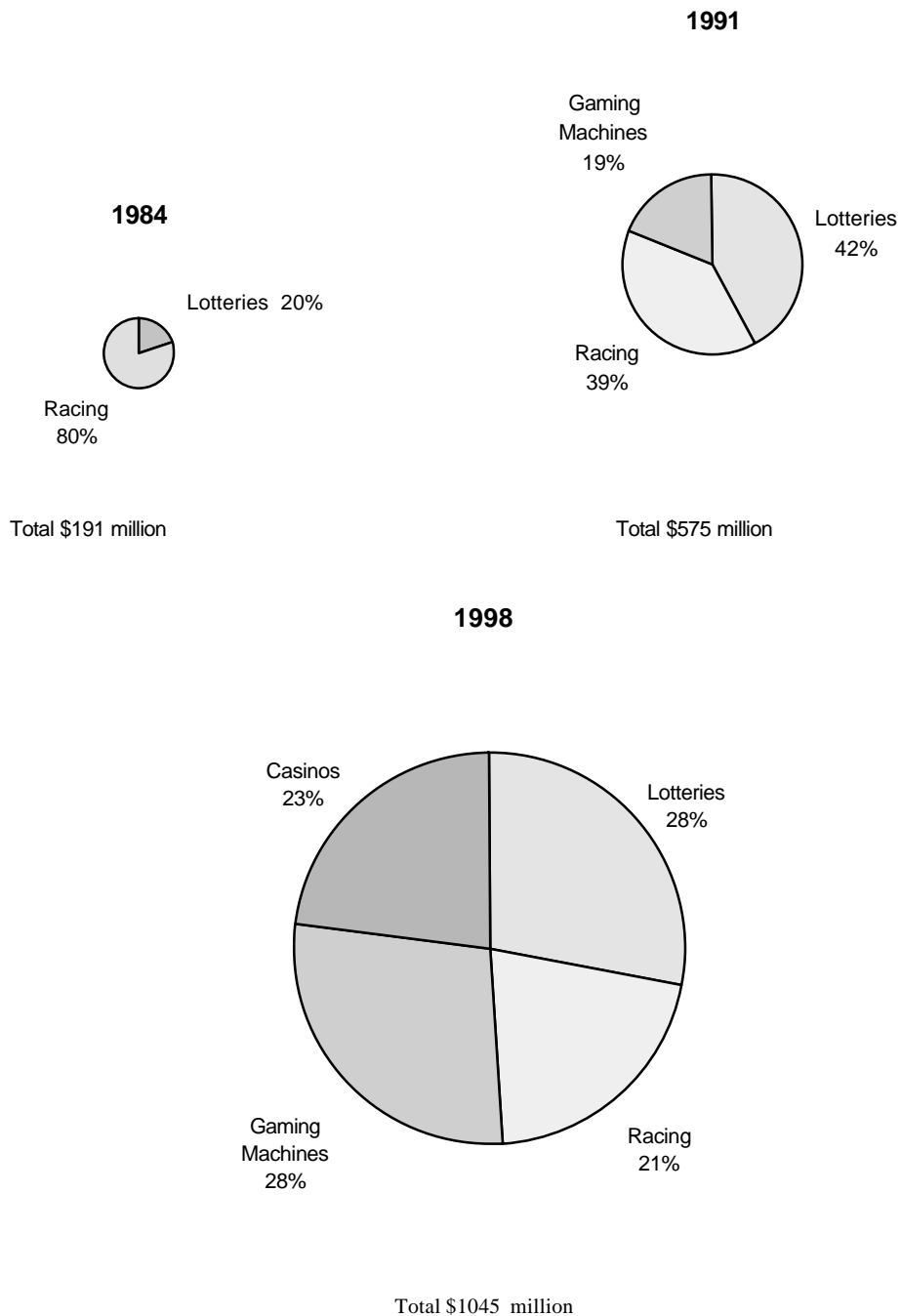
Note: Prepared from information provided by the Department of Internal Affairs

Table 1: Total Expenditure for Major Forms of Gambling in New Zealand 1979-1998[1]

Year	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Racing	89	96	106	127	140	152	164	181	211	220
Lotteries	13	22	26	28	28	39	40	40	38	95
Gaming Machines										
Casinos										
Total	102	118	132	155	168	191	204	221	249	315
Year	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Racing	232	230	222	203	198	199	209	212[3]	217	220
Lotteries	194[2]	252	246	250	247	270	275	281	285	288
Gaming Machines			107	110	122	145	171	197	230	292
Casinos							40	117	241	245
Total	426	482	575	563	567	614	695	807	973	1045

Note:

(1)   Actual (non-inflation) adjusted for the year end 30 June, rounded to the nearest NZ$ million. Source: Department of Internal Affairs.

(2)   The 1989 figure for the NZ Lotteries Commission is for 15 months as the financial year changed from 31 March to 30 June.

(3)   Racing data for 1996 onwards include sports betting.

Native American gaming refers to forms of gambling conducted within Native American tribal jurisdictions.

The recent national survey of gambling and problem gambling (Gerstein, Volberg, Murphy & Toce et al, 1999) found that 86 percent of the adult population reported having gambled at some stage in their lives, with 63 percent in the past 12 months. State level surveys conducted during the 1980s and 1990s show that there is considerable variation on both measures across states, with past year rates ranging from 49 to 89 percent.

Australia

In 1997, total gambling turnover was A$80 billion and net expenditure totalled approximately A$10 billion. This represents a mean expenditure of A$736 per adult, a figure probably higher than that of any other country. Almost half of total gambling expenditure was on gaming machines followed by casinos, track betting, lotteries, bingo and charity raffles. In three jurisdictions (New South Wales, Northern Territory and Victoria) per capita adult expenditure exceeded A$800 while in Tasmania it was less than A$500. Until July 1999, there had been no national surveys of gambling participation and expenditure in Australia. However, a number of state level surveys were conducted during the 1990s. From these surveys it appears that over 90 percent of Australians have gambled at some time. The most recent past year participation rates from five states varied from 65 to 89 percent.

Four of the five states had past year participation rates that exceeded 78 percent. The recent national survey found that 82 percent of Australians reported having participated in

some form of gambling in 1997-1998 and that 40 percent gambled weekly or more often (Productivity Commission, 1999).

New Zealand

Total gambling turnover in New Zealand during 1997 was approximately NZ$5.5 billion and net expenditure was just under NZ$1 billion. The adult per capita expenditure was approximately NZ$360, less than half that of Australia. In New Zealand lotteries, (including instant lotteries), accounted for nearly 30 percent of gambling expenditure, followed by casinos (25%), gaming machines (24%) and track betting (22%).

New Zealand survey participation data will be reviewed shortly and additional information from the current national survey will be presented in the results section of this report.

1.5 Problem Gambling and Problem Gambling Services in New Zealand

As had been the case with alcohol misuse and dependence, mutual help organisations preceded the significant involvement of mental health professionals or services in providing specialist assistance to problem gamblers. The first Gamblers Anonymous (GA) group in New Zealand was formed in Christchurch during 1978. Shortly afterwards, another chapter formed in Auckland. The first author of this report was invited to attend some of the Christchurch group's initial meetings and assisted in fostering links with mental health agencies and professionals. At that time, participants were almost exclusively European New Zealand men in their 30s or older whose major form of gambling was track betting.

In 1989, following the introduction of new forms of gambling, the New Zealand government commenced a review of gambling legislation and established a review committee that reported in 1990 (Department of Internal Affairs, 1990). The Committee examined previous research on gambling in New Zealand and received submissions from various organisations and individuals. In the same year that the Committee was receiving submissions, another committee reported on the feasibility of introducing casinos (Committee of Inquiry into Casinos, 1989). Both committees concluded that there was a lack of objective information about problem gambling in the community. They acknowledged that problem gambling did exist in New Zealand but noted that there was considerable uncertainty regarding its scale. They further noted that growth in gambling opportunities could contribute to problem gambling. The Review Committee recommended that research be undertaken to establish the prevalence of problem gambling in New Zealand. This recommendation was acted on by way of the Department of Internal Affairs commissioning the 1991 national survey.

At the time of the 1991 national survey, other than a few GA groups in major population centres, there were no specialised counselling or treatment services in New Zealand for problem gamblers or for family members and others whose lives were adversely affected by their relationship with a problem gambler. Some pathological gamblers were known to have sought help from psychologists working in various settings including the Department of Justice Psychological Service, alcohol and drug centres and mental health services. However, there was no specialist training for these or other mental health professionals and it was not known how many pathological gamblers were engaged in counselling or treatment.

Although receiving little or no attention from mental health service providers, there were, nevertheless, indications that New Zealanders had some awareness of problem gambling. A 1985 general population survey, commissioned by the Department of Internal Affairs, found that 66 percent of respondents agreed that 'there is a problem in New Zealand with people being heavily involved with gambling'. A similar percentage (65%) agreed that 'special help should be made available for people who want to give up gambling' (Wither, 1987). The issue of problem gambling received some media attention during the latter years of the 1980s, in association with the introduction of new forms of gambling and public debate concerning the possible establishment of casinos.

The Department of Internal Affairs conducted another public opinion survey in 1990 (Christoffel, 1992). In 1990, 71 percent of respondents agreed that gambling problems existed and 91 percent agreed that special help should be provided.

Reports arising from the 1991 national problem gambling survey were officially launched in Parliament and provided a focal point for national seminars jointly hosted by the Ministers of Internal Affairs and Health. The survey findings also received considerable media attention and played a part in stimulating the development of services for problem gamblers during the 1990s. These services, which were initially funded by the Lottery Grants Board, included a national telephone help-line, clinics and support for some existing drug and alcohol residential facilities that admitted small numbers of pathological gamblers. Subsequently, higher levels of funding were provided for these and other services by the Committee on Problem Gambling Management (COPGM) by way of contributions from major sectors of the gaming industry.

These service developments appear to have been in keeping with public opinion. When the Department of Internal Affairs repeated its 1985 and 1990 surveys in 1995, 77 percent agreed that gambling problems existed and 97 percent agreed that specialist help should be made available (Reid & Searle, 1996). The majority (74%) indicated that the gaming industry should provide funding for this assistance by a tax or levy.

During 1998, COPGM provided NZ$2.2 million for problem gambling services. This included funding for a national help-line, counselling centres in various parts of the country, a residential programme, Mäori and Pacific Island pilot programmes, education and publicity services for members of the community and health professionals, and research related to treatment. This fund increased to NZ$2.75 million in 1999.

Information on the utilisation of the help-line and counselling services is provided in Chapter Two.

1.6 Major Objectives and Aims

The general aim of the study outlined in this report is to advance scientific understanding of the nature of gambling and problem gambling in the general New Zealand adult population, particularly with respect to their prevalence. Other major objectives are to:

- Provide information that will assist in the development of gaming and related health and social policy and contribute to robust frameworks for future studies of the prevalence and wider economic and social impacts of gambling and problem gambling, and

- Provide a solid baseline to enable assessments of future changes in the national prevalence of problem gambling and gambling participation to be made.

Key outputs are to:

- Provide reliable lifetime and current prevalence estimates of probable pathological gambling and problem gambling in the total population aged 18 years and over

- Provide reliable estimates of the proportion of the total population aged 18 years and over in the following groups - never gambled, infrequent gambler, regular non-continuous gambler and regular continuous gambler, and

- Provide reliable estimates of the proportion of the total population aged 18 years and over who participate in the most popular forms of gambling once a week or more.

Phase one of the National Prevalence Survey (NPS-1) also aims to provide the following information at a lower level of accuracy:

- A sociodemographic profile of problem and pathological gamblers

- A measure of change in the prevalence of problem and probable pathological gambling since the 1991 Survey of Gambling and Problem Gambling in New Zealand

- The proportion of lifetime probable pathological gamblers who are (a) current probable pathological gamblers, (b) current problem gamblers and (c) not currently experiencing problems

- The proportion of lifetime problem gamblers who are (a) current problem gamblers and (b) not currently experiencing problems

- The proportion of current probable pathological gamblers who recognise that they have a problem and the proportion who do not recognise that they have a problem

- The prevalence of lifetime and current problem and probable pathological gambling within sub-populations including males, females, Mäori, Pacific Island and Asian people, major occupational groupings and unemployed people (note that many sub-population breakdowns may not be feasible due to sampling errors)

- Selected risk factors for problem gambling and probable pathological gambling

- A measure of changes in reported gambling participation and expenditure since 1991

- The ability to compare the 1999 findings with the findings of previous studies conducted in New Zealand

- The ability to compare the 1999 findings with the findings of previous studies conducted in other countries.

An additional, important aim of phase one of the National Prevalence Survey is to recruit participants for the second phase of the study. Phase two of the National Prevalence Survey (NPS-2) involves in-depth interviews with probable pathological gamblers, problem gamblers, continuous frequent gamblers, non-continuous frequent gamblers and infrequent gamblers. The report on this second phase will provide further information, analysis and discussion relevant to most of the aims and objectives above, as well as some others.

2. REVIEW OF RELEVANT LITERATURE

2.1 Introduction

An extensive critical review of international community studies of gambling and problem gambling is provided in a companion volume to the present report (Abbott & Volberg, 1999). A summary of aspects of this literature, particularly past New Zealand studies, is given here to provide a context for the 1999 National Prevalence Survey and facilitate meaningful discussion of the major findings. The 1991 national survey is included. For the reader who seeks more extensive understanding of the relationship of the present study to previous New Zealand and international research, the full review should be consulted prior to reading the remainder of this report.

2.2 General Population Surveys of Gambling Participation

The Department of Internal Affairs Surveys

In New Zealand, the Department of Internal Affairs (DIA) has conducted three national surveys of adult gambling participation and attitudes towards gambling. As indicated in Chapter One, with reference to public attitudes towards problem gambling, these surveys were undertaken in 1985, 1990 and 1995. Because they employed similar methodologies and questionnaires, it is possible to examine trends over time.

Past Year Participation

In 1985, 85 percent of respondents reported that they had taken part in at least one form of gambling during the 12 months prior to the survey (Wither, 1987). Ninety percent indicated this level of involvement in both the 1990 and 1995 surveys (Christoffel, 1992; Reid & Searle, 1996). Consistent with the introduction of new forms of gambling from 1987 to 1989, the average number of different gambling activities engaged in by participants increased from 1985 to 1990. No change was evident from 1990 to 1995. These participation rates are among the highest reported internationally.

Men and women did not differ with respect to past year participation and number of gambling activities engaged in. In 1990, older respondents, especially those aged over 64 years, and retired people reported low levels of participation. However, in 1995, students and beneficiaries had the lowest participation rates. Mäori and Roman Catholics, relative to other ethnic and religious groups, had high levels of participation.

Of the various forms of gambling available in 1985, raffles and lottery tickets were purchased by 71 percent of respondents during the preceding 12 months. Participation remained high in 1990 (62%) and 1995 (67%). Lotto, introduced in 1987, displaced raffles in 1990 (78%) and 1995 (80%) as the top ranking form of gambling.

Track betting was the second-ranking gambling activity in 1985 (engaged in by 25% of respondents during the preceding 12 months). Similar numbers reported participating, in 1990 and 1995 (23% on both occasions). However, while engaged in at similar rates

across the three surveys, the relative ranking of track betting fell to fifth equal in 1990 with informal betting with friends and others, and sixth in 1995.

The relative decline noted for track betting was largely due to the popularity of new forms of gambling, namely Instant Kiwi and other instant lotteries (66% in 1990; 58% in 1995) and gaming machines outside casinos (28%; 24%). Informal betting with friends and others (1985, 19%; 1990, 23%; 1995, 30%) also played a role. Just prior to the 1995 survey, some additional forms of gambling were introduced including Daily Keno and the Christchurch casino. Relatively low levels of participation were reported for these forms of gambling.

Expenditure

The 1990 and 1995 DIA survey reports included detailed information on reported gambling expenditure. In 1990, mean (average) respondent expenditure for the preceding 12 months was NZ$446 and in 1995 NZ$413. When reported annual expenditure was extrapolated to the total adult population, it was evident that expenditure measured this way in 1995 was approximately half the per capita turnover for that year. It is important to note here that the relationship between reported expenditure and 'actual' expenditure or turnover is complex and varies from one form of gambling to another (Abbott & Volberg, 1999). Respondent accounts are strongly influenced by the wording of questions. However, when questions are presented in a similar way on successive occasions, it is possible to make valid comparisons over time. This said, 'actual' gambling turnover and net expenditure increased from 1990 to 1995. It is not known why this increase was not reflected in the survey reports, although possible reasons are discussed later in this report. Nevertheless, well-conducted surveys of this type provide information about individual and community gambling participation that is not available from any other source.

Nearly half of 1990 and 1995 DIA respondents reported spending less than NZ$100 per annum. It was only in the highest expenditure category (expenditure of more than NZ$500) that changes appear to have taken place. In 1990, 16 percent were in this category; in 1995, 22 percent.

In contrast to past year participation rates where men and women did not differ, in both surveys women reported spending, on average, approximately two-thirds the expenditure reported by men. Mäori spent more than non- Mäori, although this difference reduced somewhat in 1995. The oldest age category (65 years and older) reported much lower expenditure than other age categories in both surveys. However, in 1995, the youngest group (15-24 years) also reported low expenditure. A somewhat similar finding was evident for beneficiaries and lower occupational status workers. In 1990, these groups had appreciably higher expenditure than other occupational groups. This differential would have been much greater if expressed as a percentage of total income. Although they remained in the top three of six expenditure groups, mean expenditure for both groups dropped markedly in 1995 relative to 1990. Respondents without formal educational qualifications also spent considerably more than other educational groups in 1990. Although this group reported lower expenditure in 1995 relative to 1990, it retained its top expenditure ranking.

Religion was examined in relation to gambling participation and expenditure only in the 1990 DIA survey. Expenditure patterns followed those noted for gambling participation, with Roman Catholics reporting past 12 months expenditure double that of the other groups.

43

Substantial expenditure differences between sociodemographic groups were found on some forms of gambling. A summary of these findings from the 1990 and 1995 DIA surveys is provided in Abbott & Volberg (1999). Attention is confined here to two forms that have been shown in previous studies to have a strong relationship with problem gambling, namely track betting and gaming machines.

In both 1990 and 1995, track betting expenditure was much higher for men than women. Mäori, people on higher incomes, employed people and those aged between 25 and 64 years also reported higher expenditure on this form of gambling.

With respect to gaming machines, in both surveys, men also reported higher expenditure than women. In contrast to track betting, non- Mäori spent more than Mäori on machines. In 1990, the youngest age group reported expenditure almost double that of any other age group. However, this was reversed in 1995, with the youngest group reporting the lowest expenditure on machines and the oldest group the highest expenditure. A similar finding pertained to income and educational level. In 1990 people on high incomes reported the lowest expenditure. In contrast, five years later this group reported expenditure that was approximately three times higher than that of any other group. In the case of education, in 1990 respondents without formal educational qualifications reported the highest level of expenditure. Five years later, this group reported expenditure that was only marginally higher than that of university graduates, the lowest spending group.

These gaming machine findings suggest a substantial change in the sociodemographic profile of gaming machine participants from 1990 to 1995. However, given the small samples involved and the lack of information regarding the survey response rates or margins of error associated with the various estimates reported, these and other findings from these surveys must be treated with caution. Furthermore, even when samples are of moderate size, one or two respondents in a given category reporting very high expenditure (outliers) can have a major impact on mean expenditure levels.

While noting a requirement for caution, the gaming machine and general expenditure data suggest that during the early 1990s there was a relative, and in some cases absolute, reduction in gambling expenditure on the part of people from lower income and marginalised sectors of the population such as youth, beneficiaries and lower occupational status workers. Mäori and Pacific Islanders are also over-represented among both beneficiaries and low wage earners. There are indications from various sources that during this period, associated with reductions in benefit entitlements and payments and other changes within the New Zealand economy, the gap between the highest and lowest income groups widened and poverty levels increased (National Health Committee, 1998). Reduced disposable income may have contributed to the reductions in gambling expenditure within some sectors of the population during the early 1990s. Similarly, greater disposable income may have played a part in the increased gambling involvement of some other sectors of the population.

Apart from the DIA surveys, three other relevant surveys were undertaken during the 1990s. The 1991 National Survey of Problem and Pathological Gambling, referred to previously, was primarily concerned with problem gambling but also considered gambling participation and reported expenditure. This survey provides a baseline for the present 'replication'. North Health also commissioned a national problem gambling survey (North Health, 1996) that included some information on gambling participation. Finally, a 1997

survey undertaken in Auckland and Christchurch provides more recent information on gambling participation (Australian Institute for Gambling Research, 1998).

The 1991 National Survey

The 1991 national survey (Abbott & Volberg, 1991; 1992; 1996; Volberg & Abbott, 1994) differed from the DIA surveys in that the sample of 4,053 was substantially larger. This larger sample allowed some sub-groups to be considered, e.g. Pacific Islanders and unemployed people, two groups that were not separated out in the DIA surveys. The 1985 DIA survey sample size was 1,500 and the two later surveys had samples of 1,200. The 1991 survey did not include 15 to 17-year-olds as the DIA surveys did and, in contrast to these surveys, used telephone rather than face-to-face interviews. A number of the gambling participation measures and the timeframes within which questions were couched also differed. Despite these and some other differences in methodology, the findings of the 1991 survey were generally similar to those of the 1990 DIA survey that had been conducted the previous year.

Ninety-five percent of the 1991 respondents said they had gambled at some stage in their lives, 90 percent in the past six months. In the 1990 DIA survey, 90 percent said they had gambled in the past 12 months.

Pacific Islanders reported high levels of participation relative to other ethnic groups in Lotto, Instant Kiwi and track betting. Unemployed people also reported high levels of participation in Instant Kiwi and somewhat higher participation rates for track betting and gaming machines.

Mean reported expenditure in the 1991 survey was NZ$37 per adult, per month. Expressed annually, this represents NZ$444 per adult on all forms of gambling, virtually identical to the 1990 DIA figure of NZ$446. However, the 1990 survey included a larger list of gambling activities. When these minor forms of gambling were removed to make the two studies comparable in this regard, the 1991 figure was NZ$400.

Christoffel (1992) compared the 1990 DIA and 1991 national survey expenditure data for each of the major forms of gambling. As with gambling participation, the general pattern of results was similar although the DIA estimates were somewhat higher for many activities.

Overall lifetime and recent (6 or 12 months) gambling participation differences between men and women were relatively small and unlikely to be significant in both the 1990 and 1991 surveys. However, in these surveys, men, particularly young men, were more likely to engage in gambling activities on a regular (weekly or more) basis. Men also reported spending twice as much as women per month in 1991, a greater difference than was found in 1990. Men were much more likely to bet, especially regularly, on horses and dogs and play gaming machines and cards for money in 1991. Although more men than women said they regularly purchased Lotto tickets in the 1991 survey, only just over a quarter of men's total gambling expenditure went on Lotto relative to approximately half of women's total expenditure.

Apart from the youngest group (which reported spending most) and the oldest group (which spent least), age appeared to have little relationship with overall gambling expenditure in 1991. The oldest age group also spent least in the 1990 DIA survey. However, the youngest group did not have the highest expenditure in the 1990 survey. This difference is likely to have been a result of the DIA survey including 15 to 17-year-olds who could be expected to spend less than older adolescents and young adults.

In contrast to the 1990 DIA survey findings, Mäori were not over-represented with respect to participation in the major forms of gambling in 1991. However, as in the 1990 survey, they did report higher overall gambling expenditure. Of the ethnic groups considered in the 1991 survey, Pacific Islanders reported the highest expenditure. Roman Catholics were found to have higher expenditure than other religious groups. This was also the case in 1990. Unemployed respondents, a group that was not considered separately in 1990, indicated high gambling expenditure in 1991.

In 1991, 18 percent of total respondents said that they participated weekly or more often in continuous forms of gambling such as track betting and gaming machines. Most of these people also participated this often in non-continuous forms such as Lotto and raffles. Thirty percent of total respondents participated weekly or more in only non-continuous forms. Forty-one percent of respondents reported participating in at least one type of gambling activity during the past six months but not weekly or more often. Five percent said they had never participated and six percent had gambled at some time in their lives but not in the past six months.

Phase two of the 1991 national survey involved face-to-face interviews with sub-samples of frequent continuous gamblers, frequent non-continuous gamblers and samples of problem and probable pathological gamblers identified on the basis of their phase one SOGS-R scores. The findings from this part of the 1991 survey will not be summarised here but will be examined in relation to the findings of phase two of the 1999 National Prevalence Survey.

1996 North Health Survey

This telephone survey of 1,500 New Zealanders aged 18 years and over found similar lifetime gambling participation to the 1991 national survey (92%). However, other than for Lotto, lower lifetime participation rates were reported for the other major types of gambling. Past six months participation rates were also generally lower than those of the 1991 survey and the 1995 DIA past 12 months rates. In contrast to the participation findings, reported overall monthly gambling expenditure was similar to that found in the 1991 national survey and 1995 DIA survey.

The North Health participation and expenditure findings were inconsistent with the substantial growth that had taken place in gambling availability and official expenditure during the early-mid 1990s. The report authors concluded that their sample was biased and that this and various methodological shortcomings reduced the confidence that could be placed in the survey findings. While this may be so, Abbott and Volberg (1999) concluded that although the response rate was low and Mäori and Pacific Islanders were greatly under-represented, the overall quality of the study appeared to be comparable to that of many of the gambling and problem gambling surveys that they reviewed from North America, Australia and New Zealand.

The 1997 Australian Institute for Gambling Research (AIGR) Survey

More recent information on gambling participation is available from a 1997 AIGR survey undertaken in Auckland and Christchurch (Australian Institute for Gambling Research, 1998). Like the North Health and 1991 national surveys, this survey was conducted by telephone and used a questionnaire modelled on the 1995 DIA survey to facilitate

comparison. This survey included only small samples of 600 Auckland residents and 400 Christchurch residents.

Past 12 months participation rates (90% for Auckland; 95% for Christchurch) were similar to those of previous New Zealand national studies discussed in this section. Forty-one percent of respondents reported having participated in four or more gambling activities during the past 12 months. This finding was consistent with responses to a similar question included in the 1990 and 1995 DIA national surveys. As in the 1995 DIA survey, Lotto (77% Auckland; 78% Christchurch), raffles (73%; 82%) and Instant Kiwi (40%; 54%) were the activities most frequently engaged in during the past 12 months. Reported participation rates were higher for gaming machines outside casinos than in 1995 and lower for housie.

The 1997 survey found much higher overall reported gambling expenditure levels than was evident in any previous New Zealand gambling participation survey. In the most recent of these prior surveys, that conducted by DIA in 1995, the mean reported annual gambling expenditure was NZ$413 per respondent and the median was NZ$145. Corresponding estimates from the 1997 survey were NZ$2,355 and NZ$299 respectively for Auckland respondents and NZ$970 and NZ$301 for Christchurch respondents. The differences between the means and medians are extreme, especially in the case of Auckland. This indicates that a few participants reported exceptionally high gambling expenditure. The overall mean for Auckland and Christchurch was NZ$1,794, approximately four times the 1995 DIA national survey figure. In 1995, although South Island expenditure was somewhat lower than the two North Island 'regions', differences between the three areas were modest.

Mean reported annual expenditure for the combined Auckland-Christchurch sample for the major forms of gambling were: TAB track betting NZ$511, Lotto NZ$319, cards NZ$239; casino table games NZ$235, casino gaming machines NZ$109, gaming machines outside casinos NZ$114, on course betting at horse and dog races NZ$98, raffle tickets $83, sports betting NZ$50, Instant Kiwi NZ$48 and housie NZ$37.

Approximately 15 percent of respondents said they gambled at a casino more than once a month. Auckland residents indicated that they visited casinos less often than people living in Christchurch; however, they reported spending substantially more per visit. This expenditure difference was especially marked for casino table games.

In Auckland, Pacific Islanders, Mäori and Asians reported higher levels of gambling expenditure than other ethnic groups. Males also reported higher expenditure and this gender difference was higher than that found in previous New Zealand surveys. Age differences, while generally consistent with the 1995 DIA survey pattern, were greatly amplified.

The authors of the AIGR report concluded that the introduction of casinos to Auckland and Christchurch has had a substantial impact on the gambling patterns and expenditure in these cities. While this appears to be so, it should be noted that there were no baseline survey data from Auckland and Christchurch and comparable data were not available from other parts of the New Zealand. This lack of information reduces the certainty with which this statement can be made. Furthermore, very little information is provided on the survey methodology and the response rates are not given. Taken together with the small sample size, it is evident that the general findings of this survey should be treated with caution and findings pertaining to ethnic and other subgroups should be treated with extreme caution.

Conclusion

Although the reports discussed in this section are generally lacking in methodological detail and the studies they describe are constrained by modest sample size and probably low response rates, relative to most other jurisdictions there is a substantial body of survey information on gambling participation and expenditure in New Zealand. These surveys have used similar questions, allowing some comparisons to be made over the period of time when new forms of gambling have been introduced and actual gambling expenditure has increased markedly. Some surveys have used face-to-face interviews and others have used telephone interviews. Although comparison of the findings of the 1991 national survey and 1990 DIA survey suggest that these methods generate similar results, further research is required to establish this. While there appear to be some anomalies, there are a number of consistencies in the findings of these surveys. They provide a useful baseline from which to examine the gambling participation findings of the 1999 survey.

2.3 Problem Gambling in the Community

Introduction

Two major sources of information can be used in epidemiological studies of physical and mental disorders, namely health service utilisation records and health surveys (Abbott, 1994). With respect to problem gambling, New Zealand has national service utilisation data and, with the present study, information from repeat national prevalence surveys. These data sources have different strengths and weaknesses (Abbott, 1994). However, considered together, they provide complementary accounts that assist in gauging the extent and nature of problem gambling in New Zealand.

Service Utilisation

Service utilisation data for gambling problems have been available since the commencement of the Compulsive Gambling Society national help-line at the end of 1992. Figure 4 provides an overview of the number of first time callers to the national help-line from 1993 to 1998. Figure 5 shows the number of new clients accessing specialist problem gambling 'outpatient' counselling services from 1994 to 1998. The majority of people accessing help-line and counselling services are problem gamblers. However, family members and others who are concerned about a problem gambler that they have contact with, or who themselves experience problems associated with their involvement with a problem gambler, are also included.

From Figures 4 and 5 it is evident that up until 1996 the numbers presenting were relatively stable. Subsequently, presentation numbers rose steadily.

Figure 4: New Calls to the National Problem Gambling Helpline 1993-1998

  Total Calls
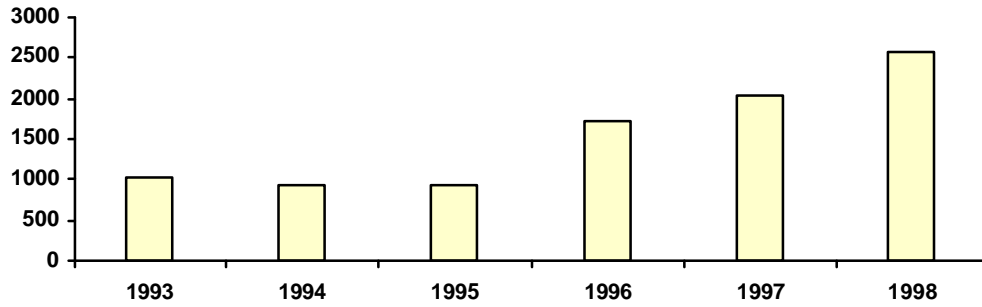
Figure 5: New Clients Presenting to Specialist Problem Gambling Counselling Services 1994-1998

Total Presentations
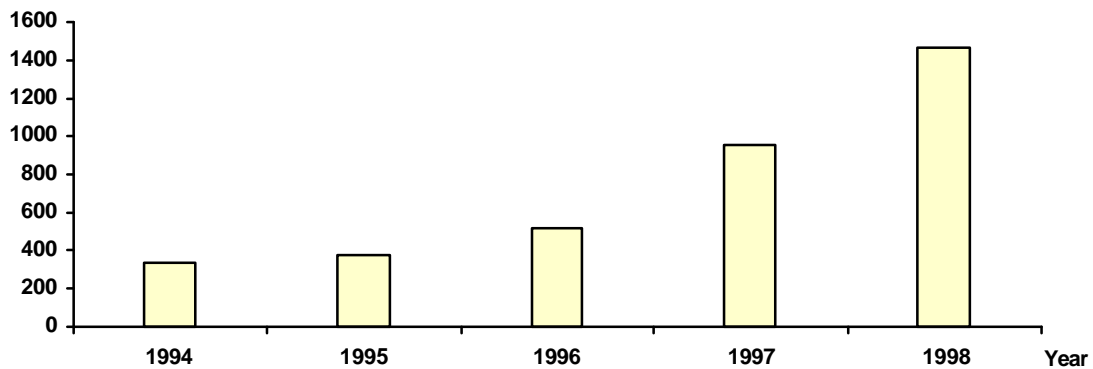
During the Helpline's first full year of operation, in 1993, approximately half of the 1,028 first-time calls were from problem gamblers (508), 350 were from partners or other family members and 170 were from other people or organisations seeking information about problem gambling (Abbott, Sullivan & McAvoy, 1994). Five percent of callers said they were Mäori, four percent Pacific Islanders and three percent Asian. Most (81%) of the 508 problem gamblers were male. Almost all problem gamblers reported a clear preference or 'addiction' to a particular form of gambling, although most indicated that they also participated in some other form, typically Lotto and/or Instant Kiwi.

With respect to the forms of gambling that were regarded as the major problem for help-line problem gambler callers during the first three months of the new service's operation, track betting dominated (Abbott, Sullivan, McAvoy & Arroll, 1994). However, for the 1993 year as a whole, there was an almost even split between track betting and gaming machines. A small number (3 percent) reported other forms as the most problematic, e.g. Instant Kiwi, cards and housie. The same pattern was evident from spouse and family member caller descriptions of problem gamblers they were concerned about. A large majority of problem gambler callers indicated high levels of anxiety, depressed mood, suicidal ideation and disturbed sleep patterns.

In addition to the substantial increase in the number of people seeking help from the national help-line from 1993 to 1998, the profile of people seeking assistance changed.

An examination of help-line data six months before and six months after the opening of the Auckland casino in 1996 revealed an increase of 62 percent in first time calls following the opening and a shift in the forms of gambling most strongly implicated in client problems (Sullivan, McCormack & Selman, 1997). Prior to the opening, casinos were reported as the major gambling mode for seven percent of new callers. After the opening, this figure increased to 34 percent. While this suggests an increase in casino-related problems, there could be other explanations such as greater publicity about gambling problems and the sources of assistance available to people with problems.

In 1998, 60 percent of first-time callers were problem gamblers, compared to 50 percent in 1993 (Problem Gambling Committee, 1999). While still predominating, male clients dropped substantially in relative terms (81% in 1993; 62% in 1998). In 1998, 21 percent of new clients were Māori, a marked increase since 1993. This is approximately double the percentage that would be expected based on Māori representation in the general population. Pacific Island (3.6%) and Asian (1.9%) percentages were fairly similar in 1993 and 1998, although somewhat higher percentages were engaged in face-to-face counselling in 1998 (5.2% and 3.4% respectively).

An increase in the number of women problem gamblers seeking professional help from gambling counselling services has also been evident in Australia and in some jurisdictions in the United States. In some Australian states, women clients now out-number men (Abbott & Volberg, 1999; Productivity Commission, 1999). Half of the respondents in recent surveys of Gamblers Anonymous in Louisiana and Montana were women (Polzin et al, 1998; Westphal et al, 1999).

In 1998, approximately half of first-time problem gambler callers to the Helpline were aged 26 to 40 years. Thirty-one percent were aged 41 to 59, 16 percent were younger than 26 and four percent were 60 or older.

Gaming machines outside casinos (52%) were the primary mode of gambling reported by problem gamblers in 1998, slightly higher than in 1993. Track betting, while coming second (20.5%), dropped considerably relative to 1993 when it was on a par with gaming machines. Other forms of gambling associated with problem gambling in 1998 included casino table games (9%), casino gaming machines (9%), sports betting (5%), Lotto/keno/scratch lotteries (3%) and housie (1%).

In both 1993 and 1998, women callers were much more likely to have problems associated with gaming machines. In both years, men were greatly over-represented among track betters.

The 1999 Problem Gambling Committee report also provided information from clients who accessed specialist problem gambling treatment services. The help-line and treatment data are not independent sources of information as many clients who enter treatment are referred from the national help-line.

In 1998, nearly 60 percent of women gamblers presenting for treatment reported that non-casino gaming machines were their primary mode of 'problem' gambling (Problem Gambling Committee, 1999). A further 30 percent of women clients said casino gaming machines were their primary mode. Corresponding figures for men were 55 percent and 11 percent respectively. In the case of men, track betting was the second highest ranking form (20%), followed by casino table games (12%).

Ethnic differences were also evident in relation to the primary mode of problem gambling. For example, relative to Asians (20%) and Pacific Islanders (33%), high percentages of Mäori (66%) and Europeans/Pakeha (59%) presenting for treatment reported problems with non-casino gaming machines. Relatively more Asians reported problems with casino table games (40%) and casino gaming machines (27%). Pacific Islanders were also over-represented with respect to casino gaming machines (26%) and casino table games (18%).

As is the case with official gambling expenditure data, service utilisation information is subject to reporting errors of unknown magnitude. In addition, while adequate for the purpose of examining the characteristics of people who seek help, client groups do not provide a representative sample of people in the population who experience significant gambling-related problems. The proportions of people who seek professional help vary considerably from one type of mental disorder to another (Abbott, 1994). Typically, client data include only a small proportion of people in the population with less severe problems. For example, two-thirds (67%) of a sample of new clients receiving treatment in New Zealand during 1998 had SOGS scores higher than 11, and 30 percent had scores between 5 and 11. All of these clients scored above the threshold for probable pathological gambling. Only 1.6 percent scored within the problem gambling range of three or four on the SOGS (Problem Gambling Committee, 1999). In addition, groups that are reluctant to seek help such as young people and members of ethnic minorities are often under-represented. In New Zealand there are indications that this is the case for Pacific Islanders and probably Asians (Abbott, 1997).

A wide variety of factors other than the prevalence or incidence of problem gambling in the community influence changing presentation rates. Prevalence refers to the total number of people who are experiencing a particular problem at a given point in time. Incidence refers to the number of new 'cases' or instances of a particular problem that develop during a given interval of time, e.g. during the preceding month or year. Both service and personal factors play an important role in determining presentation rates. While service utilisation information is important in its own right and has relevance for policy-making and service development, evaluation and planning, at best it provides a crude proxy for prevalence or incidence rates. Epidemiological surveys are required to establish more accurate estimates of the prevalence and incidence of problem gambling in the community.

Problem Gambling Surveys

Introduction

As indicated in the introductory section of this report, over 40 adult general problem gambling surveys have been conducted using the SOGS, SOGS-R and adaptations of these screening instruments. A small number of additional surveys have used other measures of problem gambling. The great majority of these problem gambling prevalence studies have been undertaken in the United States, Canada, Spain, Australia and New Zealand. This body of research is critically reviewed in Abbott & Volberg (1999).

Prior to the development of the SOGS-R in 1991 (Abbott & Volberg, 1991; 1992; 1996), problem gambling prevalence studies were confined to estimating the lifetime prevalence of problem gambling. Since 1991, most surveys, other than the Australian state-level investigations, have included both lifetime and current measures. Apart from the original (1991) New Zealand national survey, the Australian state-level surveys and one American survey that used a six-month current timeframe, a 12 month 'window' has been used to assess current prevalence. This shift from six to 12 months occurred because data from phase two of the New Zealand national survey suggested that the shorter time frame generated high levels of false negatives. Specifically, it was found that the six months SOGS-R failed to detect approximately half of the people who were independently assessed by interviewers to be experiencing gambling problems (Abbott & Volberg, 1992; 1996).

In addition to general population surveys, some studies have been undertaken with sub-populations including youth, ethnic minorities and residents in in-patient treatment programmes and prisons (Abbott & Volberg, 1999; Shaffer, Hall & Vander Bilt, 1997).

Prevalence Estimates

Apart from one very high estimate from an Australian study, there is consistency in the findings of general population prevalence studies that have used the SOGS, SOGS-R and related measures. In various countries and regions within countries, prevalence estimates for <u>current</u> probable pathological gambling have varied between 0.5 to 2.8 (Abbott & Volberg, 1999). <u>Lifetime</u> estimates are generally approximately double those of current estimates. Current prevalence estimates from North American state and provincial surveys are provided in Table 2. Australian current (six-month) estimates are shown in Table 3. It is important to note that in addition to using a six- rather than 12-month timeframe, other aspects of the methodology used in most of the Australian studies differed from that used elsewhere. Although some of the Australian estimates are high relative to those shown in Table 2, it has been argued that they are likely to be conservative and significantly under-estimate problem gambling prevalence in Australia (Abbott & Volberg, 1999).

Shaffer, Hall and Vander Bilt (1997) conclude from their meta-analysis of North American studies that prevalence estimates do not vary appreciably across measures or different investigators. In other words, different researchers using different measures generally obtain similar results.

Table 2: Current Problem and Probable Pathological Gambling Prevalence Rates in North America

Year	State/Province	Current Problem %	Current Prob/Path %	Current Total %
USA				
1990	Minnesota	1.6	0.9	2.5
1991	South Dakota	0.8	0.6	1.4
1992	Washington State	1.9	0.9	2.8
1992	North Dakota	1.3	0.7	2
1992	Montana	1.5	0.7	2.2
1992	Texas	1.7	0.8	2.5
1993	South Dakota	0.7	0.5	1.2
1994	Minnesota	3.2	1.2	4.4
1994	Georgia	1.5	0.8	2.3
1995	Texas	2.2	0.8	3
1995	Iowa	2.3	1	3.3
1995	Louisiana	3.4	1.4	4.8
1996	Connecticut	2.2	0.6	2.8
1996	Mississippi	2.8	2.1	4.9
1996	New York	2.2	1.4	3.6
1997	Oregon	1.9	1.4	3.3
1997	Michigan	2.1	1.3	3.4
1997	Colorado	1.8	0.7	2.5
1998	Louisiana	2.3	1.6	3.9
1998	Montana	1.9	1.3	3.2
1998	Washington State	1.8	0.5	2.3
Canada				
1992	New Brunswick	3.1	1.4	4.5
1993	Manitoba	2.9	1.3	4.2
1993	British Columbia	2.4	1.1	3.5
1994	Alberta	4	1.4	5.4
1994	Saskatchewan	1.9	0.8	2.7
1995	Manitoba	2.4	1.9	4.3
1995	New Brunswick	1.9	2.2	4.1
1996	British Columbia	2.8	1.1	3.9
1997	Alberta	2.8	2	4.8

However, since their review, a few studies have obtained lower estimates when they used the recently developed DSM-IV based measures (Abbott & Volberg, 1999; Gerstein et al, 1999; Rönnberg, Volberg & Abbott, et al, 1999).

Problem gambling prevalence seems to broadly mirror the rankings of countries in terms of their gambling participation and expenditure (Walker & Dickerson, 1996). In North America, where a large number of studies have been carried out during the past decade, there are indications of an increase in prevalence over time. Specifically, Shaffer, Hall and Vander Bilt (1997) found a significant, positive correlation between the year adult community studies were carried out and prevalence of current probable pathological gambling.

Although statistically significant, Shaffer, Hall and Vander Bilt (1997) pointed out that the total variability in prevalence explained by time was relatively modest and that it has yet to be determined what other factors also influence the changing rates over time. These investigators also found that there was a significant difference between the mean current prevalence rates for surveys carried out before and after 1993. The mean rate for studies conducted from 1987 to 1993 was 0.84 percent and from 1993 to 1997, 1.29 percent. Comparable changes over time were not found for youth, college and treatment studies, possibly because there were far fewer studies assessing gambling problems among these populations relative to the number of adult studies.

Although there are considerable variations between North American states and provinces with respect to gambling availability and expenditure, Shaffer, Hall and Vander Bilt (1997) did not find significant regional variation in problem gambling rates. However, the U.S. national survey found higher prevalence rates in the West than in other regions of the country (Gerstein et al, 1999). Similarly, there does not appear to be a clear relationship between state per capita gambling expenditure and problem gambling prevalence in Australia (refer to Table 3). In Table 3, per capita expenditure is given for the year in which each respective prevalence study was conducted. However, data from the 1999 Australian national survey suggest a moderate relationship between current (12-month) SOGS-R scores and state per capita expenditure (Productivity Commission, 1999). In contrast to the data summarised in Table 3, the state-level information examined in the 1999 study was all collected at the same time using the same methodology. State, territory and national 12 month probable pathological prevalence rates from the 1999 Australian national survey are outlined in Table 4, along with corresponding jurisdictional per capita gambling expenditure. Although the sample sizes for some of the states and territories are small, this data set is probably much more adequate for comparative purposes than that given in Table 3.

Table 3: Current Prevalence Rates for Probable Pathological Gambling in Australia, Family Members Experiencing Difficulty with Gambling and Per Capita Expenditure on Gambling

Year	State/Area	Method	Current Prob/Path	Family Member Problems	Per Capita Expenditure $A
1991	Four Cities	D	6.6	-	-
1994	Tasmania	D	1.1	1.1	425
1996	Tasmania	T	2.9	2.3	421
1994	WA	D	0.6	2.2	547
1996	NSW	D	2.2	3.8	720
1996	SA	T	1.2	4.0[1]	526
1997	Victoria	T	0.8	2.4	681

Note:
(1)   The question assessing family member problems was asked in a different way to the other studies and may not be comparable
D   doorknock
T   telephone

The issue of differences both across societies and over time in gambling participation and changes in problem gambling prevalence requires further investigation. It is probable that consideration of changing patterns of relationships between involvement in particular forms of gambling and problem rates will be more productive than focussing on aggregate gambling participation and expenditure data. There is some support for this

Table 4: Australian State, Territory and National 12 Month Probable Pathological Gambling Prevalence, with Corresponding Per Capita Gambling Expenditures

Jurisdiction	Probable Pathological Gambling Prevalence[1]	Per Capita Gambling Expenditure $A[2]
NSW	2.6	963.2
VIC	2.1	921.0
NT	1.9	861.5
ACT	2.1	797.6
QLD	1.9	694.3
SA	2.5	617.2
WA	0.7	527.5
TAS	0.4	507.7
Australia	2.1	818.8

Note:
(1)   From Productivity Commission (1999)
(2)   From Tasmanian Gaming Commission (1998)

conjecture in the 1999 Australian report mentioned above in that the availability of gaming machines appears to be implicated more strongly than other major forms of gambling.

Replication Studies

As mentioned in Chapter One, the matter of changes in problem gambling prevalence rates over time has also been examined by conducting baseline and 'replication' surveys within the same jurisdiction.

The baseline surveys for the first replication studies were conducted prior to the development of the SOGS-R and were thus confined to comparisons of lifetime prevalence estimates.

There are three studies of this type, undertaken in Iowa, New York and Quebec. All three, with gaps of six years, seven years and 10 years respectively between surveys, identified statistically significant increases in the lifetime prevalence of problem and probable pathological gambling (Volberg, 1995; 1996; Jacques et al, 1997).

Post-1991 replication studies, like the New Zealand survey reported here, examined changes in both current and lifetime prevalence. Table 5 shows changes in the prevalence of past year problem and probable pathological gambling in North American jurisdictions where current prevalence figures were collected at baseline and replication. This table is arrayed by the interval of time between the baseline and replication surveys.

From inspection of Table 5 it is evident that where replication studies were completed two to three years after the baseline study, very little change is found. Where the gap between studies was four to six years, increases in current prevalence were evident in two of the three cases.

In Minnesota, the increase in problem gambling was statistically significant. In Montana, the increase in probable pathological gambling and combined problem/probable pathological gambling were both statistically significant. On the other hand, in Washington State there appears to have been some reduction in prevalence.

Table 5: North American Current Problem and Probable Pathological Gambling Prevalence Rates at Baseline and Replication

Year	State/Province	Current Problem %	Current Prob/Path %	Current Total %
1991	South Dakota	0.8	0.6	1.4
1993	South Dakota	0.7	0.5	1.2
1993	Manitoba	2.9	1.3	4.2
1995	Manitoba	2.4	1.9	4.3
1992	Texas	1.7	0.8	2.5
1995	Texas	2.2	0.8	3.0
1992	New Brunswick	3.1	1.4	4.5
1995	New Brunswick	1.9	2.2	4.1
1993	British Columbia	2.4	1.1	3.5
1996	British Columbia	2.8	1.1	3.9
1994	Alberta	4.0	1.4	5.4
1997	Alberta	2.8	2.0	4.8
1995	Louisiana	3.4	1.4	4.8
1998	Louisiana	2.3	1.6	3.9
1990	Minnesota	1.6	0.9	2.5
1994	Minnesota	3.2	1.2	4.4
1992	Montana	1.5	0.7	2.2
1998	Montana	1.9	1.3	3.2
1992	Washington State	1.9	0.9	2.8
1998	Washington State	1.8	0.5	2.3

Considering all of the replication studies (i.e. those that used both lifetime and current measures), where the interval between studies was greater than three years, there appears to be some support for the view that problem gambling prevalence has increased over time. In the case of Tasmania, where the gap between studies was only one year, there also appears to be an increase in current prevalence (refer to Table 3). However, there are methodological differences between the Tasmanian baseline and replication surveys that confound the issue and necessitate caution in concluding that there was a significant change (Abbott & Volberg, 1999).

Recent National Surveys

In addition to the state and provincial surveys, the findings of three national studies have been published in 1999. Two of these studies (Sweden and Australia) involved large samples and used versions of the SOGS-R. The United States survey had a smaller sample and used a new measure of problem gambling that makes comparison with the Swedish, Australian and 1991 and 1999 New Zealand national surveys difficult. However, if the new measure is subsequently included in studies that also incorporate the SOGS-R, it may be possible to make more direct comparisons in the future.

The Swedish national survey had a sample of 7,139 people aged 15 to 74 years (Rönnberg, Volberg & Abbott et al, 1999). Youth and people born outside Sweden were

over-sampled to allow these groups to be examined separately. These two groups were also weighted into the overall sample for the purpose of calculating national prevalence estimates. The response rate was 72 percent of total individuals selected. This is a high rate relative to previous problem gambling surveys.

Participants were randomly recruited from national registers rather than from households or telephone directories. This method of selection, combined with the high response rate, probably makes the Swedish sample more truly representative of the total adult population than samples used in previous problem gambling surveys.

The use of official registers, which contain a great deal of information about Swedish citizens, also allowed the researchers to examine how their sample differed from the total population on a number of relevant variables. In addition, this collateral information was used to refine statistical weights and confidence intervals associated with prevalence estimates. The great majority of interviews were conducted by telephone. A small number of postal questionnaires were also used to obtain information from respondents who could not be contacted by telephone.

Ninety-five percent of Swedes reported having gambled at some time in their lives, 89 percent in the past year. The SOGS-R defined current (past 12-months) probable pathological gambling prevalence estimate was 0.6 percent and the corresponding lifetime prevalence was 1.2 percent. The current problem gambling estimate was 1.4 percent and the lifetime problem gambling estimate was 2.7 percent. It is interesting that the current and lifetime probable pathological gambling prevalence rates were approximately three times higher for the respondents who could not be contacted by telephone and who completed the postal questionnaire. An earlier pilot study found that the problem gambling measure yielded identical prevalence estimates when administered in postal and telephone interview format (Abbott, Rönnberg & Volberg, 1997). This suggests that people without telephones, or who do not answer when called, are more likely to be problem gamblers and requires further investigation because most problem gambling prevalence studies are conducted by telephone. If so, telephone surveys could result in significant under-estimates of prevalence, especially in countries or among sub-populations with low telephone ownership.

The Australian national survey had an initial 'screener' sample of 10,525. This sample was obtained by selecting telephone numbers from the latest electronic white page directories. It did not include unlisted numbers. Once a household was contacted, the respondent sought for a screening interview was generally the person aged 18 years or older normally living in the household who had had the last birthday. This procedure was changed in some instances to increase the number of younger participants. Quota sampling methods were used, with 'strict' quotas for area (state/territory and city/country) and 'loose' quotas for age and gender. To bring the sample more fully into line with the Australian population, the resulting sample data were post weighted on the basis of area, gender and age. An adjustment was also made for household size as only one person was interviewed per household (Productivity Commission, 1999).

Although the Australian sample was large, the response rate for this phase of the survey (using the same definition as the Swedish national survey) was only 47 percent. Not all of these participants were administered the full questionnaire including the 12 month version of the SOGS-R. Instead, sub-samples of 'screener' respondents were asked for further interviews, namely all 'regular' (weekly or more) gamblers, half of the 'non-gamblers' and a quarter of 'non-regular' gamblers. Of the 4,017 people selected in this way, completed

questionnaires were obtained from 3,489 (87%). The authors of the report state that this is 'a very acceptable participation rate'. While that would be so if the base was a random sample of Australian adult households with residential telephones, the base was actually the 47 percent who were initially contacted and completed the phase one questionnaire. Consequently, this is a very low response rate. Furthermore, the sample is technically highly complex and was obtained by quota methods. These further features have important implications for the determination of accurate confidence intervals and statistical analysis (see Abbott & Volberg, 1999; in press, for a discussion of these issues). These design features were not taken into consideration in the Productivity Commission report. These matters, considered in conjunction with the low response rate, mean that the findings of this survey need to be treated with caution.

The SOGS-R current (past 12 months) probable pathological gambling prevalence estimate from the Australian national survey was 2.1 percent and the current problem prevalence was an additional 2.8 percent. This study did not include a lifetime measure. As with most of the previous Australian studies and at variance with studies in other countries, not all sectors of the population were administered the 12 months version of the SOGS-R, and it was assumed that these sectors contained no problem gamblers. This means that the Australian estimates are not directly comparable with those derived from other studies and, despite being high relative to most previous studies, are likely to be conservative.

The United States national study involved a national telephone survey of 2,417 adults aged 18 years and older. It also included a 'patron survey' of 530 adults interviewed at gaming facilities and a youth survey of 534 16 and 17-year-olds. It used a new measure of problem gambling, the NODS, which was based on DSM-IV diagnostic criteria. As indicated previously, this measure has yet to be adequately validated and its performance relative to more widely used problem gambling screens including the SOGS and SOGS-R is not known.

In the United States national survey, random lists of commercially available telephone numbers were contacted nation-wide. These lists were screened to obtain working residential numbers. Of the 4,358 numbers identified in this way, 3,281 were successfully contacted and one adult respondent was selected from each household using a Kish grid approach (Oldendick, Bishop, Sorenson & Tuchfarber, 1998). Interviews were subsequently completed with 2,417 adults. Fourteen of these interviews were postal questionnaires, conducted this way at the request of participants. The resulting data were weighted by age, gender, ethnic group and state to align the sample with the total United States population. The response rate for this survey was 51 percent.

As in the Australian national survey, not all respondents who were initially interviewed were administered the problem gambling screen. In the present instance, only those people who reported ever having experienced gambling losses greater than US$100 in one day or across the past year were assessed.

Based on the NODS measure, the 12 month probable pathological gambling prevalence rate was 0.6 percent and the corresponding lifetime estimate was 0.8 percent. These estimates are about half those of recent state-level surveys reviewed by Shaffer, Hall and Vander Bilt (1997). After weighting additional data from the patron survey and adding these respondents to the data base, the National Opinion Research Center issued revised lifetime prevalence estimates. These revised results show that 1.2 percent of the

combined national telephone survey and patron survey pool scored as probable pathological gamblers and an additional 1.5 percent scored as problem gamblers.

It is possible that the 1998 national sample and hence population prevalence estimates were biased by limiting the administration of the NODS screen to only those respondents who acknowledged losing significant sums of money gambling. The low response rate also raises concerns of possible bias. This study does, however, provide potentially useful baseline data for the United States. Differences between regional and sociodemographic groups are also of interest although constrained by the small sample size and resulting wide margins of error.

The problem gambling prevalence estimates from the United States adolescent sample did not appear to be significantly different from the adult prevalence. However, meaningful comparison with adult prevalence is difficult given the small sample sizes and the inclusion criteria of reported gambling losses of US$100 or more for the adult respondents.

Risk Factors and High Risk Groups

Adolescent, indigenous people and residential (prison, substance dependence and psychiatric in-patient) surveys have generally yielded probable pathological gambling prevalence rates that are two to four times higher than those obtained from general adult population surveys (Abbott & Volberg, 1999). Residential populations are not included in general population surveys that are typically confined to households or households with residential telephones. Younger adolescents are also usually excluded from general population surveys. Indigenous people and other marginalised or disadvantaged ethnic minorities, while included, are likely to be under-represented and samples are rarely large enough to be examined separately. Exceptions include Abbott and Volberg (1991; 1996) and Rönnberg, Volberg and Abbott et al (1999). Volberg and Abbott (1997) reported high prevalence rates and a number of parallels in gambling and problem gambling among New Zealand Mäori and Native Americans.

Factors consistently associated with higher problem gambling prevalence in North American surveys include being male, young, in college, having a history of antisocial behaviour and experiencing psychiatric co-morbidity. In some studies, including many of those undertaken in New Zealand and Australia, the following have been identified as further risk factors:

- Commencing gambling at a young age

- Reports of parental gambling problems

- Regular participation in continuous forms of gambling such as gaming machines and track betting

- Unemployed status

- Being a member of a marginalised ethnic group.

The recent Swedish national survey found that the forms of gambling most strongly associated with current problem and probable pathological gambling were restaurant casinos, sports pools, betting on horse races, gaming machines, bingo, illegal card games not in casinos and some other forms of illegal gambling, arcade machines and games of skill.

59

In Sweden, male current and lifetime probable pathological gambling prevalence rates were approximately four times higher than the female rates. Young adults (18-24 years) had higher probable pathological gambling prevalence rates than the other age groups although the youngest (15-17 years) participants had the highest <u>problem</u> gambling rates. Other risk factors included being born outside Sweden, being unmarried and living with children in the same household. In the case of <u>current</u> problem and probable pathological gambling (but not lifetime), residence in a major city and not having a university education were additional risk factors. As in a number of the sub-national studies, commencing gambling at an early age and believing one or both parents had a problem with gambling were also risk factors.

Because a number of the risk factors in the Swedish study were inter-related, multivariate analyses were conducted. From a series of loglinear analyses, it was found that the strongest predictors of combined problem/probable pathological gambling status were male gender, being 24 years of age or younger, living in a major city and having been born outside Sweden. When these factors were taken into consideration, education level ceased to be an independent predictor or risk factor.

By incorporating register data in the Swedish multivariate analyses, it was found that receiving welfare payments was an additional risk factor. These analyses also helped clarify some of the other relationships. For example, they strongly suggested that there are two major groups of people in Sweden with gambling problems: (1) those who live alone and (2) those who are living in households with children. This is a potentially important finding that warrants further investigation.

The <u>Australian</u> <u>national</u> <u>survey</u> found that problem gambling was most strongly linked to casino table games, gaming machines and track betting. As indicated previously, there were also regional variations with prevalence generally elevated in states and territories with higher levels of per capita gambling expenditure and greater numbers of gaming machines.

In contrast to Sweden, men and women had similar problem gambling prevalence rates and being born outside Australia did not appear to be a risk factor. One-parent families and couples with children did not have higher prevalence rates. In Australia, being separated or divorced, and being unemployed appeared to be risk factors. Problem gamblers also tended, on average, to have lower incomes. As in Sweden and in the United States, age was the strongest predictor of problem gambling, with 25 percent of problem gamblers aged under 25 years.

Multivariate analyses were also conducted using the Australian survey data. Logistic regression analyses confirmed that age was the single strongest predictor of gambling problems. When other confounding variables were taken into account, gender, income and education level had no effect on problem gambling status. However, marital status (separated, divorced or single) and living in a city appeared to be additional risk factors.

The authors of the Productivity Commission report concluded that in Australia there appear to be few clear individual risk factors and that the major determinant of problem gambling appears to be regular participation in certain types of gambling, particularly continuous forms. Of the continuous forms, gaming machines were regarded as the most significant, in part because of their widespread availability. The authors also concluded, from various sources, that there has been a 'feminisation' of gambling and problem gambling, associated with the advent of gaming machines.

In the United States national survey, lifetime problem and probable pathological gambling was most strongly associated with having ever participated in card-room gambling. Past year probable pathological gambling rates were higher among people who participated during the past year in unlicensed wagering (commonly a sports pool), track betting, store betting, a private game of chance, casino gambling, Native American gaming and bingo.

As in Australia, gender differences in problem gambling prevalence were not evident in the United States national survey. This is consistent with the findings of some recent state-level surveys (e.g. Polzin et al, 1998; Volberg & Moore, 1999b; Volberg & Silver, 1993). Like the two previous national surveys, younger age was a risk factor. An interesting age by gender interaction was also noted. Past year probable pathological gambling was highest among men aged 18 to 29 years but highest among women aged 40 to 49 years. This may be related to the Swedish finding of high prevalence levels among adults living with children and the Australian observations concerning women's growing involvement with gaming machines. In the United States, respondents living with minor children had higher probable pathological gambling prevalence rates than those without minor children in the household. Further research is required to clarify the nature of what appear to be emerging groups of older problem gamblers. These groups may be at high risk because they are recent 'recruits' to continuous forms of gambling. It would be helpful if future studies could examine the development of problem gambling among such people and also investigate how their problems change over time.

In contrast to the Swedish and Australian findings, people with little formal education in the United States national survey were also at high risk for problem gambling. However, multivariate analyses have not yet been carried out to see whether this relationship holds when other related variables are controlled statistically. Ethnic minorities in the United States national survey also had high prevalence rates. The Australian study did not investigate this dimension in any detail.

The relative lack of strong sociodemographic predictors of problem gambling in Australia compared to Sweden and, to a lesser extent, the United States, may reflect the 'maturity' of the gambling market in Australia and the widespread involvement of most sectors of the population in gambling activities. Some of the Swedish findings are similar to patterns that were evident in the earliest studies in the United States and New Zealand, even though Sweden is more homogeneous than most societies. It is possible that as new groups begin to participate in high-risk forms of gambling on a regular basis, these groups become over-represented among problem gamblers. However, cultural and other factors are also likely to have an impact on the propensity of particular groups to develop gambling problems. Furthermore, these influences may change over time.

Given that many of the predictor variables or risk factors for problem gambling are inter-related, it would be advisable for future studies to follow the lead of the recent Swedish and Australian studies (and the earlier 1991 New Zealand national survey) and include multivariate analyses. This would enable these relationships to be examined and help to clarify the relative predictive and explanatory capacity of the various risk factors.

It should be noted that other than the 1991 New Zealand national survey and recent Swedish and Australian studies, the sample sizes of most of the prevalence surveys conducted to date have been relatively small. Response rates have also typically been low. This has limited the degree to which sub-groups can be considered separately and risk factors identified with confidence. The failure to identify risk factors can be a

consequence of small sample size and a lack of statistical power. In addition, almost all prevalence studies have contained methodological deficiencies, often of considerable magnitude (Abbott & Volberg, 1999; Shaffer, Hall & Vander Bilt, 1997). Despite these shortcomings, as mentioned earlier, there is a relatively high level of consistency in the general findings of these studies.

Finally, it needs to be remembered that statistical associations do not necessarily mean that these relationships are causal. The determination of causality is a complex undertaking that cannot be readily addressed by cross sectional surveys of the type considered in this section. This matter is examined further in relation to gambling research in Volume One of the NZGS (Abbott & Volberg, 1999).

Prevalence and Incidence

The studies referred to in this chapter are concerned with prevalence. With one partial exception, there appear to be no studies on the incidence of problem gambling. This exception (Cottler, 1998) involved a small prospective study of drug users. As mentioned earlier, prevalence refers to the number of cases of a particular disorder existing in the population at a given point in time. Technically, prevalence can be measured in two ways, as a point prevalence or as a period prevalence. Point prevalence is defined as the ratio of the number of cases at some specified moment to the size of the relevant population at that moment. Period prevalence is defined as the ratio of the number of cases during some specified time period to the number of people in the population in the middle of that period. The SOGS-R allows current (past 6 or 12 months) and lifetime point prevalence estimates to be determined.

Incidence refers to the number of new cases that arise over a given period of time. More precisely, incidence is the rate at which people develop a trait (in this instance problem gambling) during a specific period of time, and is defined as the ratio of new cases over a specified period to the size of the population at risk in the same period. The determination of incidence requires longitudinal studies of large cohorts within the general population. This type of investigation also enables risk factors for the onset of problem gambling to be delineated with greater precision than has been possible with cross sectional prevalence surveys.

Volume Two of the NZGS describes and discusses major findings from the first longitudinal study of a sample of problem and frequent gamblers identified from a general population survey (Abbott, Williams & Volberg, 1999). This study provides some information on the incidence of problem gambling although it is limited in at least two respects: a relatively small sample size and not including randomly selected groups of infrequent gamblers and non-gamblers. Notwithstanding these and other limitations, the study provides important information regarding the life history of problem gambling and the validity of the SOGS-R that will be considered further in the discussion section of the present report.

New Zealand Surveys

New Zealand was among the first countries to undertake community surveys of problem gambling. Apart from the survey reported here, three general population problem gambling surveys have been conducted.

1986 Christchurch Psychiatric Epidemiology Study

The pathological gambling component of the DIS was included in a general psychiatric epidemiological survey undertaken in Christchurch during 1986 (Wells et al, 1989; 1992). It was concluded that 3.6 percent of Christchurch adults had experienced a problem with gambling at some stage in their lives and that 0.4 percent were pathological gamblers. However, these estimates were based on only a few questions and the time-frame was not given for two of the seven pathological gamblers identified in the study. As mentioned earlier, the DIS pathological measure used in this survey has not been adequately validated.

1991 National Survey of Problem and Pathological Gambling

In addition to the original report (Abbott & Volberg, 1991), accounts of sections of the 1991 National Survey of Problem and Pathological Gambling have been published in refereed journals (Abbott & Volberg, 1996; Volberg & Abbott, 1994). The methodology is outlined in some detail here because one purpose of the present study is to compare the major findings of the 1991 and 1999 national surveys.

In phase one of the 1991 national survey, 4,053 people aged 18 years or older, selected from telephone owning households, were interviewed by telephone. White page residential telephone numbers were chosen at random and each number was incremented by one in order to include respondents with unlisted numbers. Within households, the person aged 18 years or older who had the next birthday was selected for interview. Up to eight calls were made to each household, five to establish contact and three to the eligible resident if necessary to arrange an interview. A similar method was used to select a supplemental sample of Mäori and Pacific Islanders. An ethnicity question was asked immediately after the eligible respondent was contacted and if this person was a Mäori or Pacific Islander, he or she was asked for an interview. One hundred and twenty such respondents were included. Combined with Mäori and Pacific Islanders from the main sample, the total for these two ethnic groupings almost reached expected proportions within the overall population. Interviewees were given the option of being interviewed in a language other than English.

Participants were administered a questionnaire that had been cognitively pre-tested and piloted. The questionnaire included a modified version of the South Oaks Gambling Screen (SOGS). The adapted instrument (SOGS-R) included an expanded section asking about participation and expenditure on forms of gambling available in New Zealand at that time and a modification of the problem gambling items to include both lifetime and current (6-month) measures of problem gambling and probable pathological gambling. In addition to the SOGS-R, a series of sociodemographic questions were included.

The phase one response rate, defined as the percentage of those contacted who agreed to participate, was 66 percent. A further seven percent of the total numbers called consisted of no replies or situations where the respondent was unavailable after the maximum number of callbacks had been made. The strictest definition of response rate would include this group in the calculation of the response rate - or a percentage of them based on an estimate of those who might have been eligible if contacted.

In the achieved sample, in addition to a small under-representation of Mäori and Pacific Islanders, males and people aged 18 to 24 years were also slightly under-represented. The sample was subsequently weighted for age, gender and household size to bring it into

conformity with population proportions. The latter weighting was applied to correct for bias introduced by interviewing only one person per household.

In phase two, sub-samples totalling 217 were selected from the larger phase one sample and interviewed, in depth, at a location of the respondent's choice. Four groups were included, namely frequent (weekly or more) non-continuous gamblers, frequent continuous gamblers, lifetime problem gamblers and lifetime probable pathological gamblers. The methodology and findings from this part of the 1991 study are detailed in Abbott and Volberg (1992). As mentioned, 143 of these respondents have recently been re-interviewed (Abbott, Williams & Volberg, 1999).

Reference was made earlier to some of the gambling participation and expenditure findings from phase one of the 1991 survey. Here, attention is confined to some of the major findings concerning problem gambling.

The current (6 months) SOGS-R probable pathological gambling prevalence estimate was 1.2 percent (0.9 - 1.5%) and the current problem gambling prevalence estimate was 2.1 percent (1.6 - 2.6%). Corresponding lifetime estimates were 2.7 percent (2.2 - 3.2%) and 4.2 percent (3.6 - 4.8%). These estimates and their corresponding confidence intervals were derived in the same way that they have been calculated in the great majority of previous and subsequent gambling prevalence studies. Consequently, they can be compared with the prevalence estimates and other findings of these studies. However, Abbott and Volberg (1999; in press) have since argued that consideration should be given to the sample complexities of these studies, including that of their 1991 survey. Other than the Swedish national survey referred to above, all of the general population prevalence surveys reviewed by Abbott and Volberg (1999) appear to be technically complex in that participant selection is not truly random and independent. While the prevalence estimates should not be altered as a consequence of sample complexity (assuming the sample was weighted appropriately), Abbott and Volberg maintain that the confidence intervals applying to these estimates (in those instances where they are provided) are likely to be wider than stated in survey reports.

Interviewer ratings of pathological gambling, that had been obtained double blind from phase two of the 1991 survey, were used in an attempt to refine the initial phase one estimates (Abbott & Volberg, 1992; 1996). Abbott and Volberg initially concluded that they had confirmed both the current prevalence estimate of 1.2 percent and the confidence interval half width of 0.3 percent. Both of these assertions have since been challenged. Gambino (in press) maintains that the revised current estimate should be much larger than the original 1.2 percent. Manly and Gonzalez (1993) demonstrated, through simulation, that the confidence interval surrounding the estimate is non-symmetrical and wider than was assumed. It remains unclear whether or not the phase two information can be validly employed to refine the original prevalence estimates (Abbott & Volberg, in press). However, the critique by Manly and Gonzalez has relevance to all surveys where prevalence estimates are near to zero percent or 100 percent. At these two extremes, assumptions that underlie orthodox methods of calculating errors of measurement and confidence intervals start to break down and alternative methods using transformations or simulation should be applied. This is a separate issue from the corrections that should be applied to all standard errors and confidence intervals when complex sample designs are used.

In addition to the SOGS-R defined problem and probable pathological gambling prevalence estimates, the 1991 participants were asked if they themselves considered that they had

ever had a gambling problem. Two percent of phase one respondents said they felt they had had a problem at some time and one percent said they felt this way during the past six months. These percentages are similar to the percentages identified by the SOGS-R as being lifetime and current probable pathological gamblers.

Most people who were classified by the SOGS-R as having experienced gambling problems at some stage in their lives (lifetime problem or probable pathological gamblers) were found to <u>currently</u> have problems (current problem or probable pathological gamblers). Abbott and Volberg (1991; 1996) concluded that while this indicated that the majority of respondents had experienced gambling problems over a significant period of time, it also implied that a substantial number had overcome or reduced their gambling problems. Although many of the lifetime probable pathological gamblers re-interviewed in phase two said they believed that they had had a gambling problem, none reported ever having received professional help for their gambling problems.

The inference that SOGS-R defined <u>lifetime</u> problem and probable pathological gamblers who were currently in a no problem or less serious SOGS-R defined category provided an indication of improvement or recovery rested on the assumption that the lifetime measure is stable over time. In other words, if a person indicated that at some time in their lives they had experienced five of more SOGS-R gambling-related problems, it was expected that they would do so again in the future if asked the same questions. However, the recent seven year follow-up of 1991 participants found that a substantial number of respondents who scored within the <u>lifetime</u> probable pathological range in 1991 failed to do so when re-assessed on the same measure in 1998 (Abbott, Williams & Volberg, 1999). It was further found that current and lifetime changes in SOGS-R performance between 1991 and 1998 had a strong tendency to shift together (co-vary) over time.

From this indication of instability over time and other findings of the 1998 follow-up study, it was concluded that 'lifetime' SOGS-R performance is influenced by current problem gambling status and, at best, provides a conservative index of actual lifetime problem gambling. This has important implications for the interpretation that has been given to a number of findings from previous problem gambling prevalence surveys including 'spontaneous' or 'natural' recovery and the belief that higher youth prevalence rates indicate recent prevalence increases. It also points to the dangers of using retrospective accounts from cross sectional surveys to assess past events and the need for prospective longitudinal studies to examine change over time. These matters are discussed in more detail in Abbott, Williams and Volberg (1999) and will be addressed further in the discussion section of this report.

A number of risk factors for problem and probable pathological gambling were identified in the 1991 phase one survey. Approximately half of the 1991 problem and probable pathological gamblers were Mäori and Pacific Islanders, a proportion far in excess of their representation within the adult population. Pacific Islanders appeared to be at particularly high risk although the sample was relatively small and the prevalence estimate must be treated with caution. Half of the problem and probable pathological gamblers were aged under 30 years. Male gender, unemployment and a reported history of parental gambling problems were additional strong risk factors. Other statistically significant risk factors identified included: being single, the occupation of the main household income earner (higher among non-professionals/non-managers), household size (higher in households of 5 or more), not having technical, professional or degree level educational qualifications and living in Auckland.

Given the inter-correlation between these risk factors, e.g. Mäori and Pacific Islanders are more likely than European (Pakeha) New Zealanders to be young, unemployed, live in larger households and reside in Auckland, a multiple discriminant function analysis was conducted (Abbott & Volberg, 1991; Volberg & Abbott, 1994). This analysis failed to separate (discriminate between) the problem and probable pathological gambling groups, but made a strong separation between the two problem groups and participants who did not report significant problems. The variables that contributed most to this separation included age, ethnicity, reporting a history of parental gambling problems, marital status and gender.

Probable pathological gamblers and, to a somewhat lesser degree, problem gamblers, were found to regularly participate in a much wider variety of gambling activities than people without significant problems and to report spending more money on average on all forms of gambling. This difference in expenditure was much greater for continuous rather than for non-continuous gambling activities.

The most favoured forms of continuous gambling among the probable pathological and problem groups, relative to non-problem participants, were track betting, gaming machines, card and dice games and Instant Kiwi. Approximately one-half of the total gambling expenditure of probable pathological gamblers and one-quarter of the expenditure of problem gamblers went on track betting. Gaming machines were the only other variety of gambling to account for a large percentage of problem and probable pathological gamblers' expenditure.

A great deal of additional information regarding the 1991 problem gambling groups was provided by the phase two study (Abbott & Volberg, 1992). For example, the younger (under 30 years) group of probable pathological gamblers appeared to differ from their older counterparts in a variety of ways. They reported commencing gambling at an earlier age and generally preferred gaming machines. Their problems also appear to have developed more rapidly. A strong relationship was found between problem gambling and alcohol-related problems. Over 60 percent of the probable pathological gamblers were identified as currently engaging in excessive or hazardous alcohol use compared to 19 percent of the non-problem group. Somewhat weaker but statistically significant associations were found between problem gambling and both depressive symptoms and general psychiatric disturbance.

Abbott and Volberg (1992, p. 12) concluded:

> Gambling participation and expenditure have increased rapidly since the introduction of new forms of gambling in the late 1980s. It is highly probable that gambling-related problems including pathological gambling have also increased significantly, especially among groups that are most involved in continuous forms of gambling on a regular basis, namely young men, Mäori, Pacific islanders and the unemployed.

> Given the latency period between starting gambling on a regular basis and the development of problems, it is likely that the present study was conducted too soon to capture the full impact of increased gambling participation on the prevalence of problem and pathological gambling within the community. It is expected that there are large numbers of people still in the 'pipeline' who will progress from regular or problem gambling to pathological gambling during the next few years.

The introduction of casinos and other new forms of gambling, as well as the more aggressive marketing of gambling activities, will also contribute to increased participation and very probably to increased prevalence rates.

Subsequently, Abbott, Williams and Volberg (1999, p.32) have speculated:

An alternative hypothesis to that proposed by Abbott and Volberg (1992) is that many young problem gamblers will 'grow out' of their problems. It is also conceivable that as people and society more generally obtain increased experience with the new forms of gambling, adaptations will be made that enable problems to be more readily countered or contained. Increased public awareness of problem gambling and its early warning signs, the development of informal social controls and the expansion of treatment and self-help options, may play a part in this process. Under this more optimistic scenario, the proposed relationship between rising gambling participation and increasing problems may be attenuated or, possibly, reversed.

Shaffer, Hall and Vander Bilt (1997) have previously commented on this second scenario:

We can anticipate that, like the very slow adjustment people have made to the information about tobacco-related dangers, or the repeal of prohibition of beverage alcohol, the informal and formal social controls necessary to provide protection against gambling problems will emerge slowly, perhaps only after decades and generations of social learning. Formal social controls include law and other regulatory mechanisms; informal social controls rest more on the folkways and mores of a given social setting (p. 58).

Both the present survey and the longitudinal follow-up of the 1991 phase two participants (Abbott, Williams & Volberg, 1999) provide information relevant to an evaluation of these alternative hypotheses.

<u>1996 North Health Survey</u>

This national survey and gambling participation information obtained from it has been mentioned above. Some methodological shortcomings were noted. The overall six months SOGS-R current probable pathological gambling prevalence estimate was 0.4 percent. This rate is lower than the corresponding 1991 estimate of 1.2 percent. However, the North Health report authors maintain that the methodological flaws in their study and low response rate mean that little confidence can be placed in the data collected in the 1996 survey. Further consideration of the findings of this study is provided in Chapter Five of this report.

2.4 Methodological Considerations

In the foregoing discussion of gambling participation and prevalence surveys, methodological issues have been mentioned on a number of occasions. This is an important matter because of the potential for methodological problems to seriously compromise the quality of information obtained from surveys and the validity of any conclusions based on this information.

In their meta-analysis of North American problem gambling studies, Shaffer, Hall and Vander Bilt (1997) outlined an evaluative template that they applied to each of the studies they examined. The criteria included were as follows:

- Sample selection process (i.e. randomly selected sites and/or respondents)

- Response rate (including appropriateness of the method used to calculate the response rate)

- Survey anonymity

- Whether the study underwent a peer review process

- Whether the authors assessed the reliability of their data collection and entry procedures

- Whether the authors varied the time of day survey data were collected

- The number of respondents in the study sample

- Whether the authors took a multidimensional approach to measuring disordered gambling (e.g. multiple dependent measures)

- Whether the study was intended primarily as a prevalence study.

Shaffer, Hall and Vander Bilt (1997) concluded that the quality of the North American studies, assessed by these criteria, varied considerably but was generally poor. For example, over a third did not report a response rate and over half of those that did either calculated it incorrectly or did not specify how it was calculated. Response rates, when reported, were generally low and well below the 70 percent minimum recommended by Shaffer et al. Sample sizes were also generally small. Few studies used more than one measure of problem gambling and none used two stage designs with second stage assessments to check the validity of the screen used in the first stage and estimate the number of false positives and negatives. Less than a third of the studies had appeared in peer reviewed publications. When the overall quality scores for each study were plotted over time, it was concluded that there had been no improvement in methodological quality. Abbott and Volberg (1999) found that these deficiencies, and a number of additional ones, also characterised studies conducted in Australia and New Zealand.

Contrary to Shaffer, Hall and Vander Bilt's (1997) expectations, a significant relationship was not found between methodological quality and the size of prevalence estimates obtained. They concluded that problem gambling is a reliable and robust phenomenon, "relatively impervious to some of the weaknesses inherent in many of the research designs reviewed in this study" (p. 61). They also failed to find significant differences in prevalence rates between published and unpublished studies.

While problem gambling may indeed be a robust phenomenon, with broadly similar patterns emerging when different measures and methodologies are used to assess it, this does not mean that the issue of methodological quality can be ignored. Low participation rates in problem gambling surveys, often largely attributable to high refusal rates, are of particular concern given that they are endemic. In addition, there are clear indications that in gambling surveys and social surveys more generally, response rates have been falling further in recent years (Abbott & Volberg, 1999). This applies to both telephone and door knock surveys.

With regard to high refusal rates, it appears that heavy, continuous gamblers are more likely to terminate interviews or not proceed to sections containing questions about problem gambling (Dickerson et al, 1996). There is reason to believe that pathological gamblers are also more likely than other members of the community to decline to participate in problem gambling surveys (Productivity Commission, 1999). However, it is also conceivable that non-gamblers or people who gamble infrequently may consider that such surveys are not relevant to them and decline to participate. **Given the uncertainty about the characteristics of people who decline participation, it is desirable to obtain high response rates in gambling and problem gambling surveys.**

The majority of gambling and problem gambling surveys involve telephone recruitment and telephone interviews. In the case of telephone surveys, even before contact is attempted, certain groups are under-represented, including those that are known to include large numbers of regular gamblers and problem gamblers. In New Zealand, for example, Mäori and Pacific Islanders have lower levels of telephone ownership than European or Asian New Zealanders. Although the 1991 New Zealand national survey over-sampled Mäori and Pacific Islanders to compensate for the under-representation of these groups, this procedure did not reach those without a telephone. It is possible, indeed likely, that this latter group differed from their counterparts with telephones. This over-sampling also added to the complexity of the design.

In addition to those who refuse to participate, the other major reason for low response rates is failure to make contact with potential respondents. It is possible that problem gamblers and people with busy or erratic life-styles (including heavy gamblers) may be away from home more than others. Problem gamblers may also be more likely than other people to have had their telephones disconnected through non-payment of bills or residential mobility. Using the most up-to-date electronic telephone lists rather than published directories can be expected to help remedy this potential source of bias. Random digit dialling could also assist in this respect, as well as picking up some people who have unlisted telephone numbers. Making multiple call-backs at varied times of the day over a prolonged period of time can improve the initial contact rate. Many of the studies reviewed by Abbott and Volberg (1999) and Shaffer, Hall and Vander Bilt (1997) either did not indicate how many calls were made or made relatively few call-backs.

Australia, New Zealand and most North American jurisdictions are ethnically diverse. In New Zealand and Australia, approximately one-in-five residents are immigrants. As indicated previously, there is considerable variation between ethnic groups with respect to gambling participation and, in some cases, problem gambling prevalence. However, very few surveys have used interviewers proficient in ethnic minority languages. This omission could also contribute to low survey participation rates from this sector of the population.

Relatively few gambling survey reports have provided confidence intervals for even the major gambling participation and expenditure estimates. Somewhat more have provided this information for problem gambling prevalence estimates. However, given the small sample size used in most studies, the confidence intervals are often wide, especially for subgroups. Furthermore, as mentioned previously, virtually all of the surveys are technically complex. Most used multi-stage, stratified cluster designs. This refers to the different levels of respondent selection. For example, telephone surveys frequently involve the selection of telephone numbers from directories and the selection of people to interview from within households. Face-to-face surveys involve the selection of small areas or units to sample from, the selection of households within these units and the selection of respondents within households. These methods generate samples that vary

from what would be attained if simple random and independent sampling of the population had occurred. As mentioned earlier, the Swedish national survey is an exception because that country has up-to-date listings of virtually all Swedish residents, listings that could be accessed by the research team. As indicated above, complex samples have important implications for both variance estimates and subsequent statistical analysis (Abbott & Volberg, 1999; in press).

The majority of problem gambling surveys appear to have made appropriate weightings for the selection of only one respondent from households of variable size to adjust for the over-representation of people who live alone or in small households and post-stratified for a few other variables such as gender and age. This means that the samples were weighted to approximate, with respect to these variables, what would be expected if they were randomly selected from the population. While these adjustments do not correct for many of the sources of potential bias mentioned above, they do enable more accurate estimates to be made for the population as a whole. However, this does not deal with the matter of design complexity. It was noted above that such designs do not present problems for point estimates such as percentages or means. However, standard errors of measurement and confidence intervals associated with these estimates are typically underestimated when standard formulae are used to calculate them. This issue has not been dealt with to date in problem gambling surveys.

A further consideration, again mentioned earlier, concerns the reliability of confidence intervals for very low or high estimates. Given that problem gambling prevalence estimates are generally low, especially for the more serious category of probable pathological gambling which usually range from 0.5 to two percent, they also require specialist treatment beyond that provided by conventional statistical software packages. As with the matter of complex sample designs, this has also not been addressed to date in problem gambling surveys. Similarly, the related issue of non-symmetrical confidence intervals, referred to previously in relation to the 1991 New Zealand national survey, has not been considered in the problem gambling literature.

All surveys have a number of other inherent problems apart from those just considered. They involve asking people about aspects of their lives that they may or may not wish to report or report accurately. The recent Australian Productivity Commission report refers to a relevant survey of problem gamblers receiving counselling (Productivity Commission, 1999). Substantial numbers said they would not disclose their problems if asked in a general population survey. This suggests, as might be expected, that gambling is one of the areas of peoples' lives that some respondents will not want to discuss freely with interviewers. Even when people are willing to be interviewed, there are a number of problems that commonly arise with respect to recall, especially for distant events. The previous reference to instability in lifetime SOGS-R performance is a case in point.

The reliability and validity of information obtained in surveys is influenced by a variety of additional factors that have been investigated by social scientists. Some of these sources of potential bias can be reduced by careful questionnaire design, pre-testing and piloting prior to the commencement of a study (Schwarz, 1999). The use of standardised measures such as the SOGS-R that have been validated and used in other studies also increases the likelihood of obtaining valid information and facilitates comparison with previous research. Despite some concerns about the SOGS-R, even its strongest critics maintain that it currently remains the measure of choice for problem gambling prevalence studies (Abbott & Volberg, 1999; Productivity Commission, 1999).

70

3. METHODOLOGY

3.1 Introduction

This chapter describes the methodology used in the 1999 National Prevalence Survey.

Prior to commencing the national survey, extensive preparatory work was undertaken. This included a critical review of previous gambling and problem gambling surveys conducted internationally (Abbott & Volberg, 1999). It also involved cognitive testing of the questionnaire, internal and external peer review, ethical clearance, two pilot studies and obtaining approval from the Minister of Statistics to proceed with the survey. It was originally intended to conduct the survey during late 1998. For a variety of reasons, the preparatory phase was more detailed and protracted than originally planned and interviewing for the full survey did not commence until early 1999.

From the outset there were some tensions inherent in the project objectives. A primary concern was to execute the 1999 survey in a way that would facilitate comparison with the main findings of the 1991 National Survey of Problem and Pathological Gambling. However, there was also a concern to ensure that the 1999 survey incorporated advances in knowledge about the topic since 1991. Ensuring high quality methodologically was a further, over-riding, imperative.

In designing the study, there was a major concern to use procedures that would generate a high response rate. The principal investigators agreed with Shaffer, Hall and Vander Bilt (1997) that 70 percent was an appropriate minimum target. Statistics New Zealand (SNZ) considered this to be the minimum that would be acceptable professionally for this survey or that would pass external peer review and obtain Ministerial approval.

From the review of the international gambling and problem gambling literature, it was evident that response rates in excess of 65 percent were rare in general population surveys (Abbott & Volberg, 1999). Since the 1991 national study, response rates for social surveys generally have been falling both within New Zealand and internationally. The 1996 North Health attempt to 'replicate' the 1991 survey was characterised by a low response rate and a sample that the survey authors considered to be seriously biased (North Health, 1996). Consequently, consideration was given to shifting from telephone to face-to-face interviews for the 1999 survey. Although such surveys in the problem gambling field do not generally yield higher response rates than telephone interview surveys (Abbott & Volberg, 1999), SNZ has obtained rates in the 75 to 90 percent range for recent face-to-face national surveys on other topics.

The main reason for deciding to retain telephone interviewing was that comparability would be lost with both the 1991 survey and a large body of international gambling research that is primarily based on telephone interviewing. A change to face-to-face interviewing would also have involved a considerable increase in the cost of data collection that would have had to be offset by a reduction in the sample size. This would have had an adverse effect on the attainment of some of the aims outlined in Chapter One.

While SNZ was considered by NZGS consortium members to be the only organisation in New Zealand that could currently obtain the response rate sought, SNZ had no prior experience in the recruitment of participants by telephone.

A further tension arose from the dual purpose of the national survey, namely to collect relatively detailed information and to recruit participants for a second phase of the study involving in-depth, face-to-face interviews. If the first phase interview was too long or intrusive, it was thought that this could compromise the recruitment process and adversely affect the phase two response rate.

The original intention of the principal investigators was to conduct a large national survey with boosted samples of Pacific Islanders and Asians. The inclusion of boosted samples was to enable reliable estimates to be made of gambling participation and problem gambling prevalence in these sub-populations. An overall sample exceeding 6,000 was sought, including approximately 500 Pacific Islanders and 500 Asians. Mäori over-sampling was not considered necessary as it was anticipated that sufficient Mäori respondents would be obtained from the general population sample. As indicated previously, it was agreed that telephone recruitment and administration of the questionnaire would be employed and that the questionnaire and other aspects of the methodology would be as similar as possible to the instrumentation and procedures used in the 1991 national survey.

The recruitment to phase two was complicated by the involvement of two agencies in this part of the study. Because another member of the research consortium, the National Research Bureau (NRB), was responsible for phase two data collection, it was necessary to obtain the written consent of participants to hand over contact details including names and telephone numbers. Given that the phase one interviews were conducted by telephone, this meant that obtaining written consent would require mailing and/or personal delivery of the consent forms. Both the logistics of this and the resulting response rates required examination prior to proceeding with the survey.

3.2 Questionnaire Development and Pilot Studies

Cognitive Pre-testing

The principal investigators prepared the draft questionnaire. This draft closely followed that used in the 1991 New Zealand national survey. It included the SOGS-R developed for that survey. Although studies in various parts of the world have since extended the timeframe of the current SOGS-R from six to 12 months, the original six months timeframe was retained for both the gambling participation and problem gambling SOGS-R items. It was recognised that this might result in slightly lower current prevalence estimates than would be obtained if the 12 month format was used and some loss of comparability with the findings of most studies conducted elsewhere in the world. However, switching to a different timeframe would mean that the findings of the 1991 and 1999 surveys could not be readily compared. The lifetime phrasing of the SOGS-R items was also retained so that both current and lifetime prevalence estimates could be obtained and compared with their 1991 counterparts. In contrast to the situation for current prevalence, the national survey lifetime estimates could be compared with the findings of studies conducted elsewhere, except for those in Australia.

A second problem gambling measure, the Fisher DSM-IV Screen, was also included in the draft questionnaire. This instrument has a 12 month timeframe and has been used in some recent North American surveys (Abbott & Volberg, 1999). It was also included in

phase one of the Swedish National Survey of Problem and Pathological Gambling (Rönnberg, Volberg & Abbott et al, 1999). Although not as fully validated as the SOGS and SOGS-R, this alternative measure is based on the most recent version of the DSM, whereas the SOGS and SOGS-R were derived from the earlier DSM-III and validated against DSM-III-R diagnostic criteria.

As indicated earlier, a number of new forms of gambling have been introduced to New Zealand since 1991. These new forms were added to the gambling participation section of the draft questionnaire for the 1999 survey. Very few 1991 respondents had indicated involvement in some of the forms listed in the 1991 questionnaire. Members of the Department of Internal Affairs NZGS consultative committee were of the view that involvement in these forms would remain very low and that they should be dropped from the questionnaire. Given the concern to avoid a high respondent load and the significant number of additions to this part of the questionnaire, the principal investigators agreed to remove these items from the draft questionnaire. The forms of gambling included in the 1991 and 1999 questionnaires are listed in Table 6. The omitted items are evident from inspection of this table.

Table 6: Forms of Gambling Included in the 1991 and 1999 National Surveys

1991	1999
Lotto	Lotto
Instant Kiwi	Instant Kiwi
Other instant scratch tickets	-
Other lotteries or raffles of any kind	Other lotteries or raffles or any kind
Housie, played for money	Housie played for money
Betting on horse or dog races	Betting on horse or dog races
Gaming machines	Gaming machines outside casinos
Overseas casinos	-
-	Casino gambling (a) machines (b) other
Card games, played for money	Card games, played for money
Dice games, such as Crown and Anchor	Dice games, such as Crown and Anchor
Gaming or casino evenings	-
Money bets with friends or workmates	Money bets with friends or workmates
Football pools	-
-	Other sports betting
-	Daily Keno
-	TeleBingo
-	0900 telephone competitions
-	Gambling on the Internet for money
Any other gambling activities	Any other gambling activities

A few further questions not in the 1991 questionnaire were also added. This included a question relating to general life satisfaction. This question was incorporated because wellbeing had been little investigated in relation to different patterns of gambling participation or problem gambling (Abbott & Volberg, 1999) and some information on this topic was sought by the project team.

Some of the other questions varied somewhat from those used in the 1991 survey, including the way labour force participation and ethnicity were defined. These changes were made to bring these definitions into line with usual SNZ practice and facilitate comparison with Census data and other recent New Zealand health and social surveys.

SNZ survey specialists cognitively tested the draft questionnaire with a number of people to examine ease of presentation, understanding of the questions and interviewer scoring and coding of responses to questions. A few minor changes were made to the phrasing of

some questions as a consequence of this testing. The SNZ Questionnaire Design Division then examined the revised draft questionnaire. SNZ staff and the principal investigators considered the Division's report and made a few additional minor changes to the phrasing of some questions. The revised draft of the questionnaire was included in the first field test (pilot study).

Pilot Study 1

This field test was conducted primarily to:

- Provide an indicative response rate

- Trial two different methods for selecting respondents within the household, namely selecting the person who had the next birthday and using a Kish selection grid

- Trial the telephone frame methodology, in particular to (a) obtain unlisted numbers using an 'add one' method versus numbers as supplied by Telecom not adjusted for unlisted numbers, (b) assess the geographic dispersal of the 'add one' method and (c) test the effectiveness of targeting people from Pacific Island and Asian ethnic groups in Auckland

- Trial the consent process, in particular (a) the procedure for obtaining written consent to pass on contact information for phase two recruitment, (b) the drop-off for verbal consents from the telephone interview to SNZ receiving written consent and (c) the effectiveness of links with the NRB (the consortium partner responsible for phase two interviewing)

- Assess respondent load.

Additional goals of this field test were to:

- Further pilot the questionnaire (both personal questionnaire and household forms) to ensure that there were no significant problems with them

- Trial the proposed field methodology, in particular (a) telephone recruitment and interviewing and (b) interviewer training

- Provide data for testing the data capture and edit system

- Provide data for the Analytic Support and Social Policy sections of SNZ to test data analysis

- Trial non-standard classifications developed for the survey.

This field test was conducted during the last week in July 1998. The sample size was 700 telephone numbers provided from electronic listings by Telecom. Eight sub-samples were selected. Twelve SNZ interviewers conducted the interviews.

The response rates obtained in the first pilot study were 56 percent using the next birthday method and 54 percent using the selection grid. Although comparable to rates obtained in many previous gambling and problem gambling studies and higher than those of the recent United States and Australian national surveys, the pilot response rates were considered by the research team to be unsatisfactory. Response rates were lowest in Auckland

(50%) where it was intended to over-sample Pacific Islanders and Asians in the national survey.

One reason for the low response rate was the number of households or eligible respondents not contacted (105 of the total sample of 700). However, the main reason was the large number of people (137) who declined to participate prior to respondent selection. It was considered likely that those in the first category could be reduced by making additional call-backs, extending them over a longer time period and varying the times of the day at which calls were made. Those in the second category were regarded as posing a greater challenge. Strategies considered included changing some aspects of the interviewer training, increasing the number of call-backs and writing to selected households in advance and advising them they would shortly be contacted for an interview.

Participation in official SNZ surveys is mandatory (required by New Zealand law). This requirement could have been invoked to enhance the response rate. However, it was stipulated by the contracting organisation (DIA) that the present survey was to be voluntary. The DIA also required that the survey had approval from an appropriate ethics committee. In addition, the project director is an employee of a university and both of the principal investigators are members of professional bodies that have policies that relate to the ethical conduct of research. For these reasons, the principal investigators agreed that invoking the Statistics Act was not an option. They also interpreted the voluntary participation requirement as precluding the payment of potential respondents or offering monetary prizes as has occurred in some gambling surveys (Abbott & Volberg, 1999). A further method that has been strongly advocated by Shaffer, Hall and Vander Bilt (1997) involves phoning back people who had declined and asking them to reconsider their participation. Although this option was given consideration, it was also rejected. However, where practicable, respondents in the problem and probable pathological categories who had declined to carry on to phase two were approached a second time by another interviewer.

Five percent of respondents who were interviewed in the 'add one' sub-sample had unlisted numbers, less than the percentage of New Zealand households with unlisted white page directory numbers. It was considered that this lower percentage may have resulted in part from using the most up-to-date electronic lists that included active numbers (approximately 5 percent) that do not appear in printed directories.

The sample and selection procedures used to target Asians and Pacific Islanders were not as successful as expected. On the basis of the pilot results, SNZ concluded that many thousands of additional screening calls would be required to provide adequate 'over-samples' of Asians and Pacific Islanders. It was also concluded that the inclusion of these boosted samples would increase the sampling error for the main sample from approximately 4 percent to 5.4 percent and add to the complexity of the design. On resource and technical grounds, SNZ recommended dropping the proposal to include boosted sub-samples.

Following completion of the second pilot study, the principal investigators and the DIA subsequently agreed to this recommendation. While it was considered desirable to obtain information about these ethnic groups, DIA confirmed that the primary concern was to obtain robust estimates of gambling participation and problem gambling for the population as a whole.

Forty-five phase one pilot study respondents were randomly selected for phase two. These people were drawn from the following four categories: lifetime probable pathological gamblers, regular continuous gamblers, regular non-continuous gamblers and infrequent gamblers. The proportions selected were based on the relative numbers in these categories in the 1991 national survey. It was found that the number of regular continuous gamblers was smaller than expected on the basis of 1991 proportions and that the number of infrequent gamblers was substantially larger. This raised the possibility that the proportions of people in the gambling categories employed had changed since 1991 and that phase two selection ratios might need to be modified.

Thirty-three (73%) of the 45 respondents selected from the pilot study for phase two agreed to participate in phase two. Thirty of the 33 participants who agreed to take part subsequently provided written consent when a SNZ interviewer called to collect the consent form. This was considered by the research team to be satisfactory. However, if the phase one response rate was low in the main survey, e.g. 55 percent as in the pilot, it was noted that the actual phase two rate would in fact be only 40 percent. This would not be acceptable.

Of the 11 probable pathological gamblers selected from the pilot study for phase two, nine consented to participate. The only category where a low rate was obtained was the regular continuous group (6 out of 10). Infrequent gamblers had a high rate (15 of 21 agreed to participate).

Interviewers noted that the phase one interview involved high respondent load because of the interview length (mean of 18 minutes for the personal questionnaire), the repetition of some problem gambling questions and the perceived irrelevance of these questions for many interviewees. Interviewers were of the opinion that adverse participant reaction to the SOGS-R and Fisher DSM-IV Screen items in phase one was a reason why some respondents declined to take part in phase two. Consequently, following the pilot, the Fisher DSM-IV Screen was removed from phase one to shorten the questionnaire. This screen was transferred to the phase two interview schedule.

While the 'next birthday' method was preferred by most interviewers, it made respondent selection in the ethnic screening interviews difficult and inefficient. Although the Kish procedure took more time, it was considered to be more effective than the 'next birthday' method in ensuring random selection within households.

The pilot also involved evaluation of the interviewer manual prepared for the survey and interviewer training. The interviewers found the inclusion of a briefing from DIA staff particularly informative. This briefing included an overview of the gaming industry in New Zealand, the prevalence of gambling and problem gambling and the relevance of the survey. It was agreed that this briefing increased interviewer understanding of the survey, motivation and ability to recruit participants.

Questionnaire scoring, data capture and editing systems were evaluated. Some improvements in questionnaire layout were recommended. The data capture and editing software and implementation were found to be satisfactory.

A number of recommendations, additional to those already mentioned, resulted from the pilot study. The critical concern was to find ways to increase the phase one response rate. It was agreed that additional consideration would be given to ways to improve the

response rate and that a further pilot would be conducted prior to making a decision to proceed with the main survey.

Pilot Study 2

The second pilot study involved skirmish work to test a variety of recruitment introductions and a field test primarily designed to provide an indication of the likely response rate for the main survey. This included an examination of the effect that a pre-notification letter would have on the response rate. This pilot was conducted near the end of 1998.

During the skirmish phase, a variety of alternative introductions were developed and assessed by SNZ Survey Design and Development staff. This method involved telephoning people using the various introductions and asking people who declined to participate how the interviewer could have approached them differently to get them to agree to take part. Advice was also provided by staff from consortium partner NRB, a research company with a great deal of experience with telephone surveys.

From the phase just described, four introductions were developed and tested with approximately 30 different telephone respondents. It was found that explaining from the outset what SNZ was and did helped to establish a link with respondents. Substituting reference to gambling with "the survey is to do with betting activities or games such as Lotto, TAB or TeleBingo" was found to increase participation. In the case of respondents who said they did not gamble, adding the comment "we're still interested in you - we need to talk to people who don't do any of these things" was found to assist in retaining their interest. Explaining at the beginning that a selection process within the household was involved and that this would only take a short time to complete also assisted.

The final introduction developed for the initial respondent selection phase was as follows:

> Hello. I'm (name) from Statistics New Zealand. We're the government department which collects statistics, for example we do the Census. We're doing a survey. What I need to do is select one person at random from your household and ask them to take part. Would it be OK to do this now? It only takes half a minute to do the selection.

This new introduction was used in the second pilot.

The second pilot was undertaken to evaluate the new introduction and other changes intended to improve the response rate, and to examine the impact of ethnic screening on the survey process. In addition to the new introduction, a pre-notification letter was evaluated. The letter provided background information about SNZ and advised that the household had been selected for the study and would be contacted shortly by telephone. Statistics Canada had advised that letters of this type can boost response rates by five to six percent.

There were two samples in the second pilot. Both consisted of 1,100 people, large enough to yield separate indicative response rates. They both included a 'core' sample and Asian screening sample to test screening in general. The 'add one' procedure to detect unlisted numbers was not included as sufficient information on this aspect had been obtained from the first field test. In addition, if this method had been used it would not have been possible to obtain addresses to send out the introductory letter for the 'add one' sample. The grid method was used to select respondents within households and

increased callbacks were made, namely up to eight for each household and five to obtain the selected respondents. One sample included the pre-notification letter. Recruitment took place over three weeks instead of the one week in the first pilot.

The entire revised phase one questionnaire was included but no action was taken to select respondents to go through to phase two. Respondents who received pre-notification letters were also probed to establish the effectiveness of the letters. The total sample size for this pilot study (n = 2,200) was larger than samples used in the majority of population surveys of gambling and problem gambling undertaken to date internationally.

The pre-notification method generated a response rate of 73 percent. The 'no letter' estimated eligible response rate was 59 percent. This difference was statistically significant. The differences in refusal rates were of particular note, namely Pilot 1 (24%), Pilot 2 - no letter (19%), Pilot 2 - letter (10%).

The majority of people telephoned in the 'letter' sample had read the letter and many indicated that they appreciated the background information provided. The interviewers found that the letter gave them a starting place and was preferable to 'cold calling'.

The percentage of Asian respondents picked up by the screen used was comparable with the proportion expected based on Census figures.

Following the second pilot, the methodology was finalised and preparations made for the data collection phase of the national survey. Based primarily on the pilot findings but also on cost considerations, it was decided to use up-to-date electronic 'white page' listings provided by Telecom and not use the 'add one' method to attempt to pick up some unlisted numbers. It was decided to include the pre-notification letter and agreed that obtaining a high response rate was more important than including some participants who chose to have 'silent' listings. Had the 'add one' method been used, it would not have been possible to send pre-notification letters to these respondents. As already mentioned, it was also decided to drop the original plan to include boosted samples of Asians and Pacific Islanders.

3.3 Approvals

Prior to commencement, the Auckland University of Technology Ethics Committee approved the proposed study. The research proposal also underwent independent peer review from SNZ appointed reviewers and from Associate Professor Steve Haslett, Director of the Statistical Research and Consulting Centre at Massey University, who was statistical consultant and external auditor of the statistical methodology for DIA throughout the project. Finally, it received Ministerial approval to proceed from the Minister of Statistics.

3.4 Survey Population

Target Population

The target population for the national survey was defined as the non-institutionalised usually resident population of New Zealand aged 18 years and over.

The following were excluded from the target population:

- Long-term residents in old peoples homes
- Long-term residents in hospitals and psychiatric institutions
- Inmates in penal institutions
- Overseas diplomats and non-New Zealand staff members of foreign diplomats
- Overseas visitors who expect to be usually resident in New Zealand for less than 12 months.

Survey Population

The survey population was defined as the New Zealand on-shore non-institutionalised, usually resident population aged 18 years and over living in households that have a (non-mobile) listed telephone for private use at the time of sample selection.

The survey population was thus expected to have under-coverage of the target population where:

- People do not live in households with a telephone for private use
- People have an unlisted number
- People only have access to a mobile telephone
- People live on offshore islands
- People live in military barracks.

3.5 Survey Design

Frame

The sampling frame for the survey was the database of listed, residential telephone numbers maintained by Telecom. These numbers are grouped into 18 directories, covering all of New Zealand.

Sample Design

A stratified, two-stage sample design was used, with 18 Telecom directories as strata. Telephone numbers were selected randomly from each latest updated electronic directory, in proportion to the number of listed, residential telephone numbers contained in that directory. For each household contacted, a list of eligible household members was made and, using the selection grid method (based on the Kish procedure), one person was randomly chosen to take part. No substitution was allowed.

The selection grid method was used because of its robustness, relative lack of bias and SNZ experience of using it in other surveys. The alternative procedure considered, the 'next birthday' method, would not have produced a sound probability sample and would have allowed a greater chance of respondent self-selection.

It was decided not to use the 'add one' methodology to capture unlisted telephone numbers. As indicated previously, this would have precluded sending pre-notification letters to households selected using this methodology. Additional reasons included:

- Bias/under-coverage - not all listed residential numbers would have had a non-zero probability of selection and although there would be potential to capture some unlisted numbers, not all would have had a chance of selection

- Complexity - weighting, sampling errors and inferential statistical analyses would have become more complicated

- Expense - there would have been fewer usable responses per dialled number.

While there were logistical and technical advantages from not using methods to include households with 'silent' telephone numbers, there were also disadvantages. The most notable was the possibility that respondents selected from such households may have differed, with respect to gambling behaviour, from surveyed respondents.

No over-sampling of Mäori, Pacific Island or Asian groups was carried out. The unbiased method of doing this, namely screening, was ruled out for the following reasons:

- Inefficiency - the gains in accuracy in ethnic estimates, which were restricted by the inability to target areas high in ethnic composition, would not have compensated for the increase in cost and the decrease in accuracy of the national statistics

- Complexity - screening would have added great complexity to weighting and sampling errors, as well as to analysis of the unit record data.

Sample Size

A total of 9,300 telephone numbers were selected. The achieved sample was 6,452 adults. The estimated eligible response rate was 75 percent. This rate is similar to that of the 1999 Swedish national survey and higher than any previously published account of general population surveys of problem gambling, including the 1991 New Zealand National Survey.

A breakdown of the full sample is as follows:

Participation Code	Frequency	Percent
Full Response	6,452	69.4
Refusal (unknown eligibility)	1,114	12.0
Refusal (eligibility established)	374	4.0
Part Refusal	2	0
Non-contact (unknown eligibility)	492	5.3
Non-contact (eligibility established)	154	1.7
Unable to complete (death/illness)	181	1.9
All persons out of scope	20	0.2
Ineligible number	511	5.5

The response rate used in this survey is the estimated eligible response rate. This response rate gives the proportion of eligible households that fully respond. It is evident from the sample breakdown that there are a number of households of unknown eligibility. Consequently, it is necessary to estimate the proportion of these that were actually eligible to participate. The estimated eligible response rate is determined by classifying households into four eligibility status groups, namely:

- B Ineligible post-contact (all persons out of scope and ineligible number)
- C Eligible non-responding (refusals-eligibility established, part refusals, non-contact-eligibility established, unable to complete)
- D Eligible responding (full response)
- E Unknown eligibility (refusal-unknown eligibility, non-contact-unknown eligibility).

A weighted count is obtained of the number of households having each eligibility status. The estimated number of eligible households, U, is calculated as:

$$U = C + D + E\left(\frac{C + D}{B + C + D}\right)$$

The estimate eligible response rate is then given by:

$$\text{Estimated Eligible Response Rate} = \left(\frac{D}{U} \times 100\right)\%$$

The breakdown of the composition of the achieved sample relative to the expected composition is provided in Table 7.

Table 7: Composition of the Achieved Sample

Category	Raw Proportion	Weighted Proportion %
Male	44.2	48.5
Female	55.8	51.5
18-24 years	7.2	13.5
25-29	8.5	10.0
30-34	10.3	10.5
35-39	12.0	11.3
40-44	10.4	10.3
45-49	8.4	9.2
50-54	7.8	8.2
55-59	6.7	6.5
60-64	5.9	5.2
65+	22.7	15.4
Mäori	6.7	11.8
Pacific Island	1.3	4.1
Asian	2.7	4.4
European and other	89.4	79.8

The weighted proportions in Table 7 reflect the population benchmarks as employed in the raking ratio procedure used to post-stratify (raw) inverse selection probability weights to population proportions for sex, ethnicity, and age group combinations (Deville, Sarndall & Sautory, 1993).

Of the respondents randomly selected for phase two of the national survey, 303 (70%) provided written consent for their contact details to be passed on to NRB. Cognitive testing of the phase two questionnaire, re-contacting respondents who agreed to participate and seeking confirmation of their consent, and conducting face-to-face interviews with participants, was undertaken by NRB. Phase two interviewing took place during March, April and May 1999. As indicated previously, the results of this phase of the study will be reported separately.

From Table 7 it is evident that there is some under-representation in the achieved sample of younger adults, Mäori, Pacific Islanders and Asians. Older adults and Europeans and other ethnicities are somewhat over-represented. These differences are typical of New Zealand general population surveys. They arise for a variety of reasons. In the case of telephone surveys, Mäori and Pacific Islanders have lower levels of access to residential telephones (both approximately 85% relative to 96% for the remainder of the adult population). People of these two ethnicities are also more likely to live in larger households including households containing more than two adults. Consequently, under-representation is expected when only one household member is interviewed, and this is adjusted for by using inverse probability of selection weighting. People in these ethnic

groups may also be more likely to decline to be interviewed. Subsequent weighting of the sample can partially correct for the likely effects of this under-representation.

3.6 Data Collection

The survey was in the field from 23 January to 21 March 1999.

A pre-notification letter was sent to households in the sample indicating that the household had been selected to take part in an important social survey and that an interviewer would be contacting them by telephone some time during the next month. The letter, signed by the Government Statistician, was accompanied by a 'New Zealand in Profile' pamphlet, providing an overview of a variety of national statistical information. No other form of advance publicity was used in this survey.

Pre-notification letters were sent in two waves to ensure that households would be contacted within four weeks of their receipt. It was not possible to send letters to rural addresses as the name of the resident is needed for delivery. One hundred and sixty-six letters were returned to sender. Interviewers were provided with a supply of letters, 'New Zealand in Profile' and stamped envelopes, so when a letter had not been received interviewers offered to send one.

Thirty-eight decentralised interviewers administered the survey via telephone. No substitutions were permitted. Respondents were given the option of being interviewed in a language other than English. Twenty-five people either requested to be interviewed in another language or were considered by interviewers to require this service. Eleven such interviews were completed in the following languages: Arabic/Iranian (2), Hindi (2), Yugoslav/Russian (1) and Mandarin (6). In exceptional circumstances interviewers visited respondents and collected information face-to-face. This occurred on 41 occasions when requested by the respondent or when there were language or hearing difficulties.

Although the survey was carried out under the Statistics Act 1975, survey participation was voluntary. The average duration of interviews with fully responding participants was 20 minutes.

Up to eight telephone calls were made to establish initial contact with the household. In addition, a maximum of five extra calls were made to contact the selected respondent. Calls were spread across various times and days including weekends. After four non-contact calls to a household, the interviewer waited one week before resuming to try to make contact.

Quality control was undertaken using standard SNZ procedures. Specifically, a 100 percent manual check was carried out on the first batch of returns from each interviewer and additional training was given when it was considered necessary. Ten percent of all households were phoned back or revisited. Office staff and senior interviewers conducted the telephone callbacks. The contact to obtain written consent for phase two participation was also considered to constitute part of the quality control process.

The telephone callback used a questionnaire that asked:

- Whether the household had been contacted

- If the survey was completed

- About the attitude of the interviewer

- About compliance with survey rules

- Two questions from the Personal Questionnaire.

A total of 959 households were recontacted as part of the quality control process.

In the case of respondents selected for phase two of the survey, written consent was collected prior to any information being passed on to NRB. Generally this consent was collected in person by the interviewers conducting the phase one interview, i.e. respondents were mailed a consent form and it was subsequently collected by the interviewers. In situations where this was not feasible the consent forms were either collected by SNZ interviewers living closer to the respondent, or received from respondents via mail.

3.7 Questionnaire Content

Two questionnaires were used in the survey, the Household Form and Personal Questionnaire.

The Household Form

The Household Form was used to identify and select eligible respondents for the survey via the Kish method. It was also used in conjunction with participant responses to particular questions in the Personal Questionnaire to identify whether respondents were selected for the second phase interview. Both questionnaires are included in Appendix One.

Personal Questionnaire

The Personal Questionnaire contained groups of questions about:

- Forms of gambling participated in during the respondent's lifetime and during the past six months

- Monthly expenditure on each form of gambling for people who had gambled on that activity in the past six months and whether or not the respondent gambled weekly on any form or forms

- Preferred forms of gambling, and reasons for gambling participation

- The problem gambling items from the modified form of the South Oaks Gambling Screen (SOGS-R) originally developed for the 1991 national survey and since widely used internationally

- People usually gambled with, length of gaming sessions and largest amount of money ever lost gambling

84

- Age when the respondent started gambling, type of gambling involved in when first started, whether or not the amount of money gambled had ever made the respondent nervous, types of gambling involved in when nervous and age when this first happened

- Being in trouble with the law because of gambling-related activities

- Help-seeking for own gambling problems

- The presence of gambling problems in other family members and among people known to the respondent

- General self-rated happiness

- Sociodemographics.

3.8 Processing

A number of processing steps were followed in the survey. These steps are outlined below.

Data Capture

Data from phase one questionnaires were entered directly into computers in SNZ's Wellington office. The data capture programme, which used Blaise 3 software, allowed for a valid range of codes for each question and automatically followed the flow of the questionnaire.

Edit and Imputation

All survey records were subjected to computer edits to identify and correct invalid or inconsistent information. If it was possible to establish the value of missing variables from the original questionnaire, this was done. This was limited to variables required for weighting, namely age, gender and ethnic group. For all other questions, if the respondent was unwilling or unable to answer, 'refused' and 'not known' codes were used as appropriate.

If respondent age, gender or ethnicity information could not be obtained from the questionnaire, these variables were imputed randomly. Gender was imputed with an equal chance of male or female being assigned. Age and prioritised ethnicity were imputed based on the distribution of the sample data. It was also necessary to impute for the variable 'number of residential telephone lines in the household', since this was also needed for the weighting. In the few cases where the respondent did not give this variable, it was set at one. No other imputation was carried out for missing data items.

Classification and Definitions

The survey used SNZ's standard classifications related to income, occupation, labour force status, ethnic group, age and marital status. This allows the survey results to be integrated with data from other SNZ surveys. Some independent and non-standard classifications were also used to ensure comparability with the 1991 national survey. A list of definitions is provided in Appendix Two.

85

Coding

Several questions allowed "write in" responses. In the case of questions that had an "other - specify" category (for example "any other gambling activity", religion and country of birth) the response was examined and coded back to an existing code as appropriate.

Some of the questions allowed for multiple responses. For these "tick all that apply" categories, all responses were retained with each option shown as a separate variable on the data file.

Combined and Derived Variables

A number of variables were derived. Some of these derived variables are straightforward and involve the collapsing of categories. For example, age is collapsed into broad groupings. In other cases, several variables were combined to create a new variable, e.g. lifetime probable pathological gambler. A detailed description of derivations is given in Appendix Three.

3.9 Estimation

Weighting

Each respondent was assigned a unique survey weight, for use in producing survey estimates. The most important functions of these weights are to:

- Inflate the sample to represent the whole target population
- Account for different probabilities of selection
- Account for different non-response between sub-populations.

The steps involved in calculating the sample weights were:

- Calculation of basic selection weights as the inverse of the selection probability
- Adjustment for household non-response
- Adjustment for multiple telephone lines
- Adjustment for selection of one person per household
- Calibration of weights to population benchmarks.

Response Criteria

Incomplete questionnaires were treated as responses if all of the specified core questions were completed. They were treated as non-responses if some or all of the core questions were not completed.

Sampling and Non-sampling Error

The estimates derived from the survey are based on a <u>sample</u> of households and individuals within households. Somewhat different figures might have been obtained if a <u>complete</u> <u>census</u> had been taken using the same questionnaire and methods as those employed in the survey. The variability of a survey estimate due to the random nature of the sample selection is measured as its <u>sampling</u> <u>error</u>.

Errors that are not related to sampling may occur at almost every phase of a survey's execution. Interviewers may misunderstand instructions, respondents may make errors in answering questions as a result of recall problems, distortions or intentional deception, data may be coded or entered incorrectly and errors may be introduced in the processing and tabulation of data. These are examples of <u>non</u>-<u>sampling</u> <u>errors</u>.

Systematic errors will contribute to biases in survey estimates. In the present survey, considerable attention was given to measures designed to reduce non-sampling errors. Quality assurance procedures were implemented at each step of the data collection and processing cycle to monitor the quality of the data. Measures included:

- The use of experienced, specially selected skilled interviewers
- Extensive training of interviewers with respect to the survey procedures and questionnaire
- Cognitive testing and refinement of the questionnaire using a variety of methods including field tests and peer review
- Monitoring of returned questionnaires to detect misunderstanding of instructions and additional interviewer briefing or training when problems were detected
- Procedures to ensure that data capture errors were minimised
- Coding and edit quality checks to verify the processing logic.

A major source of non-sampling error in surveys is the effect of non-response on the survey results. The extent of non-response varies from partial non-response (failure to answer just one or some questions) to total non-response. Total non-response may occur because the interviewer was either unable to contact the selected household, the household refused to participate in the survey, or the selected respondent refused to participate in the survey. Total non-response was handled by adjusting the weight of each household that responded to the survey to compensate for those that did not respond.

Since estimates from sample surveys are also subject to sampling error, it is sound statistical practice to provide an indication of the magnitude of this error.

Sample Error Estimates

Given a certain sample size, the level of sample error for any given variable depends on the number of sampled individuals in the category of interest and the design effect for that variable. The design effect measures the performance of a complex sample design. It is the ratio of the variance under the complex sample design to the variance under simple random sampling.

In the present survey, sampling within households added extra complexity to the design. Because of this, sample errors for key outputs were estimated by the jackknife method, rather than using standard analytic formulae. This procedure accounted for all aspects of the sample design and estimation process, including the stratification, two stages of selection (households and selected respondent within households) and weighting adjustments.

The jackknife is a relatively computer intensive method of determining sampling error estimates. It is based on a methodology of comparing estimates derived from a set of carefully constructed partial deletions of the survey data. The advantage of this method is its flexibility: the same method can be used for a variety of simple estimates, including totals, means, proportions and rates, and for complex statistics such as chi-squares and regression coefficients. The disadvantage is that it cannot easily deal with order statistics such as medians and quartiles.

Estimates with large sample errors can be unreliable. For this reason it is important to take the sample error of an estimate into account when assessing its reliability. In the results section of the report, estimates with large relative sample errors are indicated and should be treated with caution.

Confidence Intervals

Much of the survey output reported in the results section involves proportions, e.g. statements of the kind "the proportion of males who are lifetime probable pathological gamblers". The jackknife replication for variance estimation usually provides reliable estimation of variance for proportions and most other descriptive statistics. However, statistical inference requires the construction of confidence intervals. Inferential statistics are used for such purposes as examining the strength and significance of relationships between different variables or change over time on the same measure. When sample sizes are large and the proportion not near zero or one, confidence intervals can be determined (via the Central Limit Theorem argument) by using a normal approximation. As mentioned earlier, if proportions are very small (close to zero) or very large (close to one), this approximation may be inappropriate because estimators are often not distributed normally at these extremes. In this situation, alternative methods can be substituted to provide more accurate and stable confidence intervals. In the present survey, a procedure recommended by Korn and Graubard (1998) is used for estimating the confidence intervals for some of the proportion estimates.

3.11 Data Analysis

In addition to the descriptive statistics such as proportions referred to in the previous section, statistical analyses were conducted to test the significance of differences between results obtained for various groups and to examine relationships between variables of theoretical and/or practical interest. Because many of the variables related to measures of particular interest (such as participation in certain forms of gambling and problem gambling) are themselves inter-related, a number of multivariate analyses were included. As indicated previously, complex samples such as that used in the present study call for the application of specialised statistical software to take account of this complexity. The package used for this purpose was WesVar [Complex Samples (v3.0)]. Confidence intervals for key variables were also estimated using the survey package Sudaan and asymmetric confidence intervals checked as part of the external audit of the phase one survey results.

In addition to multivariate analyses, a number of two-way tables are analysed to examine relationships between particular variables and to allow comparison with the findings of previous studies. These analyses should be regarded as indicators only of important effects related to gambling and problem gambling measures. More definitive analysis is provided by the multivariate analyses, especially logistic regression models.

A secondary objective of the survey was to compare the findings of the present survey with those of the 1991 national survey. While overall patterns can be and are compared in a general, descriptive way, formal statistical comparison of specific findings is complicated by some of the methodological differences between the studies. Furthermore, the design complexity of the 1991 survey was not taken into account in the earlier analysis of the survey findings and cannot be adjusted for with the precision that is possible in the present survey. Nevertheless, tentative comparisons of some major findings are made, albeit that they rest on assumptions that cannot be verified. This matter will be considered further in subsequent sections of this report.

4. RESULTS

4.1 Introduction

In this chapter, the major findings of the national survey are outlined. Subsequent papers will provide more detailed examination of some of the findings reported here and include additional analyses to test specific hypotheses and examine issues of interest to the specialist reader.

This chapter is divided into two major sections, namely gambling participation and problem gambling. In each section, some consideration will be given to comparisons between selected findings of the earlier 1991 national survey and the present survey. Comparisons will be examined further in a third, concluding section.

In Chapters One and Two, an overview of international and New Zealand trends in the development of gambling was provided. The findings of previous international and local population surveys of gambling and problem gambling were summarised and discussed. This included a description of the 1991 New Zealand National Survey of Problem and Pathological Gambling and an account of some of its major findings. Relevant conceptual and methodological considerations were also addressed in these chapters. Further methodological and some analytic issues were considered in Chapter Three, which was primarily concerned with description of the methods used in the present survey, including the refinement of these methods through pilot studies and other developmental work. This background provides a context for the findings outlined here and guided the selection and application of some of the analyses that were undertaken to examine relationships between particular variables. More extensive background information relevant to this survey is included in Abbott and Volberg (1999) and Abbott and Volberg (1991; 1996).

While some preliminary discussion of the survey findings is included in this chapter, for the most part discussion is reserved for Chapter Five, where the major findings are examined in relation to previous research and current issues within the gambling and problem gambling literature.

4.2 Gambling Participation

Introduction

This section is concerned with reported gambling participation and expenditure among New Zealand adults in 1999. Some reference is made to comparisons between relevant findings of the 1991 and 1999 national surveys.

Gambling in the General Population

As established in previous New Zealand surveys and recent studies in a number of other countries, the great majority of the adult population aged 18 years over (94%) report that they have participated in some form of gambling at some stage in their lives. The lifetime participation estimate for the 1991 national survey was 95 percent. The absolute sample error for the 1999 estimate of 94 percent was 0.6 percent. This is equivalent to the 95 percent confidence interval half-width and means that we can be reasonably certain that 94 percent of the adult population plus or minus 0.6 percent would have reported lifetime gambling participation if a census had been carried out. Put another way, we can be 95 percent confident that the true population percentage lies between 93.4 and 94.6. From this point on, sample percentages will usually be reported with their associated 95 percent confidence intervals.

Table 8 shows the lifetime, past six months and once a week or more often participation rates for the different types of gambling included in the survey. Rates are expressed as a proportion of the total of the adult population estimated to have engaged in each activity and absolute sample errors are provided for each column proportion. Relative sampling errors, which express the absolute error as a proportion of the estimate, are not reported but can be calculated from the figures in the table by dividing the absolute sampling error by the estimate (percentage). **Table cells with fewer than ten respondents or a relative sampling error greater than 50 percent are indicated by the symbol †. These estimates and their associated standard errors and confidence intervals should be treated with extreme caution as they may be unreliable. Cells with a relative sampling error of between 30 percent and 50 percent are shown with an asterisk and should also be treated with caution.**

In interpreting the information displayed in Table 8, it should be noted that the lifetime rates include past six months and weekly participation. The past six months rates include weekly participation.

Lifetime participation rates in 1999 are highest for Lotto (85.9%; 84.9-86.9%), other lotteries or raffles (76.8%; 75.6-78.0%) and Instant Kiwi (61.4%; 60.1-62.7%). This was also the case in 1991. Lifetime rates are also high for betting on horse or dog races (48.1%; 46.6-49.6%), and moderately high for gaming machine participation both in and outside casinos, taking bets with work-mates and TeleBingo. Between 25.8 percent and 37.1 percent of respondents acknowledge that they have tried these types of gambling at some time. Lifetime rates are below 25 percent for all of the other types of gambling included in the survey. Very few people reported having gambled on the Internet. The low percentage reporting engaging in "other gambling activities" indicates that the questionnaire listing of forms of gambling participated in by New Zealanders was comprehensive.

Past six months participation in at least one form of gambling (86.2%; 85.2-87.2%) was also high and among the highest reported internationally. Although weekly (once a week or more often) participation (40.8%; 39.2-42.4%) was also relatively high, the large majority of these weekly gamblers confined their involvement to non-continuous forms of gambling, especially Lotto.

Table 8: Participation in Gaming Activities by Frequency of Participation: Column Percentages and Absolute Sample Errors [1]

Gaming activity	Frequency of gaming participation					
	Ever participated		Participated in past six months		Participate once a week or more	
Lotto	85.9%	(1.0%)	72.6%	(1.3%)	35.0%	(1.4%)
Instant Kiwi	61.4%	(1.3%)	36.4%	(1.3%)	5.9%	(0.7%)
Daily Keno	8.8%	(0.9%)	3.1%	(0.6%)	*1.1%	(0.4%)
TeleBingo	25.8%	(1.2%)	16.7%	(1.1%)	6.2%	(0.8%)
Other lotteries or raffles	76.8%	(1.2%)	48.1%	(1.4%)	3.1%	(0.5%)
0900 telephone competitions	7.6%	(0.8%)	2.8%	(0.5%)	†0.1%	(†0.1%)
Internet - horse or dog races	†0.1%	(†0.1%)	†0.1%	(†0.1%)	†0%	N/A
Internet - other sports betting	†0.1%	(†0.1%)	†0.1%	(†0.1%)	†0%	(†0.1%)
Internet - lottery tickets	†0%	N/A	†0%	N/A	†0%	N/A
Internet - casino games	†0%	N/A	†0%	N/A	†0%	N/A
Other types of internet gambling	†0%	N/A	†0%	N/A	†0%	N/A
Gaming machines at a casino	35.7%	(1.3%)	10.6%	(1.0%)	†0.3%	(†0.2%)
Other games at casinos	16.4%	(1.1%)	4.5%	(0.5%)	†0.1%	(†0.1%)
Gaming machines not at casinos	37.1%	(1.5%)	14.0%	(1.1%)	2.0%	(0.5%)
Betting on horse or dog races	48.1%	(1.5%)	18.4%	(1.2%)	2.7%	(0.5%)
Other sports betting	10.1%	(0.8%)	4.9%	(0.7%)	*0.7%	(0.2%)
Dice games	4.2%	(0.5%)	*0.4%	(0.2%)	0%	(†0.1%)
Card games	14.6%	(1.1%)	2.9%	(0.5%)	†0.3%	(†0.2%)
Housie	17.1%	(1.2%)	2.5%	(0.5%)	*0.7%	(0.3%)
Money bets with friends or workmates	34.3%	(1.4%)	17.0%	(1.1%)	*1.2%	(0.4%)
Other gambling activity	3.5%	(0.6%)	*1.4%	(0.4%)	†0.2%	(†0.2%)
Total, any one or more forms	94.0%	(0.6%)	86.2%	(1.0%)	40.8%	(1.6%)

Note:
(1)   Absolute sampling errors are shown in brackets and are equivalent to the 95% confidence interval half-width
†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell
*   Relative sampling error is between 30% and 50%
N/A   Absolute sampling error cannot be calculated because there are no, or too few, respondents in the cell

Over a third (35.0%; 33.6-36.4%) of respondents reported weekly Lotto participation and nearly three-quarters (72.6%; 71.3-73.9%) reported having participated in this form of gambling during the past six months. The only other activities engaged in during the past six months by more than 15 percent of respondents were other lotteries or raffles, Instant Kiwi, betting on horse and dog races, taking bets with friends or work-mates and TeleBingo. Only two of these, Instant Kiwi and horse and dog (track) betting are continuous forms of gambling.

In the 1991 survey, 90 percent of national survey respondents indicated that they had gambled in the past six months; 48 percent reported weekly participation.

93

Patterns of Gambling Participation

In order to understand patterns of gambling participation, it is helpful to examine the sociodemographic characteristics of respondents who gamble at increasing levels of frequency. As discussed in Chapter Two, there is also interest in differentiating between people who participate regularly in continuous and non-continuous forms of gambling. In part, this interest stems from the expectation arising from the theoretical expectation (based on other research) that frequent participation in continuous gambling forms is a major risk factor for problem gambling. To analyse levels of gambling participation and distinguish between regular continuous and non-continuous gamblers, the respondents are divided into four groups:

- <u>Non-gamblers</u> who are defined as people who have never gambled and those who have not reported gambling in the past six months (13.8%; 12.8-14.8% of the total population)

- <u>Past</u> <u>six</u> <u>months</u> <u>gamblers</u> who have participated in one or more types of gambling in the past six months (45.5%; 43.8-47.2% of the total population)

- <u>Regular</u> <u>non-continuous</u> <u>gamblers</u> who have participated in one or more non-continuous types of gambling at least weekly but who have not participated in a continuous activity at least weekly (30.3%; 28.9-31.7% of the total population)

- <u>Regular</u> <u>continuous</u> <u>gamblers</u> who have participated in one or more forms of continuous gambling at least weekly (10.5%; 9.6-11.4% of the total population).

These four categories are mutually exclusive.

The regular continuous category includes people who, in addition to taking part in continuous forms, may also have participated in non-continuous gambling activities during the past week. Allocation to the non-continuous category, on the other hand, is confined to people who have participated exclusively in non-continuous forms during the past week. However, they may have engaged in continuous gambling activities less frequently.

Table 9a shows the percentages of people in a number of sociodemographic groupings who are 'non-gamblers' (including both people who have never gambled and those who have not gambled in the past 6 months), past six month gamblers, regular non-continuous gamblers and regular continuous gamblers. The absolute sampling errors for these estimates are provided in Table 9b. Other categories that are mentioned in Table 9a and 9b include 'not elsewhere included' and 'not in subject population'. **In this and subsequent tables 'not elsewhere included' refers to those people who either did not know the answer to the question or refused to answer the question. 'Not in subject population' includes those people who were not asked the question because it did not relate to them. For example, people who were not employed were not asked about their occupation.**

Table 9a : Patterns of Gambling Participation by Selected Characteristics: Row Percentages

Selected characteristics	Gambling status				
	Non-gamblers (1)	Past six month gamblers	Regular non-continuous	Regular continuous	Total Population Counts
Sex					
Male	13.1%	43.7%	31.0%	12.1%	1,313,580
Female	14.4%	47.1%	29.6%	9.0%	1,396,050
Age group					
18-24	13.2%	61.2%	13.9%	11.7%	365,740
25-34	11.5%	50.3%	28.2%	10.1%	555,610
35-44	12.1%	48.0%	30.8%	9.1%	584,350
45-54	13.1%	36.7%	39.0%	11.3%	471,120
55-64	14.5%	36.2%	36.3%	13.0%	316,200
65 plus	19.8%	38.6%	32.3%	9.3%	416,610
Ethnicity					
European	13.0%	46.1%	30.2%	10.7%	2,110,274
NZ Māori	* 9.6%	42.8%	35.2%	12.4%	318,651
Pacific Island	* 19.5%	44.8%	* 26.5%	† 9.2%	110,707
Asian	34.1%	39.4%	* 21.7%	† 4.8%	118,786
Other ethnic group	* 13.1%	52.0%	29.3%	† 5.7%	51,212
Country of birth					
New Zealand	12.0%	47.0%	30.2%	10.8%	2,150,500
Europe/Australia/North America	16.9%	38.6%	34.4%	10.1%	328,455
Other countries	25.6%	41.0%	* 25.3%	* 8.1%	229,480
Not elsewhere included	† 0%	† 46.3%	† 53.8%	† 0%	†1,195
Years since arrival in NZ					
Less than 4 years	34.9%	40.9%	* 17.1%	† 7.1%	95,884
4 years or more	17.6%	39.7%	33.0%	9.7%	458,601
Not elsewhere included	† 4.5%	† 0%	† 87.7%	† 7.8%	†4,645
Not in subject population	12.0%	47.0%	30.2%	10.8%	2,150,500
Highest qualification					
No formal qualification	16.0%	36.9%	34.3%	12.7%	609,831
School qualification	11.9%	48.4%	29.6%	10.1%	572,249
Vocational or trade qualification	12.5%	45.2%	31.7%	10.7%	1,148,982
Degree or higher qualification	17.0%	55.7%	20.6%	6.8%	378,568
Labour force status					
Employed	10.1%	46.7%	31.7%	11.5%	1,790,909
Unemployed	* 22.0%	50.2%	* 21.8%	† 6.0%	101,486
Not in the labour force	20.6%	42.2%	28.2%	8.9%	811,090
Labour force status unidentifiable	† 38.3%	† 26.7%	† 21.2%	† 13.8%	†6,146
Occupation					
Legislators, administrators and managers	* 7.7%	49.0%	31.0%	12.2%	225,248
Professionals	15.5%	51.9%	25.2%	* 7.5%	267,686
Technicians and associate professionals	10.5%	53.7%	26.9%	* 8.8%	232,387
Clerks	* 7.1%	43.7%	37.4%	11.8%	209,506
Service and sales workers	* 9.5%	47.4%	31.6%	* 11.5%	245,355
Agriculture and fishery workers	* 12.6%	55.1%	23.3%	* 9.0%	149,270

95

Trades workers	10.1%	40.1%	36.3%	* 13.6%	170,669
Plant and machine operators and assemblers	*8.9%	35.8%	39.6%	*15.8%	152,473
Elementary occupations	* 7.3%	36.0%	39.6%	17.1%	138,315
Not in subject population	20.9%	43.0%	27.5%	8.6%	918,721

Main activity for those not in the labour force

Studying	* 25.4%	62.6%	† 6.3%	† 5.6%	58,943
Retired	19.9%	38.0%	32.4%	9.7%	456,687
At home looking after children	18.5%	47.8%	25.5%	† 8.2%	131,744
Other (2)	24.4%	39.5%	29.1%	* 7.0%	120,189
Not elsewhere included	† 32.8%	† 43.8%	† 5.0%	† 18.4%	†4,620
Not in subject population	10.9%	46.9%	31.0%	11.2%	1,937,447

Marital status

Married/Living with a partner	12.8%	42.6%	34.2%	10.4%	1,810,,884
Separated/Divorced/Widowed	17.1%	45.4%	28.5%	9.1%	355,888
Never married	14.8%	55.5%	17.9%	11.8%	526,849
Not elsewhere included	† 13.6%	† 43.3%	† 34.6%	† 8.6%	*16,009

Religion

No religion	9.9%	49.8%	29.4%	11.0%	811,600
Anglican	7.6%	44.0%	36.9%	11.6%	479,801
Presbyterian	10.4%	42.3%	35.7%	11.6%	349,206
Catholic	9.3%	41.1%	36.3%	13.3%	356,911
Other Christian	26.3%	46.5%	20.0%	7.2%	552,093
Other religion	29.1%	38.6%	* 23.9%	† 8.4%	129,754
Not elsewhere included	† 13.1%	51.8%	* 30.1%	† 5.1%	30,266

Household size (includes children)

1	18.7%	43.8%	28.7%	8.9%	299,649
2	13.1%	42.0%	33.6%	11.4%	894,511
3	11.3%	48.0%	29.0%	11.8%	528,106
4	12.5%	47.1%	30.0%	10.4%	527,018
5 or more	16.2%	48.9%	26.4%	8.5%	453,537
Not elsewhere included	† 27.7%	† 34.3%	† 38.0%	0%	†6,809

Household income

$20,000 or less	19.3%	42.9%	27.5%	10.3%	518,939
$20,001 to $30,000	14.7%	42.0%	31.5%	11.8%	409,358
$30,001 to $40,000	11.9%	43.3%	33.7%	11.1%	379,133
$40,001 to $50,000	9.0%	45.5%	35.1%	10.4%	308,947
$50,001 to $70,000	11.1%	47.1%	33.3%	8.5%	366,240
$70,001 or more	9.0%	49.7%	30.0%	11.3%	465,302
Not elsewhere included	21.9%	49.4%	19.3%	* 9.4%	261,712

Location

Auckland	16.1%	43.9%	29.6%	10.4%	809,880
Wellington	13.5%	46.4%	30.3%	9.8%	293,561
Christchurch	10.2%	50.2%	27.4%	12.1%	335,545
Rest of New Zealand	13.3%	45.0%	31.5%	10.3%	1,270,643

Total	13.8%	45.5%	30.3%	10.5%	2,709,630

Note:

Non-gamblers includes those people who have never gambled and those people who have not gambled in the past six months
(2) Other includes those at home not looking after children
(3) The relative sampling error criterion used to decide when to use '*' and '†' makes it less likely that high percentages will receive this designation
† Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell [3]
* Relative sampling error is between 30% and 50% [3]

Table 9b: Patterns of Gambling Participation by Selected Characteristics: Absolute Sample Errors for Row Percentages[1][5]

Selected characteristics	Gambling status			
	Non-gamblers (2)	Past six month gamblers	Regular non-continuous	Regular continuous
Sex				
Male	1.4%	2.5%	1.9%	1.4%
Female	1.2%	1.8%	1.7%	1.1%
Age group				
18-24	3.5%	5.2%	3.7%	3.1%
25-34	2.0%	3.4%	3.2%	2.2%
35-44	2.0%	2.9%	2.9%	1.6%
45-54	2.2%	3.2%	3.0%	2.2%
55-64	3.2%	3.8%	4.1%	2.7%
65 plus	2.0%	2.6%	2.6%	1.8%
Ethnicity				
European	0.9%	1.4%	1.3%	1.0%
NZ Mäori	3.1%	5.6%	4.6%	3.0%
Pacific Island	9.1%	13.3%	11.4%	† 4.8%
Asian	6.1%	7.7%	7.7%	† 3.7%
Other ethnic group	6.0%	9.4%	8.2%	† 4.6%
Country of birth				
New Zealand	1.0%	1.6%	1.3%	1.0%
Europe/Australia/North America	2.5%	3.5%	3.8%	2.5%
Other countries	4.5%	7.5%	7.8%	3.8%
Not elsewhere included	N/A	† 114.9%	† 114.9%	N/A
Years since arrival in NZ				
Less than 4 years	6.2%	8.5%	6.3%	† 4.1%
4 years or more	2.6%	4.5%	4.1%	2.0%
Not elsewhere included	† 12.4%	0%	† 28.1%	† 20.4%
Not in subject population	1.0%	1.6%	1.3%	1.0%
Highest qualification				
No formal qualification	2.3%	3.0%	2.7%	2.0%
School qualification	2.0%	3.1%	2.9%	2.1%
Vocational or trade qualification	1.5%	2.2%	2.0%	1.5%
Degree or higher qualification	2.9%	3.7%	3.0%	1.8%
Labour force status				
Employed	1.1%	2.0%	1.7%	1.1%
Unemployed	10.0%	9.9%	7.3%	† 3.2%
Not in the labour force	2.0%	2.6%	2.6%	1.3%

97

Labour force status unidentifiable	† 24.6%	† 33.6%	† 21.6%	† 27.1%
Occupation				
Legislators, administrators and managers	2.4%	4.9%	5.0%	3.2%
Professionals	3.5%	4.5%	3.3%	2.6%
Technicians and associate professionals	2.6%	4.9%	4.9%	3.1%
Clerks	2.7%	4.9%	4.4%	3.0%
Service and sales workers	2.9%	4.9%	4.9%	3.5%
Agriculture and fishery workers	4.3%	6.8%	6.1%	3.1%
Trades workers	3.0%	5.9%	5.8%	4.4%
Plant and machine operators and assemblers	3.2%	6.4%	6.6%	4.8%
Elementary occupations	3.2%	6.6%	6.5%	5.0%
Not in subject population	2.0%	2.7%	2.4%	1.3%
Main activity for those not in the labour force				
Studying	10.2%	12.3%	† 4.4%	† 4.9%
Retired	2.1%	2.9%	3.0%	1.7%
At home looking after children	5.5%	6.3%	6.8%	† 4.1%
Other (3)	6.5%	7.9%	6.3%	3.1%
Not elsewhere included	† 34.9%	† 63.9%	† 12.0%	† 36.0%
Not in subject population	1.2%	1.9%	1.7%	1.1%
Marital status				
Married/Living with a partner	1.0%	1.9%	1.7%	1.0%
Separated/Divorced/Widowed	2.0%	2.7%	2.9%	1.9%
Never married	2.7%	4.0%	2.8%	2.4%
Not elsewhere included	† 10.2%	† 23.3%	† 18.4%	† 8.9%
Religion				
No religion	1.6%	2.4%	2.2%	1.7%
Anglican	1.5%	3.1%	3.2%	2.0%
Presbyterian	2.5%	3.8%	3.6%	2.4%
Catholic	2.4%	4.0%	4.1%	2.8%
Other Christian	3.1%	3.3%	2.5%	1.8%
Other religion	6.0%	8.4%	7.2%	† 4.3%
Not elsewhere included	† 10.7%	14.5%	13.1%	† 4.6%
Household size (includes children)				
1	1.8%	2.8%	2.5%	1.5%
2	1.5%	2.1%	2.1%	1.3%
3	1.9%	3.7%	3.2%	2.2%
4	2.0%	2.9%	2.9%	2.2%
5 or more	3.1%	5.0%	4.2%	2.5%
Not elsewhere included	† 30.6%	† 28.7%	† 30%	0%
Household income				
$20,000 or less	2.4%	3.0%	2.4%	1.7%
$20,001 to $30,000	2.6%	3.9%	3.2%	2.4%
$30,001 to $40,000	2.4%	3.9%	3.6%	2.0%
$40,001 to $50,000	2.2%	3.7%	3.6%	2.4%
$50,001 to $70,000	2.7%	3.9%	3.5%	2.5%
$70,001 or more	2.0%	3.3%	3.1%	2.1%
Not elsewhere included	4.8%	5.3%	3.9%	2.9%
Location				
Auckland	1.5%	3.8%	3.3%	1.7%
Wellington	2.9%	5.3%	4.1%	2.9%

Christchurch	2.0%	3.9%	2.6%	2.6%
Rest of New Zealand	1.6%	2.0%	1.8%	1.3%
Total	1.0%	1.7%	1.4%	0.9%

Note:

(1)   The sampling errors presented in this table are absolute sampling errors, not relative sampling errors

(2)   Non-gamblers includes those people who have never gambled and those people who have not gambled in the past six months

(3)   Other includes those at home not looking after children

(4)   The relative sampling error criterion used to decide when to use '*' and '†' makes it less likely that high percentages will receive this designation

(5)   Upper confidence bounds cannot exceed 100% and lower bounds cannot be less than 0%

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell [4]

*   Relative sampling error is between 30% and 50%.[4]

N/A   Absolute sampling error cannot be calculated because there are no, or too few respondents in the cell

From Table 9a, it is evident that only a relatively small percentage of the total adult population (12.1% of males and 9.0% of females) participate weekly or more in <u>continuous</u> forms of gambling such as track betting and gaming machines. The combined male and female weekly participation rate for this type of gambling is 10.5 percent. A substantially larger percentage (30.3%) participate exclusively in <u>non-continuous</u> forms of gambling weekly or more often. As mentioned earlier, the particular form of non-continuous gambling that most adults engaged in weekly or more is Lotto. 1991 national survey weekly participation rates were 18 percent for continuous forms and 30 percent for non-continuous forms. **This suggests that there has been a substantial reduction in the number of people who participate regularly in continuous forms of gambling but no change in levels of non-continuous gambling**.

In 1999, a further 45.5 percent reported having gambled in the past six months but not in the past week on at least one form of continuous or non-continuous gambling and 13.8 percent indicated that they had not gambled at all during the past six months. As mentioned earlier, this included six percent of the population who said they had never gambled. In 1991, 41 percent of survey respondents reported that they had participated during the past six months but not in the past week and 11 percent said they had not gambled in the past six months. This suggests that there may have been a slight increase in the number of people who participate infrequently or not at all. In the 1999 survey, it should be recalled that reluctant participants were advised that the researchers were interested in all people, irrespective of how much they gambled. The issue of continuity and change between the two national surveys will be considered further in the third part of this chapter.

Groups that appear to have <u>high</u> representation in the <u>regular</u> <u>continuous</u> <u>category</u> in 1999 include:

- Males
- People aged 55-64 years
- Mäori
- People without formal educational qualifications
- Employed people
- People with lower status occupations*
- Roman Catholics
- Christchurch residents.

Groups with <u>low</u> representation in this participation category include:

- Women
- Asians*
- People in ethnic groups other than European, Mäori, Pacific Island*
- People with degrees or professional qualifications
- Unemployed people*
- Students*
- Other Christians
- Other religions.*

The participation estimates for some of these groups in these and the following lists had large relative sampling errors and should be treated with caution. The groups with large relative sampling errors are indicated with an asterisk (*).

Many groups contain relatively large numbers of people who did <u>not</u> report having gambled in the <u>past</u> <u>six</u> <u>months</u>. Included here are:

- People aged 65 years and over
- Asians
- Pacific Islanders*
- People born in countries other than New Zealand/Europe/Australia/North America
- Recent immigrants
- Professionals
- Unemployed people*
- People not in the labour force, including students and retired people
- Other Christians
- Other religions
- People with an annual household income of NZ$20,000 or less
- Auckland residents.

Some of these categories over-lap: for example, recent immigrants are more likely to be Asian, have a religion other than Christian and live in Auckland. Pacific Islanders also live predominantly in Auckland, have a relatively high unemployment rate and are over-represented in low-income households.

Sociodemographic differences with respect to frequency and general category of gambling participation are shown more clearly in Table 10. In contrast to Table 9a, in this table respondents who never gambled are separated from those who said they had gambled in the past but not in the last six months. Tests for statistically significant associations between gambling status and sociodemographic variables were conducted (Chi-square analyses adjusted for the complex survey design). Highly significant associations (a significance level (α) of less than 0.001) were obtained for all sociodemographic groups considered, indicating that general patterns of gambling participation in New Zealand vary considerably across demographic and social groups. These differences are complex and difficult to summarise in narrative form. It should also be noted that two-way tables of the type presented here, while providing an indication of important effects, are not definitive. Multivariate analysis is necessary to more adequately identify the most important relationships.

100

From Table 10 it is evident that the small proportion of people who reported having <u>never gambled</u> differ appreciably from the other groups in many respects. These differences are greatest when people who have never gambled are compared with the two groups of regular gamblers.

Table 10: Patterns of Gambling Participation by Selected Characteristics: Percentages and Significance of Differences within Groups

Characteristic		Never gambled	Not gambled in past 6 months	Past six month gamblers	Regular non-continuous	Regular continuous	Significance (p value) [1]
Sex	Male	41.7%	49.8%	46.6%	49.6%	56.0%	0.0005
	Female	58.3%	50.2%	53.4%	50.4%	44.0%	
Ethnicity	European	64.1%	80.5%	78.9%	77.8%	79.5%	
	Mäori	8.2%	8.2%	11.1%	13.7%	13.9%	
	Pacific Island	4.0%	7.2%	4.0%	3.6%	3.6%	< 0.0001
	Asian	20.9%	3.2%	3.8%	3.1%	2.0%	
	Other ethnic group	2.9%	0.9%	2.2%	1.8%	1.0%	
Marital status	Married/Living with a partner	65.7%	59.7%	62.6%	75.4%	66.3%	
	Separated/Divorced/Widowed	15.9%	16.6%	13.1%	12.4%	11.3%	< 0.0001
	Never married	17.6%	23.4%	23.7%	11.5%	21.8%	
	Not elsewhere included	0.9%	0.3%	0.6%	0.7%	0.5%	
Age group	18-24	9.7%	15.4%	18.2%	6.2%	15.0%	
	25-34	14.1%	19.4%	22.7%	19.1%	19.7%	
	35-44	21.3%	17.2%	22.8%	22.0%	18.6%	< 0.0001
	45-54	16.8%	16.3%	14.0%	22.4%	18.6%	
	55-64	10.4%	13.8%	9.3%	14.0%	14.4%	
	65 plus	27.7%	17.9%	13.1%	16.4%	13.6%	
Country of birth	New Zealand	59.1%	77.2%	82.0%	79.1%	81.8%	
	Europe/Australia/North America	14.3%	15.4%	10.3%	13.8%	11.6%	< 0.0001
	Other countries	26.6%	7.4%	7.6%	7.1%	6.5%	
	Not elsewhere included	0%	0.1%	0%	0%	0%	
Years since arrival in NZ	Less than 4 years	15.4%	4.0%	3.2%	2.0%	2.4%	
	4 years or more	25.4%	18.7%	14.8%	18.4%	15.7%	< 0.0001
	Not elsewhere included	0.1%	0.5%	0.1%	0%	0%	
	Not in subject population	59.1%	77.2%	82.0%	79.1%	81.8%	
Highest qualification	No formal qualification	31.2%	22.4%	18.3%	25.5%	27.3%	
	School qualification	19.6%	17.1%	22.5%	20.7%	20.4%	< 0.0001
	Vocational or trade qualification	33.5%	42.1%	42.1%	44.4%	43.2%	
	Degree or higher qualification	15.6%	18.4%	17.1%	9.5%	9.1%	
Labour force status	Employed	39.7%	55.4%	67.9%	69.2%	72.2%	
	Unemployed	4.2%	7.3%	4.1%	2.7%	2.1%	< 0.0001
	Not in the labour force	55.1%	37.0%	27.8%	27.9%	25.4%	
	Labour force status unidentifiable	1.0%	0.3%	0.1%	0.2%	0.3%	
Religion	No religion	17.2%	24.8%	32.8%	29.1%	31.3%	
	Anglican	7.3%	11.6%	17.1%	21.6%	19.5%	
	Presbyterian	7.1%	11.7%	12.0%	15.2%	14.3%	
	Catholic	9.3%	8.7%	11.9%	15.8%	16.7%	< 0.0001
	Other Christian	42.0%	36.6%	20.8%	13.5%	13.9%	
	Other religion	15.4%	6.1%	4.1%	3.8%	3.8%	
	Not elsewhere included	1.7%	0.5%	1.3%	1.1%	0.5%	

101

Household size (includes children)	1	14.9%	15.1%	10.6%	10.5%	9.3%	
	2	29.9%	32.4%	30.5%	36.7%	35.8%	
	3	15.4%	16.3%	20.6%	18.7%	21.9%	0.0007
	4	19.4%	16.2%	20.2%	19.3%	19.3%	
	5 or more	19.5%	19.9%	18.0%	14.6%	13.6%	
	Not elsewhere included	1.0%	0.2%	0.2%	0.3%	0%	
Household income	$20,000 or less	30.7%	23.9%	18.1%	17.4%	18.9%	
	$20,001 to $30,000	15.6%	16.6%	13.9%	15.7%	16.9%	
	$30,001 to $40,000	11.1%	12.8%	13.3%	15.6%	14.8%	
	$40,001 to $50,000	5.9%	8.7%	11.4%	13.2%	11.3%	< 0.0001
	$50,001 to $70,000	8.5%	12.7%	14.0%	14.9%	11.0%	
	$70,001 or more	9.6%	12.4%	18.8%	17.0%	18.4%	
	Not elsewhere included	18.5%	12.9%	10.5%	6.1%	8.7%	
Location	Auckland	43.5%	28.5%	28.9%	29.2%	29.5%	
	Wellington	7.5%	13.1%	11.1%	10.8%	10.1%	< 0.0001
	Christchurch	6.4%	11.4%	13.7%	11.2%	14.3%	
	Rest of New Zealand	42.6%	47.0%	46.4%	48.8%	46.1%	

Note:
(1)   Adjusted Chi-square p values used

Relative to those in the regular gambling categories, people who had never gambled were more likely to be:

- Female
- Asian
- Separated, widowed, divorced
- Aged 65 or older
- Born outside New Zealand, Europe, Australia or North America
- Resident in New Zealand for less than 4 years
- Lacking in formal educational qualifications
- Not in the labour force
- Other Christians
- Other religions
- Living in a one-person or large household
- Living in a household with an annual income less than NZ$20,000
- Resident in Auckland.

They were less likely to be:

- European
- Mäori
- Aged 34 or under
- New Zealand born
- Employed
- Of no religion
- An Anglican, Presbyterian or Catholic
- Resident in a two- or three-person household
- Resident in a household with an annual income of more than NZ$40,000
- Living somewhere other than Auckland.

A number of differences were also evident between each of the other groups shown in Table 10. Consideration of these differences is, however, confined here to the two groups of regular gamblers.

Although men and women do not differ with respect to infrequent gambling and regular gambling on non-continuous forms, men are significantly more likely than women to be regular continuous gamblers. Fifty-six percent of regular continuous gamblers were men. Asians and 'other ethnic groups' were somewhat under-represented among regular continuous gamblers. With respect to age, the most notable difference was that a much higher proportion of regular gamblers aged 18 to 24 participated in continuous rather than non-continuous forms. Regular continuous gamblers also differed from regular non-continuous gamblers in that members of the continuous group were <u>less</u> likely to be married or living with a partner. They were <u>more</u> likely to be never married, have no formal educational qualification, be employed, have no religion, live in a household of three people, be in either the lowest or highest household income categories and live in Christchurch, although the statistical significance of these differences is not reported here.

Gambling Expenditure

As mentioned in Chapter Two and discussed in more detail in Abbott and Volberg (1999), reported estimates of expenditure in this and similar surveys are based on self-report and are subject to errors of recollection. There are also uncertainties about the tacit definitions that people employ when asked to estimate 'expenditure' on different types of gambling. These definitions appear to vary across gambling forms. For example, winnings are rarely taken into account when people report Lotto expenditure. The varying social acceptability of different forms of gambling may also influence self-reported expenditure. In the present survey, the questions used to obtain gambling expenditure information were the same as those used in the 1991 national survey. This was done to facilitate comparison between the two surveys. It should be noted that information on reported expenditure is better suited to examining changes over time, differences between surveys, and differences between groups within a particular survey than for determining absolute spending levels on different types of gambling.

Table 11:   Monthly Expenditure on Gaming by Gaming Activity: Total Expenditure, Percentage of Total Expenditure and Absolute Sample Errors

Gaming Activity	Total typical monthly expenditure on gaming (1) (2)		Typical monthly expenditure on gaming activity as a proportion of the total expenditure	
Lotto	$34,861,588.13	($1,487,082.65)	36.0%	(5.1%)
Betting on horse or dog races	†$17,787,448.80	($9,626,301.93)	*18.4%	(7.9%)
Gaming machines not at casinos	$6,601,036.98	($1,448,946.57)	6.8%	(1.6%)
Other lotteries or raffles	$6,333,730.30	($1,118,522.72)	6.5%	(1.5%)
Instant Kiwi	$5,706,135.23	($432,732.81)	5.9%	(0.9%)
Gaming machines in casinos	$5,473,584.61	($1,472,320.95)	5.7%	(1.6%)
TeleBingo	$4,488,699.04	($480,490.86)	4.6%	(0.8%)
Card games	†$3,489,595.34	($4,832,903.94)	†3.6%	(4.9%)
Casino gambling - other	*$3,425,727.36	($1,209,126.31)	*3.5%	(1.2%)
Money bets with workmates/ friends	$2,378,666.40	($466,716.02)	2.5%	(0.5%)
Other sports betting	*$2,365,824.79	($990,030.83)	*2.4%	(1.1%)
Housie	*$1,876,531.76	($577,018.61)	*1.9%	(0.6%)
Daily Keno	$884,636.21	($237,173.39)	0.9%	(0.3%)
Other gambling activity (e.g. mah-jong or battens up)	† $704,997.05	($439,986.84)	†0.7%	(0.5%)
0900 telephone competitions	$223,632.85	($62,049.48)	* 0.2%	(0.1%)
Dice games	† $149,248.05	($116,805.99)	† 0.2%	(0.1%)
Internet – other sports betting	† $58,527.21	($94,826.18)	† 0.1%	(0.1%)
Internet – horse or dog races	† $18,344.86	($20,040.97)	† 0%	(0%)
Other internet gaming activity	† $1,104.64	($2,166.82)	† 0%	(0%)
Internet – lottery tickets	† $0	N/A	† 0%	N/A
Internet – casino games/gaming machines	† $0	N/A	† 0%	N/A
Total	$96,829,059.61	($14,108,614.94)	100%	

(1)   Typical monthly expenditure was collected by gaming activity and was only collected from people who participated in the activity in the past six months

(2)   Absolute sampling errors shown in brackets

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

N/A   Absolute sampling error cannot be calculated because there are no, or too few respondents in the cell

In this survey, average (or mean) typical monthly expenditure refers to total reported expenditure on all gaming activities, divided by the number of people in each group. Average expenditure is only calculated for those people who gambled on one or more activities in the past six months. People who did not know their typical monthly expenditure on one or more activities are excluded from the average. In some instances, a few individuals who reported very high expenditure affect average expenditures, resulting in a skewed expenditure distribution.

Table 11 shows the total typical monthly gambling expenditure for the New Zealand population, based on the self reported expenditure of survey participants who said they had gambled in the past six months. Total monthly expenditure, calculated this way, was NZ$96,829,060 per month. The absolute sample error was NZ$14,108,615. **Based on this information, the estimated annual expenditure for New Zealand adults in 1998 was NZ$1,162 million (NZ$993 million to NZ$1,331 million).   This is comparable to the Department of Internal Affairs 1998 actual net expenditure figure of NZ$1,045 million for major forms of legal gambling.**

Table 11 also displays reported total typical monthly gambling expenditure on various forms of gambling as a proportion of total gambling expenditure. It is evident that Lotto takes by far the largest share of reported expenditure (36%; 30.9-41.1%), followed by track betting (18.4%; 10.5-26.3%). These two forms of gambling also dominated in the 1991 national survey (34% and 16% respectively).

Other forms of gambling that individually accounted for more than five percent of total expenditure included gaming machines not in casinos, other lotteries or raffles, Instant Kiwi, and gaming machines in casinos. The survey estimates for gaming machines and casino gambling are substantially lower than actual 1998 net expenditure for these forms of gambling.

Average typical monthly expenditures on the various forms of gambling included in the survey are indicated in Table 12. As mentioned previously, average expenditure for each activity is calculated by summing the expenditure on each activity for all of the people in each group and then dividing by the number of people who bet on that activity in the past six months.

Table 12: Average Typical Monthly Expenditure by Gaming Activity [1] [2]

Gaming Activity	Average Typical Monthly expenditure	
Lotto	$17.72	($0.64)
Instant Kiwi	$5.79	($0.38)
Daily Keno	$10.44	($2.19)
TeleBingo	$9.94	($0.81)
Other lotteries or raffles	$4.86	($0.83)
0900 telephone competitions	† $2.97	($1.54)
Internet - horse or dog races	† $8.35	($6.76)
Internet - other sports betting	† $26.45	($26.24)
Internet - lottery tickets	† $0	N/A
Internet - casino games	† $0	N/A
Other types of internet gambling	† $2.00	N/A
Gaming machines at a casino	$19.10	($4.35)
Other games at casinos	* $28.23	($9.39)
Gaming machines not at casinos	$17.49	($3.68)
Betting on horse or dog races	† $35.81	($19.22)
Other sports betting	* $17.75	($7.21)
Dice games	* $12.41	($6.01)
Card games	† $43.92	($60.43)
Housie	$27.80	($7.78)
Money bets with friends or workmates	$5.19	($0.97)
Other gambling activity	* $18.26	($8.57)

(1) Typical monthly expenditure was collected by gaming activity and was only collected from people who participated in the past six months
(2) Absolute sampling errors are indicated in brackets
†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell
*   Relative sampling error is between 30% and 50%
N/A Absolute sampling error cannot be calculated because there are no, or too few respondents in the cell

From Table 12 it is evident that average typical monthly expenditure is highest for people who gamble on card games, followed by track betting, casino games, housie and the Internet-other sports betting. These are all forms of continuous gambling and some also

involve an element of skill. However, in a number of cases these mean expenditures are derived from small samples and, in some instances, one or more very high spending individuals skew the expenditure distribution. Of the forms mentioned, one or both of these qualifying comments apply particularly to card games, 0900 telephone betting, Internet-horse or dog betting, Internet-other sports betting and track betting. The mean expenditures for these types of gambling activity should be treated with extreme caution.

Table 13 shows typical monthly expenditure on gambling activities for each of the major categories of gambler, namely people who have gambled but not in the past six months, past six months gamblers, regular non-continuous gamblers and regular continuous gamblers.

Table 13: Typical Monthly Expenditure on Gaming by Major Gambling Participation Groups [1]

Expenditure	Gambling Status					
	Never Gambled	Ever gambled but not in past six months	Gambled in past six months	Regular non-continuous	Regular continuous	Total Population Count
Typical monthly expenditure						
Did not bet in past 6 months	43.5%	56.5%	-	-	-	373,119
$10	-	-	94.4%	4.9%	† 0.7%	617,868
$10-$19	-	-	78.0%	17.8%	* 4.2%	452,002
$20-$29	-	-	34.7%	57.4%	7.9%	427,602
$30-$39	-	-	25.3%	62.4%	12.3%	201,243
$40 or more	-	-	14.8%	53.0%	32.1%	627,548
Not elsewhere included	-	-	† 37.6%	* 50.1%	† 12.3%	10,249
Total	6.0%	7.8%	45.5%	30.3%	10.5%	2,709,630
Average monthly expenditure	-	-	†$15.37	†$42.12	*$152.35	†$41.42

1. Typical monthly expenditure was collected by gaming activity and was only collected from people who participated in the activity in the past six months. Expenditure from each activity is then aggregated to give typical monthly expenditure

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

Although only 10.5 percent of the adult population is classified as regular continuous gamblers, they account for nearly a third (32.1%; 29.4-34.8%) of the people who report typically spending NZ$40 per month or more. Seventy-one percent of total regular continuous gamblers were in this expenditure category and, as is evident from Table 13, this group's average typical monthly expenditure was NZ$152 (NZ$106-NZ$200).

While proportionally fewer regular non-continuous gamblers than their continuous counterparts report spending NZ$40 per month or more on gambling activities, there are nevertheless a substantial number (41%) of regular non-continuous gamblers who report this level of expenditure. The regular non-continuous group also reported spending significantly less, on average (NZ$42; NZ$40-NZ$44), than the continuous group. In contrast to the regular continuous group, regular non-continuous gamblers also evidenced much less variability in their expenditure levels.

People who reported having bet in the past six months but not on a weekly basis accounted for the great majority of people in the adult population who spend less than NZ$20 per month. The average typical monthly gambling expenditure for this group of infrequent gamblers was NZ$15 (NZ$14-NZ$17). As was the case for regular non-continuous gamblers, this group displayed little variation in their gambling expenditure.

These findings are consistent with those from other countries and jurisdictions. Typically, most adults report spending rather small amounts on gambling in the past month or in a typical month. **The majority of New Zealand adults (53%) report spending less than NZ$20 per month on gambling. The corresponding figure from the recent Swedish national survey was 58 percent. Twenty-three percent of New Zealand adults report spending NZ$40 or more per month on gambling**.

Table 14a shows typical monthly gambling expenditure for a number of sociodemographic groups. Absolute sample errors are provided in Table 14b. From inspection of Table 14a, it is evident that the following groups are over-represented in the NZ$40 per month or more expenditure category:

- Males
- People aged 45-64 years
- Pacific Islanders
- Mäori
- People born in countries other than New Zealand, Europe, Australia and North America
- Migrants resident four years or more
- People without formal qualifications
- Employed people
- People in the following occupations:
    Elementary occupations
    Plant and machine operators and assemblers
    Trades workers
    Legislators, administrators and managers
    Clerks
- Catholics
- Presbyterians
- Other religions
- People with a household income of NZ$70,001 or more
- People with a household income of NZ$40,001 to NZ$50,000
- Auckland residents.

Twenty-five percent or more of the people in the groups listed above reported that they typically spent NZ$40 or more per month on gambling activities. Most but not all of these groups also had high average typical monthly gambling expenditure.

The following groups included 25 percent or more people who did not report gambling expenditure in the past six months:

- Asians
- People born in countries other than New Zealand, Europe, Australia or North America
- Migrants resident less than four years

- Students
- Other Christians
- Other religions.

The following groups had 25 percent or more members who were in the lowest (less than NZ$10 per month) expenditure category, namely:

- Females
- People aged 18-24 years
- People who belong to an ethnic group other than Mäori, Pacific Island, European or Asian*
- People with a degree or higher qualification
- Unemployed people*
- People not in the labour force
- People in the following occupational groups:
    Professionals
    Agriculture and fishery workers
- Students*
- People at home looking after children
- People who were separated, divorced or widowed
- People who were never married
- Other Christians
- People living in a one-person household
- People with a household income less than NZ$20,000
- People resident in Christchurch.

As expected, the groups with relatively large numbers of members who did not gamble, or reported typical monthly gambling expenditure of less than NZ$10 per month, also generally had lower average monthly expenditure. However, people born in countries other than New Zealand, Europe, Australia or North America, agriculture and fishery workers and Christchurch residents were exceptions. These three groups had high average monthly expenditures. Two of these non- or low-expenditure groups were also included in the list that contained large numbers of people in the highest expenditure category, namely people born in countries outside New Zealand, Europe, Australia and North America, and other religions. These groups are of interest because they have bimodal distributions with relatively large numbers of both heavy gamblers and people who do not gamble or have very low levels of gambling expenditure. They may represent groups that have recently been introduced to gambling or have recently increased their gambling involvement. People in these groups may be more likely than others to develop gambling problems.

Table 14a: Typical Monthly Expenditure on Gaming Activities by Selected Characteristics: Row Percentages, Total Population Counts and Average Expenditure

| Selected characteristics | Typical Monthly Expenditure (1) | | | | | | | Total Population Counts | Average ($) monthly expenditure |
	Did not bet in past 6 months	<$10	$10-$19	$20-$29	$30-$39	$40 or more	Not elsewhere included		
Sex									
Male	13.1%	20.4%	16.0%	15.5%	7.8%	26.9%	† 0.2%	1,313,580	$52.88
Female	14.4%	25.1%	17.3%	16.0%	7.1%	19.7%	† 0.5%	1,396,050	$30.44
Age group									
18-24	13.2%	29.4%	21.3%	13.7%	* 4.3%	18.1%	† 0%	365,740	$29.73
25-34	11.5%	23.5%	17.9%	15.2%	8.8%	22.8%	† 0.5%	555,610	* $44.08
35-44	12.1%	22.0%	18.6%	16.3%	8.1%	22.7%	† 0.2%	584,350	$40.20
45-54	13.1%	18.7%	14.2%	16.7%	7.3%	29.2%	† 0.8%	471,120	* $58.04
55-64	14.5%	19.4%	12.3%	16.2%	8.1%	29.2%	† 0.2%	316,200	$40.63
65 plus	19.8%	24.4%	14.6%	16.4%	7.1%	17.3%	† 0.4%	416,610	$30.84
Ethnicity									
European	13.0%	24.0%	17.8%	16.4%	7.5%	21.0%	† 0.4%	2,110,274	$39.68
NZ Mäori	* 9.6%	17.4%	14.1%	15.8%	* 9.3%	33.6%	† 0.2%	318,651	$49.43
Pacific Island	* 19.5%	* 20.1%	† 10.2%	† 6.4%	† 2.2%	41.2%	† 0.5%	110,707	* $61.59
Asian	34.1%	* 17.3%	* 11.1%	* 13.7%	† 2.9%	20.8%	† 0%	118,786	* $38.36
Other ethnic group	* 13.1%	* 28.0%	* 15.0%	* 16.0%	* 12.9%	* 15.1%	† 0%	51,212	* $26.00
Country of birth									
New Zealand	12.0%	23.3%	17.8%	15.7%	7.7%	23.1%	† 0.4%	2,150,500	$42.15
Europe/Australia/North America	16.9%	22.7%	13.1%	19.3%	8.1%	19.3%	† 0.6%	328,455	$30.30
Other countries	25.6%	* 18.8%	* 11.6%	* 11.3%	* 3.3%	29.3%	† 0%	229,480	$51.13
Not elsewhere included	† 0%	† 12.5%	† 33.8%	† 0%	† 53.8%	† 0%	† 0%	† 1,195	† $20.80

	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8	Col9
Years since arrival in NZ									
Less than 4 years	34.9%	* 20.9%	† 9.2%	* 15.6%	† 7.5%	† 11.9%	† 0%	95,884	* $29.21
4 years or more	17.6%	21.4%	13.4%	16.2%	5.7%	25.3%	† 0.4%	458,601	$39.64
Not elsewhere included	† 4.5%	† 0%	† 0%	† 0%	† 31.8%	† 63.7%	† 0%	† 4,645	† $53.28
Not in subject population	12.0%	23.3%	17.8%	15.7%	7.7%	23.1%	† 0.4%	2,150,500	$42.15
Highest qualification									
No formal qualification	16.0%	18.1%	14.4%	14.8%	7.7%	28.4%	† 0.6%	609,831	$46.38
School qualification	11.9%	23.4%	18.1%	16.0%	7.0%	23.2%	† 0.5%	572,249	$33.96
Vocational or trade qualification	12.5%	23.2%	15.7%	17.3%	8.0%	23.1%	† 0.3%	1,148,982	$47.28
Degree or higher qualification	17.0%	28.5%	21.3%	12.4%	5.7%	15.1%	† 0.1%	378,568	$26.56
Labour force status									
Employed	10.1%	21.7%	18.0%	16.4%	8.0%	25.3%	† 0.4%	1,790,909	$46.22
Unemployed	* 22.0%	* 25.6%	* 14.0%	* 13.8%	† 4.2%	* 20.5%	† 0%	101,486	* $38.17
Not in the labour force	20.6%	25.0%	14.1%	14.8%	6.6%	18.7%	† 0.3%	811,090	$29.68
Labour force status unidentifiable	† 38.3%	† 9.1%	† 9.5%	† 5.5%	† 5.5%	† 29.5%	† 2.6%	† 6,146	† $66.95
Occupation									
Legislators, administrators and managers	* 7.7%	19.9%	19.8%	14.5%	* 9.6%	28.0%	† 0.5%	225,248	† $62.36
Professionals	15.5%	28.1%	20.7%	14.9%	* 5.8%	15.0%	† 0.2%	267,686	$24.88
Technicians and associate professionals	10.5%	24.9%	22.6%	16.7%	* 5.6%	19.3%	† 0.4%	232,387	$33.84
Clerks	* 7.1%	18.4%	17.0%	19.5%	9.6%	27.4%	† 1.0%	209,506	$39.98
Service and sales workers	* 9.5%	21.9%	16.8%	19.6%	* 10.5%	21.3%	† 0.5%	245,355	$35.73
Agriculture and fishery workers	* 12.6%	30.1%	17.7%	14.6%	* 4.7%	20.1%	† 0.2%	149,270	† $73.78
Trades workers	10.1%	15.0%	18.0%	16.7%	* 9.8%	30.1%	† 0.4%	170,669	$47.90
Plant and machine operators and assemblers	* 8.9%	* 17.0%	* 9.0%	* 15.6%	* 10.4%	38.8%	† 0.3%	152,473	$61.34
Elementary occupations	* 7.3%	* 16.1%	* 16.7%	* 13.9%	* 5.6%	39.9%	† 0.6%	138,315	$58.98
Not in the subject population	20.9%	24.9%	14.0%	14.6%	6.3%	19.0%	† 0.3%	918,721	$30.79

Main activity for those not in the labour force

Studying	* 25.4%	* 30.1%	† 18.5%	† 12.4%	† 2.6%	† 11.1%	0%	58,943	* $22.98
Retired	19.9%	24.3%	14.0%	15.6%	6.7%	19.1%	† 0.4%	456,687	$30.66
At home looking after children	18.5%	26.4%	15.1%	14.1%	* 7.1%	* 18.7%	† 0.2%	131,744	* $29.53
Other (2)	24.4%	22.9%	* 10.9%	* 12.3%	* 8.0%	21.3%	† 0.3%	120,189	$32.20
Not elsewhere included	† 32.8%	† 38.3%	0%	† 10.5%	0%	† 18.4%	0%	† 4,620	† $52.38
Not in subject population	10.9%	22.0%	17.8%	16.3%	7.8%	24.9%	† 0.4%	1,937,447	$45.37

Marital status

Married/Living with a partner	12.8%	21.2%	16.1%	16.7%	8.2%	24.6%	† 0.4%	1,810,884	$43.41
Separated/Divorced/ Widowed	17.1%	25.6%	16.8%	15.0%	6.3%	18.9%	† 0.3%	355,888	$32.48
Never married	14.8%	26.4%	18.6%	13.0%	5.6%	21.2%	† 0.4%	526,849	$40.36
Not elsewhere included	† 13.6%	† 19.0%	† 14.7%	† 20.1%	† 6.6%	† 26.1%	† 0%	* 16,009	† $38.57

Religion

No religion	9.9%	24.7%	19.0%	16.1%	6.6%	23.4%	† 0.3%	811,600	$36.72
Anglican	7.6%	21.9%	18.2%	19.5%	8.4%	23.8%	† 0.7%	479,801	* $46.54
Presbyterian	10.4%	18.9%	17.3%	15.4%	11.6%	25.4%	† 1.1%	349,206	$38.49
Catholic	9.3%	19.4%	17.0%	16.1%	8.7%	29.2%	† 0.3%	356,911	† $57.45
Other Christian	26.3%	25.9%	12.2%	13.9%	5.1%	16.6%	† 0.1%	552,093	$31.86
Other religion	29.1%	21.2%	* 12.2%	* 8.8%	† 3.5%	25.3%	† 0%	129,754	* $54.04
Not elsewhere included	† 13.1%	* 23.4%	† 20.4%	† 13.4%	† 11.3%	† 18.5%	† 0%	30,266	* $26.98

Household size (includes children)

1	18.7%	25.6%	16.6%	15.1%	6.4%	17.2%	† 0.5%	299,649	$36.70
2	13.1%	21.7%	16.2%	17.0%	7.7%	24.1%	† 0.4%	894,511	$43.98
3	11.3%	24.3%	16.7%	14.9%	7.7%	24.9%	† 0.3%	528,106	$38.03
4	12.5%	22.1%	18.5%	15.5%	6.9%	23.9%	† 0.7%	527,018	$38.42
5 or more	16.2%	22.3%	15.6%	15.4%	8.1%	22.5%	† 0%	453,537	† $46.85
Not elsewhere included	† 27.7%	† 22.0%	† 21.8%	† 2.6%	† 0%	† 25.9%	† 0%	† 6,809	† $50.26

Household income

$20,000 or less	19.3%	25.0%	14.6%	16.6%	6.0%	18.2%	† 0.3%	518,938	$29.81
$20,001 to $30,000	14.7%	19.4%	16.8%	16.5%	7.3%	24.8%	† 0.6%	409,358	$36.89

$30,001 to $40,000	11.9%	21.3%	16.4%	17.5%	9.5%	23.2%	† 0.3%	379,133	$37.59
$40,001 to $50,000	9.0%	22.1%	17.2%	15.5%	9.4%	26.7%	† 0.2%	308,947	$40.01
$50,001 to $70,000	11.1%	22.6%	18.0%	16.8%	7.2%	23.9%	† 0.6%	366,240	$38.39
$70,001 or more	9.0%	24.2%	17.3%	15.2%	7.1%	26.8%	† 0.4%	465,302	* $67.39
Not elsewhere included	21.9%	24.9%	17.8%	10.5%	* 6.1%	18.6%	† 0.3%	261,712	$32.08
Location									
Auckland	16.1%	22.4%	13.4%	15.0%	5.9%	27.0%	† 0.3%	809,880	$45.34
Wellington	13.5%	20.2%	18.6%	15.7%	* 7.6%	23.9%	† 0.6%	293,561	$37.12
Christchurch	10.2%	28.1%	17.7%	16.5%	6.2%	21.0%	† 0.3%	335,545	† $65.33
Rest of New Zealand	13.3%	22.3%	18.1%	16.2%	8.7%	21.2%	† 0.4%	1,270,643	$33.44
Total	13.8%	22.8%	16.7%	15.8%	7.4%	23.2%	† 0.4%	2,709,630	$41.42

(1)   Typical monthly expenditure was collected by gaming activity and was only collected from people who participated in the activity in the past six months. Expenditure from each activity is then aggregated to give typical monthly expenditure

(2)   Other includes those at home not looking after children

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

Table 14b: Typical Monthly Expenditure on Gaming Activities by Selected Characteristics: Absolute Sample Errors for Row Percentages [3] [4]

Selected characteristics	Typical Monthly Expenditure (1)						
	Did not bet in past 6 months	<$10	$10-$19	$20-$29	$30-$39	$40 or more	Not elsewhere included
Sex							
Male	1.4%	2.0%	1.5%	1.6%	0.9%	1.9%	† 0.2%
Female	1.2%	1.5%	1.6%	1.4%	0.9%	1.5%	† 0.4%
Age group							
18-24	3.5%	5.0%	4.0%	3.3%	1.8%	4.3%	N/A
25-34	2.0%	2.6%	2.5%	2.4%	1.6%	3.1%	† 0.4%
35-44	2.0%	2.5%	2.2%	2.5%	1.5%	3.1%	† 0.2%
45-54	2.2%	2.4%	2.5%	2.6%	1.9%	3.0%	† 0.8%
55-64	3.2%	3.2%	2.2%	2.6%	1.9%	3.7%	† 0.3%
65 plus	2.0%	2.3%	1.7%	2.4%	1.4%	2.3%	† 0.3%
Ethnicity							
European	0.9%	1.4%	1.1%	1.1%	0.8%	1.3%	† 0.2%
NZ Mäori	3.1%	4.4%	3.7%	4.1%	2.9%	5.3%	† 0.4%
Pacific Island	9.1%	9.7%	† 8.5%	† 4.1%	† 3.0%	11.6%	† 0.9%
Asian	6.1%	5.6%	5.0%	4.8%	† 2.8%	5.8%	N/A
Other ethnic group	6.0%	9.2%	6.8%	7.6%	5.6%	7.0%	N/A
Country of birth							
New Zealand	1.0%	1.4%	1.2%	1.2%	0.8%	1.3%	† 0.2%
Europe/Australia/North America	2.5%	3.3%	2.5%	3.5%	2.2%	3.2%	† 0.6%
Other countries	4.5%	6.0%	4.4%	4.3%	1.6%	5.2%	N/A
Not elsewhere included	N/A	† 38.6%	† 98.5%	N/A	† 114.9%	N/A	N/A
Years since arrival in NZ							
Less than 4 years	6.2%	6.9%	† 4.7%	6.3%	† 3.8%	† 6.4%	N/A
4 years or more	2.6%	3.1%	2.3%	3.2%	1.4%	3.4%	† 0.4%
Not elsewhere included	† 12.4%	N/A	N/A	N/A	† 61.4%	† 69.0%	0%
Not in subject population	1.0%	1.4%	1.2%	1.2%	0.8%	1.3%	† 0.2%
Highest qualification							
No formal qualification	2.3%	2.2%	1.7%	2.1%	1.5%	2.9%	† 0.4%
School qualification	2.0%	2.6%	2.7%	2.5%	1.5%	2.6%	† 0.4%
Vocational or trade qualification	1.5%	2.0%	1.6%	1.8%	1.1%	1.9%	† 0.3%
Degree or higher qualification	2.9%	3.8%	2.7%	2.5%	1.7%	3.0%	† 0.2%
Labour force status							
Employed	1.1%	1.6%	1.4%	1.5%	0.9%	1.7%	† 0.3%
Unemployed	10%	7.8%	6.1%	6.2%	† 2.9%	9.0%	N/A
Not in the labour force	2.0%	1.9%	1.5%	1.6%	1.2%	2.1%	† 0.2%
Labour force status unidentifiable	† 24.6%	† 14.3%	† 17.8%	† 12.2%	† 12.3%	† 27.8%	† 5.8%

Occupation							
Legislators, administrators and managers	2.4%	4.3%	3.5%	3.7%	2.9%	4.1%	† 0.8%
Professionals	3.5%	4.1%	3.6%	3.6%	1.9%	3.8%	† 0.3%
Technicians and associate professionals	2.6%	4.1%	4.7%	3.3%	1.9%	4.5%	† 0.6%
Clerks	2.7%	3.6%	3.8%	4.6%	2.7%	4.0%	† 1.0%
Service and sales workers	2.9%	4.4%	3.7%	4.3%	3.2%	4.5%	† 0.7%
Agriculture and fishery workers	4.3%	6.0%	4.4%	4.1%	2.3%	5.8%	† 0.3%
Trades workers	3.0%	3.9%	4.8%	3.5%	3.2%	5.5%	† 0.7%
Plant and machine operators and assemblers	3.2%	5.1%	3.2%	4.9%	3.5%	6.8%	† 0.6%
Elementary occupations	3.2%	5.5%	5.0%	4.5%	2.6%	7.6%	† 1.1%
Not in the subject population	2.0%	1.9%	1.5%	1.5%	1.1%	1.8%	† 0.2%

Main activity for those not in the labour force							
Studying	10.2%	10.9%	† 11.3%	† 7.6%	† 3.1%	† 8.3%	0%
Retired	2.1%	2.4%	1.7%	2.1%	1.3%	2.6%	† 0.3%
At home looking after children	5.5%	5.3%	4.0%	3.6%	3.0%	6.5%	† 0.3%
Other (2)	6.5%	5.6%	3.5%	4.5%	3.6%	6.3%	† 0.6%
Not elsewhere included	† 34.9%	† 58.5%	N/A	† 20%	N/A	† 36.0%	N/A
Not in subject population	1.2%	1.6%	1.3%	1.4%	0.8%	1.6%	† 0.3%

Marital status							
Married/Living with a partner	1.0%	1.5%	1.2%	1.4%	0.9%	1.6%	† 0.3%
Separated/Divorced/ Widowed	2.0%	2.4%	1.9%	2.0%	1.5%	2.7%	† 0.3%
Never married	2.7%	3.6%	3.1%	2.5%	1.6%	3.1%	† 0.5%
Not elsewhere included	† 10.2%	† 11.2%	† 11.3%	† 16.1%	† 9.5%	† 15.8%	N/A

Religion							
No religion	1.6%	2.2%	1.9%	1.9%	1.3%	2.1%	† 0.2%
Anglican	1.5%	2.3%	2.6%	2.3%	1.7%	2.4%	† 0.6%
Presbyterian	2.5%	2.8%	2.8%	2.5%	2.3%	3.6%	† 0.8%
Catholic	2.4%	3.1%	3.2%	3.0%	1.9%	3.9%	† 0.4%
Other Christian	3.1%	2.7%	2.1%	2.3%	1.4%	2.3%	† 0.1%
Other religion	6.0%	6.2%	5.8%	3.3%	2.4%	6.0%	N/A
Not elsewhere included	† 10.7%	11.1%	† 11.7%	† 8.2%	† 9.5%	† 11.3%	N/A

Household size (includes children)							
1	1.8%	2.2%	2.0%	1.9%	1.4%	2.1%	† 0.4%
2	1.5%	1.8%	1.7%	1.7%	1.1%	1.8%	† 0.3%
3	1.9%	3.1%	2.4%	2.5%	1.8%	3.1%	† 0.4%
4	2.0%	3.0%	2.8%	2.7%	1.6%	3.0%	† 0.7%
5 or more	3.1%	4.0%	2.9%	3.0%	2.0%	4.3%	N/A
Not elsewhere included	† 30.6%	† 25.9%	† 22.4%	† 5.4%	N/A	† 28.7%	N/A

Household income							
$20,000 or less	2.4%	2.5%	1.8%	2.3%	1.5%	2.5%	† 0.3%
$20,001 to $30,000	2.6%	2.7%	2.9%	2.7%	1.9%	3.7%	† 0.8%
$30,001 to $40,000	2.4%	3.0%	2.6%	2.6%	2.1%	3.2%	† 0.3%
$40,001 to $50,000	2.2%	3.5%	2.9%	2.7%	2.3%	4.0%	† 0.3%
$50,001 to $70,000	2.7%	3.2%	3.1%	3.0%	1.9%	2.9%	† 0.7%
$70,001 or more	2.0%	3.2%	2.6%	2.5%	1.9%	2.8%	† 0.4%
Not elsewhere included	4.8%	5.3%	4.5%	3.1%	2.0%	5.0%	† 0.6%
Location							
Auckland	1.5%	3.0%	2.0%	2.5%	1.2%	3.1%	† 0.4%
Wellington	2.9%	2.9%	3.1%	2.6%	2.6%	4.2%	† 0.5%
Christchurch	2.0%	3.6%	3.5%	2.9%	1.7%	3.4%	† 0.4%
Rest of New Zealand	1.6%	1.7%	1.6%	1.6%	1.1%	1.8%	† 0.3%
Total	1.0%	1.3%	1.1%	1.1%	0.7%	1.4%	† 0.2%

1) Typical monthly expenditure is collected by gaming activity and is only collected from people who participated in the activity in the past six months. Expenditure from each activity is then aggregated to give typical monthly expenditure

(2) Other includes those at home not looking after children

(3) The relative sampling error criterion used to decide when to use '*' and '†' makes it less likely that high percentages will receive this designation

(4) Upper confidence bounds cannot exceed 100% and lower bounds cannot be less than 0%

† Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

* Relative sampling error is between 30% and 50%

N/A Absolute sampling error cannot be calculated because there are no, or too few, respondents in the cell.

Sociodemographic Differences in Gambling Preferences, Reasons for Gambling and Participation in Particular Forms of Gambling

To this point, sociodemographic factors have been considered in relation to broad gambling participation categories and overall gambling expenditure. However, as mentioned in Chapter One and discussed more extensively in Abbott and Volberg (1999), 'gambling' is not a unitary phenomenon and combining heterogeneous forms can obscure important differences between different types of activity. Some of these differences will now be considered, first by looking at the specific gambling preferences of people within the broad categories considered to this point. This will be followed by an examination of the reasons participants gave for engaging in different forms of gambling. Finally, the characteristics of people who participate in the more popular forms of gambling will be investigated.

Gambling Preferences

Table 15a shows the forms of gambling activity that different categories of participants nominated as their favourite or most preferred type. Absolute sample errors are provided in Table 15b.

Table 15a: Favourite Gaming Activity by Gambling Status, Sex, Age Group and Ethnicity: Participation Group, Row Percentages

	Never Gambled	No Favourite	Lotto	Instant Kiwi	Daily Keno	TeleBingo	Other Lotteries/raffles
				Favourite gaming activity			
Gambling status							
Non-gambler (1)	43.5%	36.4%	5.5%	† 1.5%	0%	† 0.7%	* 1.7%
Past six month gambler	-	33.1%	20.2%	8.9%	† 0.2%	3.6%	3.1%
Regular non-continuous	-	18.4%	41.6%	2.5%	† 0.6%	9.9%	* 1.9%
Regular continuous	-	7.1%	17.7%	11.6%	† 0.5%	* 7.0%	† 0.8%
Sex							
Male	5.2%	27.6%	23.5%	3.8%	† 0.4%	3.5%	1.8%
Female	6.8%	25.3%	25.3%	8.5%	† 0.3%	7.3%	2.8%
Age group							
Less than 35 years	4.2%	19.7%	18.3%	11.0%	† 0.4%	4.5%	* 2.1%
35 years or over	6.9%	29.8%	27.6%	3.7%	† 0.3%	6.0%	2.4%
Ethnicity							
European	4.9%	27.4%	25.0%	6.5%	† 0.1%	5.6%	2.6%
NZ Mäori	* 4.2%	18.1%	22.6%	† 5.4%	† 1.1%	* 7.3%	† 2.1%
Other ethnic group	16.0%	28.1%	21.9%	† 5.0%	† 1.0%	† 2.2%	† 0.4%
Total	6.0%	26.4%	24.4%	6.2%	† 0.3%	5.4%	2.3%

	Favourite gaming activity						
	0900 telephone competitions	Internet gaming activities	Casino gaming machines	Other casino games	Gaming machines not in a casino	Betting on horse or dog races	Other sports betting
Gambling status							
Non-gambler (1)	† 0%	† 0%	† 0.9%	† 0.9%	† 2.1%	* 2.5%	† 0.5%
Past six month gambler	† 0.1%	† 0%	4.7%	2.5%	* 3.3%	9.8%	* 2.1%
Regular non-continuous	† 0.1%	† 0%	4.3%	2.7%	* 2.8%	8.2%	* 1.2%
Regular continuous	† 0%	† 0%	* 4.7%	† 2.9%	* 10.5%	22.6%	* 5.0%
Sex							
Male	† 0.1%	† 0%	3.9%	2.9%	4.5%	11.3%	3.3%
Female	† 0.1%	† 0%	4.1%	1.9%	3.0%	8.1%	† 0.5%
Age group							
Less than 35 years	† 0.1%	† 0%	5.8%	3.9%	6.3%	9.3%	3.8%
35 years or over	† 0.1%	† 0%	3.1%	1.6%	2.4%	9.9%	* 0.9%
Ethnicity							
European	† 0%	† 0%	4.0%	2.2%	3.3%	10.8%	1.9%
NZ Mäori	† 0.3%	† 0%	† 4.4%	† 2.2%	* 8.9%	* 6.2%	† 2.5%
Other ethnic group	† 0%	† 0%	* 3.9%	* 4.1%	† 1.3%	* 5.3%	† 0.9%
Total	† 0.1%	† 0%	4.0%	2.4%	3.7%	9.7%	1.9%

| | Favourite gaming activity | | | | | | |
	Dice Games for Money	Card Games for Money	Housie for Money	Money Bets with friends/workmates	Other Gaming Activities	Not elsewhere included	Total Population Count
Gambling status							
Non-gambler (1)	† 0%	† 1.6%	† 0.3%	† 1.0%	† 0.5%	† 0.6%	373,119
Past six month gambler	† 0.3%	2.2%	* 1.2%	3.6%	† 0.6%	* 0.7%	1,231,984
Regular non-continuous	† 0.1%	† 1.4%	† 0.3%	* 2.9%	† 0.4%	† 0.6%	820,084
Regular continuous	† 0%	* 2.3%	* 5.0%	† 1.1%	† 1.0%	† 0.2%	284,444
Sex							
Male	† 0.2%	2.5%	† 0.3%	4.3%	† 0.5%	† 0.5%	1,313,580
Female	† 0.1%	* 1.3%	* 2.1%	1.3%	† 0.7%	* 0.6%	1,396,050
Age group							
Less than 35 years	† 0.2%	* 2.5%	† 1.1%	5.5%	† 0.6%	† 0.8%	921,350
35 years or over	† 0.1%	1.6%	* 1.3%	1.4%	† 0.6%	* 0.5%	1,788,280
Ethnicity							
European	† 0.2%	1.3%	* 0.8%	2.7%	† 0.2%	* 0.5%	2,110,274
NZ Mäori	† 0.3%	† 3.9%	† 3.0%	† 4.6%	† 1.6%	† 1.3%	318,651
Other ethnic group	† 0%	† 3.9%	† 2.0%	† 1.1%	† 2.4%	† 0.4%	280,705
Total	† 0.2%	1.9%	1.2%	2.8%	† 0.6%	* 0.6%	2,709,630

(1)   Non-gamblers includes those people who have never gambled and those people who have not gambled in past six months

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

Table 15b: Favourite Gaming Activity by Gambling Participation Group: Sex, Age Group and Ethnicity: Absolute Sampling Errors

	Favourite gaming activity						
	Never gambled	No favourite	Lotto	Instant Kiwi	Daily Keno	TeleBingo	Other lotteries/ raffles
Gambling status							
Non-gambler (1)	3.6%	3.2%	1.5%	† 1.2%	N/A	† 0.6%	0.8%
Past six month gambler	-	1.8%	1.5%	1.2%	† 0.2%	0.7%	0.7%
Regular non-continuous	-	1.9%	2.2%	0.7%	† 0.6%	1.6%	0.6%
Regular continuous	-	2.0%	3.2%	2.8%	† 0.6%	2.2%	† 0.8%
Sex							
Male	0.9%	1.8%	1.7%	0.8%	† 0.4%	0.8%	0.5%
Female	1.0%	1.6%	1.6%	1.1%	† 0.2%	1.0%	0.6%
Age group							
Less than 35 years	1.0%	2.3%	2.0%	1.7%	† 0.5%	1.1%	0.7%
35 years or over	0.7%	1.4%	1.3%	0.5%	† 0.2%	0.8%	0.5%
Ethnicity							
European	0.6%	1.4%	1.1%	0.7%	† 0.1%	0.7%	0.5%
NZ Mäori	1.9%	3.6%	4.0%	† 2.7%	† 1.1%	2.4%	† 1.5%
Other ethnic group	3.1%	4.8%	4.0%	† 2.8%	† 1.6%	† 1.7%	† 0.5%
Total	0.6%	1.2%	1.2%	0.7%	† 0.2%	0.7%	0.4%

| | Favourite gaming activity | | | | | | |
	0900 telephone competitions	Internet gaming activities	Casino gaming machines	Other casino games	Gaming machines not in a casino	Betting on horse or dog races	Other sports betting
Gambling status							
Non-gambler (1)	N/A	N/A	† 0.7%	† 0.5%	† 1.6%	1.0%	† 0.5%
Past six month gambler	† 0.1%	N/A	0.9%	0.7%	1.0%	1.3%	0.7%
Regular non-continuous	† 0.2%	N/A	1.1%	0.8%	0.9%	1.3%	0.5%
Regular continuous	N/A	N/A	2.1%	† 1.7%	3.4%	3.6%	1.9%
Sex							
Male	† 0.1%	N/A	1.0%	0.7%	1.0%	1.4%	0.9%
Female	† 0.1%	N/A	0.8%	0.5%	0.7%	1.1%	† 0.3%
Age group							
Less than 35 years	† 0.2%	N/A	1.2%	1.0%	1.7%	1.4%	1.1%
35 years or over	† 0.1%	N/A	0.5%	0.5%	0.5%	1.1%	0.3%
Ethnicity							
European	† 0.1%	N/A	0.6%	0.4%	0.6%	1.0%	0.4%
NZ Mäori	† 0.5%	N/A	† 2.2%	† 1.7%	3.7%	2.6%	† 1.7%
Other ethnic group	N/A	N/A	1.9%	1.9%	† 2.0%	2.5%	† 1.0%
Total	† 0.1%	N/A	0.5%	0.4%	0.7%	0.9%	0.4%

	Favourite gaming activity					
	Dice Games for Money	Card Games for Money	Housie for Money	Money bets with friends/workmates	Other Gaming Activities	Not Elsewhere Included
Gambling status						
Non-gambler (1)	N/A	† 1.7%	† 0.4%	† 0.7%	† 0.8%	† 0.8%
Past six month gambler	† 0.3%	0.6%	0.5%	0.8%	† 0.4%	0.3%
Regular non-continuous	† 0.1%	† 0.8%	† 0.2%	0.9%	† 0.3%	† 0.4%
Regular continuous	N/A	1.1%	2.3%	† 1.1%	† 1.0%	† 0.2%
Sex						
Male	† 0.2%	0.7%	† 0.3%	1.0%	† 0.3%	† 0.3%
Female	† 0.2%	0.6%	0.6%	0.4%	† 0.4%	0.3%
Age group						
Less than 35 years	† 0.3%	1.0%	† 0.6%	1.4%	† 0.5%	† 0.4%
35 years or over	† 0.1%	0.4%	0.4%	0.4%	† 0.4%	0.2%
Ethnicity						
European	† 0.1%	0.4%	0.3%	0.5%	† 0.1%	0.2%
NZ Māori	† 0.7%	† 2.0%	† 1.9%	† 3.0%	† 1.3%	† 1.2%
Other ethnic group	N/A	† 2.6%	† 1.9%	† 1.4%	† 2.3%	† 0.6%
Total	† 0.1%	0.4%	0.3%	0.5%	† 0.3%	0.2%

(1)   Non gamblers includes those people who have never gambled and those people who have not gambled in the past six months

†   Relative sampling error exceeds 50% and/or less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

N/A   Relative sampling error cannot be calculated because there are no, or too few, respondents in the cell

From Table 15a it is apparent that of the participants who had ever gambled, nearly three-quarters reported that they had a favourite gambling activity. As anticipated from the participation data previously reported, Lotto was the most frequently preferred type. This was followed in descending rank order by betting on horse or dog races, Instant Kiwi, TeleBingo and casino gaming machines. Each of the remaining forms was preferred by fewer than four percent of respondents.

Regular gamblers, especially regular continuous gamblers, were much more likely than less frequent gamblers to report having a favourite form. Almost a quarter of regular continuous gamblers favoured betting on horse or dog races. Other continuous forms favoured by more than ten percent of regular continuous gamblers included Instant Kiwi and gaming machines not in a casino. A relatively large number of regular continuous gamblers nominated Lotto, a non-continuous form, as their most preferred gambling activity.

Lotto was by far the most frequently mentioned preferred gambling activity for regular non-continuous gamblers. The next most frequently mentioned forms by people in this category were TeleBingo and betting on horse or dog races.

Females were more likely than males to favour Instant Kiwi and TeleBingo. Males were more likely than females to favour betting on horse or dog races, other sports betting and money bets with friends and work-mates.

Younger (under 35 years) participants were more likely than their older (35 years or over) counterparts to indicate that they had a favourite form of gambling activity. They were also more likely to favour Instant Kiwi, gaming machines (both in and outside casinos), other sports betting and money bets with friends and workmates. Older adults were more likely to favour Lotto.

Mäori were more likely than the other two broad ethnic categories considered to nominate a favourite form of gambling. Large absolute and relative sample errors for most of the ethnic estimates preclude meaningful examination other than for gaming machines not in casinos and betting on horse or dog races. Mäori appear to favour non-casino gaming machines more than people in the other two ethnic categories and Europeans appear to favour horse or dog betting more than Mäori and people in the 'other' category.

Reasons for Gambling

Participants were asked to indicate their reasons for gambling. These reasons are given in Table 16a. Participants could provide as many reasons as they wished. Consequently, the percentages in Table 16a do not add up to 100 percent.

Quite marked differences are evident between the broad gambling participation categories in this respect. Relative to people in other gambling categories, regular continuous gamblers were more likely to say they gambled to socialise, for excitement or challenge, for fun or entertainment, or as a hobby or habit. Regular non-continuous gamblers were more likely than people in the other two categories of gamblers to say they gambled to win money, although this was the most frequently mentioned reason for all three gambling groups. They were less likely to say they gambled to socialise.

122

Table 16a: Reasons for Gaming Participation by Gambling Participation Group, Gambling Status, Sex and Age Group and Ethnicity: Row Percentages [1]

	Never gambled	Socialising	Excitement/ challenge	To win money	To support worthy causes	For entertainment/fun
			Reasons for gambling participation			
Gambling status						
Non-gamblers (2)	43.5%	7.8%	* 2.9%	11.0%	21.0%	14.0%
Past six month gamblers	-	17.3%	11.5%	50.5%	32.0%	39.0%
Regular non-continuous	-	13.2%	14.8%	72.6%	27.1%	39.1%
Regular continuous	-	22.7%	25.3%	66.4%	19.9%	54.5%
Sex						
Male	5.2%	17.0%	13.3%	54.5%	25.0%	38.3%
Female	6.8%	13.8%	12.3%	52.4%	30.3%	36.1%
Age						
Less than 35 years	4.2%	18.2%	15.1%	54.9%	21.3%	43.5%
35 years or over	6.9%	13.8%	11.6%	52.6%	31.0%	34.0%
Ethnicity						
European	4.9%	15.6%	12.3%	54.3%	29.3%	36.2%
NZ Mäori	* 4.2%	18.5%	16.0%	54.9%	28.7%	42.2%
Other	16.0%	* 9.8%	* 12.6%	45.1%	* 15.0%	39.2%
Total	6.0%	15.3%	12.8%	53.4%	27.7%	37.2%

	As a hobby/habit	Curiosity	Other Reasons	Population Counts
	Reasons for gambling participation			
Gambling status				
Non-gamblers (2)	0%	* 3.0%	* 5.5%	273,119
Past six month gamblers	2.1%	3.9%	7.2%	1,231,984
Regular non-continuous	6.9%	* 2.1%	4.9%	820,084
Regular continuous	11.1%	* 2.6%	6.8%	284,444
Sex				
Male	4.4%	3.3%	6.3%	1,313,580
Female	4.1%	2.9%	6.2%	1,396,050
Age				
Less than 35 years	3.4%	3.5%	7.0%	921,350
35 years or over	4.6%	2.9%	5.9%	1,788,280
Ethnicity				
European	4.3%	3.0%	6.4%	2,110,274
NZ Mäori	* 6.7%	† 4.2%	* 4.9%	318,651
Other	† 0.9%	† 2.4%	† 6.4%	280,705
Total	4.2%	3.1%	6.2%	2,709,630

(1) Percentages will not add to 100% because this is a multiple response question

(2) Non-gamblers includes those people who have never gambled and those people who have not gambled in the past six months

† Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

* Relative sampling error is between 30% and 50%

Table 16b: Reasons for Gaming Participation by Gambling Participation Group, Sex, Age Group and Ethnicity: Absolute Sample Errors [1]

	Reasons for gambling participation					
	Never gambled	Socialising	Excitement/ challenge	To win money	To support worthy causes	For entertainment/ fun
Gambling status						
Non-gamblers (2)	3.6%	1.9%	1.1%	2.3%	3.0%	3.0%
Past six month gamblers	-	1.4%	1.2%	1.9%	1.9%	1.9%
Regular non-continuous	-	1.8%	1.9%	2.4%	2.2%	2.6%
Regular continuous	-	4.1%	3.7%	4.4%	3.7%	4.0%
Sex						
Male	0.9%	1.6%	1.4%	2.2%	2.0%	2.0%
Female	1.0%	1.1%	1.2%	2.4%	1.7%	1.9%
Age						
Less than 35 years	1.0%	2.0%	2.1%	3.1%	2.0%	2.7%
35 years or over	0.7%	1.0%	1.1%	1.5%	1.6%	1.6%
Ethnicity						
European	0.6%	0.9%	0.9%	1.5%	1.3%	1.5%
NZ Māori	1.9%	3.9%	3.9%	4.9%	4.9%	5.3%
Other	3.1%	3.1%	5.1%	7.0%	5.4%	5.8%
Total	0.6%	0.9%	0.9%	1.5%	1.3%	1.3%

	Reasons for gambling participation		
	As a hobby/ habit	Curiosity	Other reasons
Gambling status			
Non-gamblers (2)	N/A	1.1%	1.9%
Past six month gambler	0.6%	0.8%	1.1%
Regular non-continuous	1.2%	0.7%	1.0%
Regular continuous	2.7%	1.2%	1.8%
Sex			
Male	0.8%	0.8%	1.1%
Female	0.7%	0.7%	0.8%
Age			
Less than 35 years	0.9%	1.0%	1.5%
35 years or over	0.6%	0.5%	0.7%
Ethnicity			
European	0.5%	0.5%	0.6%
NZ Māori	2.7%	† 2.3%	2.2%
Other	† 0.9%	† 2.0%	† 3.4%
Total	0.5%	0.4%	0.6%

(1)   The sampling errors presented in this table are absolute sampling errors, not relative sampling errors

(2)   Non-gamblers includes those people who have never gambled and those people who have not gambled in the past six months

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

N/A   Absolute sampling error cannot be calculated because there are no, or too few, respondents in the cell

Males were more likely than females to report that they gambled to socialise and less likely than females to say they gambled to support worthy causes.

Younger adults were more likely than older adults to indicate that they gambled to socialise, for excitement or challenge, for entertainment or fun and less likely to indicate that they gambled to support worthy causes.

As with the preference data, the sampling errors were generally too large to conclude that the apparent ethnic differences are reliable or significant.

Participation in More Popular Forms of Gambling

Table 17a examines involvement in the forms of gambling that were most frequently participated in during the past six months by respondents in a variety of sociodemographic categories. These categories are also cross-classified by gender. Table 17b provides absolute sample errors for the Table 17a estimates. This data set is concerned with reported 'actual' gambling behaviour, rather than gambling preferences.

From careful inspection of Tables 17a and 17b it is evident that particular groups are more likely to have participated in some forms of gambling than in others.

Lotto

As indicated earlier and shown in Table 8, Lotto has a very high level of participation. From Table 17a it is evident that all of the groups with relative sampling errors of less than 50 percent contained a majority of respondents who reported having purchased a Lotto ticket within the past six months. However, adults aged 25-64 years were somewhat more likely to report participation than people in the youngest and oldest age groups. Gender differences were negligible. Of the three broad ethnic groupings, participants of ethnicities other than European and Mäori reported somewhat lower participation rates. However, when ethnicity and gender were considered together, it was evident that this difference was a consequence of lower involvement by women in the non- Mäori /non-European group. People who were unemployed or not in the labour force also reported relatively lower levels of participation, as did single adults. Participation did not vary appreciably between the four geographical regions.

Other Lotteries or Raffles

Past six month participation in other lotteries or raffles had a pattern generally similar to that for Lotto. There were a few exceptions. Women reported somewhat higher participation than men and there was little difference between men and women in the 'other' ethnic category. Regional differences were also evident. Christchurch and the rest of New Zealand had higher levels of participation than Auckland and Wellington.

Instant Kiwi

Instant Kiwi has a relatively high level of participation, especially on the part of people aged 18-24 years. Females were somewhat more likely to participate than males. Mäori were somewhat more likely to participate than Europeans and both of these groups had higher rates of participation than those of other ethnicities. Employed people had somewhat higher rates than people who were unemployed or not in the labour force and Auckland residents had lower rates than people from other parts of the country.

<u>Track Betting</u>

As in the case of Lotto and other lotteries and raffles, betting on horse and dog races was less frequently reported by the youngest and oldest groups of respondents. However, in contrast to the situation for these forms of non-continuous gambling and Instant Kiwi, males have higher participation than females. Mäori and European rates were similar and, as with all forms of gambling considered to this point, were higher than the participation of the 'other' ethnic respondents.

When ethnicity and gender were considered together, quite substantial differences appeared to pertain to Mäori, with men having participation rates more than double those of women. However, the participation rates for these two groups had quite high absolute sample errors and thus need to be treated with some caution. Relative to respondents from other parts of the country, Wellingtonians had higher levels of participation in track betting.

<u>Money Bets with Friends</u>

Like Instant Kiwi, money bets with friends were most prevalent among people aged 18-24 years and reduced in prevalence in each older age grouping to reach their lowest levels among those aged 65 years and older. As with track betting, this form of gambling was strongly gender-linked, with higher involvement on the part of men. This gender difference was particularly marked in Auckland and Wellington. Mäori had somewhat higher levels of participation than Europeans who, as with previously considered forms of gambling, had higher levels of participation than the residual 'other' ethnic category. Relative to employed people, respondents in the unemployed/not in the labour force group had very low participation rates. People without partners had somewhat higher levels of involvement than did partnered respondents.

<u>TeleBingo</u>
In contrast to the situation of Instant Kiwi and money bets with friends, participation in TeleBingo was lowest among young respondents and <u>increased</u> in each successively older age category. Like other lotteries or raffles and Instant Kiwi, women had somewhat higher levels of engagement than men. As with money bets with friends, Mäori had slightly higher levels of involvement than Europeans and moderately higher participation than respondents of other ethnicities. In contrast to the situation with all other forms of gambling included in Table 17a, respondents who were unemployed/not in the labour force had somewhat <u>higher</u> levels of involvement. People living outside the three largest urban centres also reported higher levels of involvement in TeleBingo, as did partnered respondents.

<u>Gaming Machines not in Casinos</u>
As with Instant Kiwi and money bets with friends, people in the youngest age group reported the highest level of involvement in this gambling activity, followed by those in the next youngest group. Participation levels were lowest in the two oldest groupings. Like betting on horse and dog races and making money bets with friends, males had higher participation rates than females. Mäori reported much higher levels of involvement than Europeans and people of other ethnicities. Employed respondents also had higher participation rates than people who were unemployed or not in the labour force. Non-

partnered respondents were a further group with higher levels of involvement than those with partners. Regional differences with respect to gaming machines not in casinos were not great, although somewhat higher rates of participation were apparent in Christchurch and somewhat lower rates were found in Auckland.

Casino Gaming Machines
Participation levels in this form of gambling were lower in the 65 plus age group relative to other age categories. Little difference was evident among respondents in the age groups under age 65 years. Males and females had fairly similar participation rates, in contrast to the situation with gaming machines that were not located in casinos. Casino gaming machines were the only form of gambling shown in Table 17a where respondents of other ethnicities had higher levels of involvement than did Europeans and Mäori. This was especially so for males of ethnicities other than Mäori or European. As with gaming machines not in casinos, respondents who were unemployed or not in the labour force reported lower levels of casino gaming machine involvement than their employed counterparts. As expected, given the location of casinos, Auckland and Christchurch people had much higher participation levels than people resident in Wellington or other parts of the country.

The above narrative accounts of the sociodemographic profiles of past six months participants in the eight most frequently engaged in forms of gambling are provided to assist in interpreting Tables 17a and 17b. Although an indication of the statistical significance of the differences between sociodemographic groups with respect to their levels of involvement in each form of gambling can be obtained by inspecting the absolute sample errors associated with row percentages, there are more appropriate ways to examine relationships between sociodemographic factors and past six month gambling participation. In the present case, contingency table and logistic regression analyses were conducted for the data pertaining to each of the eight types of gambling considered in this section. The contingency table analyses allowed the statistical significance of differences in participation within each sociodemographic category (e.g. males versus females) to be examined. By further considering sociodemographic variables together in multivariate logistic regression analyses, it was possible to partially control for the inter-relationships between each of these variables and identify those factors that were most strongly associated with the various types of gambling participation.

In Appendix Four, the results of a series of Chi-square analyses of two-way tables (i.e. tests of independence) are outlined for each of the eight forms of gambling participation as well as a ninth form, 'other casino gambling'. In addition, the results of logistic regression analyses for each form of gambling participation are provided. The models reported are preliminary, and generally do not address potential confounding effects and possible variable interactions. Thus, they should be considered as exploratory rather than definitive statements on the sociodemographic variables that have most and least impact on participation in the various forms of gambling considered. Further logistic regression models will be considered subsequently and the results outlined in Appendix Four may be refined and reported in a subsequent publication.

Table 17a: Participation in Eight Most Frequently Engaged in Activities in the Past Six Months by Selected Characteristics Cross-Classified by Sex: Row Percentages[1]

Selected characteristics		Gaming activities									Population Counts
		Did not bet in past 6 months	Lotto	Other lotteries or raffles	Instant Kiwi	Betting on horse or dog races	Money bets with friends	TeleBingo	Gaming machines not in casinos	Casino gaming machines	
Age Group Total											
	18-24	13.2%	59.1%	37.2%	50.5%	14.5%	27.9%	9.5%	23.8%	10.9%	365,740
	25-34	11.5%	75.4%	50.1%	39.1%	22.3%	22.7%	13.8%	18.3%	13.6%	555,610
	35-44	12.1%	75.4%	56.0%	36.1%	18.7%	19.4%	15.4%	11.8%	10.4%	584,350
	45-54	13.1%	77.3%	51.2%	33.8%	18.7%	14.9%	17.5%	13.4%	11.6%	471,120
	55-64	14.5%	74.9%	46.2%	32.0%	20%	10.2%	22.0%	9.3%	10.9%	316,200
	65 plus	19.8%	69.9%	42.3%	27.2%	14.3%	3.7%	23.8%	7.0%	5.3%	416,610
Age Group by Sex											
18-24	Male	* 11.9%	57.4%	34.2%	46.4%	* 16.6%	33.5%	† 6.2%	30.2%	* 10.8%	184,910
	Female	* 14.6%	60.9%	40.2%	54.8%	* 12.4%	22.3%	* 13.0%	17.2%	* 10.9%	180,830
25-34	Male	14.0%	72.6%	42.9%	33.3%	22.5%	26.7%	* 9.5%	21.7%	* 14.4%	267,260
	Female	9.2%	78.1%	56.7%	44.5%	22.1%	18.9%	17.7%	15.1%	12.8%	288,350
35-44	Male	10.5%	77.8%	54.8%	35.8%	20.8%	24.1%	14.0%	14.5%	11.4%	284,720
	Female	13.6%	73.1%	57.1%	36.4%	16.7%	14.9%	16.8%	9.2%	9.4%	299,630
45-54	Male	11.6%	78.8%	48.3%	27.7%	23.6%	17.8%	* 13.3%	15.9%	13.1%	234,650
	Female	14.6%	75.7%	54.1%	39.9%	14.0%	12.0%	21.7%	10.8%	* 10.1%	236,470
55-64	Male	* 13.3%	77.6%	46.4%	27.8%	24.3%	* 11.5%	16.7%	* 10.9%	* 11.1%	156,900
	Female	15.8%	72.3%	45.9%	36.2%	15.8%	* 9.0%	27.1%	* 7.7%	* 10.8%	159,300
65 plus	Male	19.1%	71.4%	42.4%	24.5%	18.4%	* 4.5%	23.7%	9.4%	* 4.2%	185,140
	Female	20.5%	68.7%	42.2%	29.4%	11.1%	* 3.1%	23.9%	* 5.1%	* 6.2%	231,470
Ethnicity Total											
	European	13.0%	73.8%	50.7%	37.3%	18.8%	16.9%	16.2%	13.1%	10.2%	2,110,274
	NZ Māori	* 9.6%	73.0%	50.5%	41.2%	21.2%	23.0%	23.2%	24.9%	* 8.8%	318,651
	Other	24.5%	63.7%	26.6%	24.5%	* 11.9%	* 10.9%	* 13.2%	† 8.4%	15.7%	280,705

128

Ethnicity by Sex										
European	Male	13.1%	73.0%	48.5%	33.2%	21.2%	20.8%	13.1%	16.4%	10.6%	1,020,862
	Female	12.9%	74.4%	52.7%	41.1%	16.5%	13.2%	19.1%	9.9%	9.8%	1,089,413
NZ Māori	Male	† 8.4%	72.7%	45.1%	39.3%	29.4%	27.5%	* 17.3%	29.6%	†7.9%	148,690
	Female	* 10.6%	73.3%	55.2%	42.8%	* 14.1%	19.1%	28.5%	20.8%	*9.6%	169,961
Other ethnic group	Male	* 18.5%	74.1%	25.2%	23.0%	* 12.2%	* 12.2%	* 13.0%	† 10.7%	*18.7%	144,029
	Female	30.9%	52.7%	28.1%	26.0%	* 11.6%	† 9.5%	* 13.3%	† 5.9%	†12.5%	136,676
Labour Force (LF) Status Total										
	Employed	10.1%	77.0%	52.1%	39.2%	21.1%	22.3%	14.8%	16.1%	12.5%	1,790,909
	Unemployed/ Not in the LF	20.8%	64.2%	40.6%	31.3%	13.0%	6.5%	20.5%	9.8%	6.8%	912,575
	LF status unidentifiable	† 38.3%	† 52.7%	† 14.5%	† 8.1%	† 8.9%	† 0%	† 11.0%	† 6.8%	†13.8%	†6,146
Labour Force Status by Sex										
Employed	Male	10.6%	75.9%	49.3%	34.8%	22.1%	24.5%	11.6%	18.5%	12.5%	981,397
	Female	9.6%	78.3%	55.5%	44.5%	19.8%	19.7%	18.6%	13.2%	12.5%	809,512
Unemployed/ Not in the LF	Male	20.9%	64.7%	34.8%	27.0%	18.1%	* 9.0%	19.2%	13.8%	*7.1%	330,018
	Female	20.7%	63.9%	44.0%	33.7%	10.2%	5.1%	21.3%	7.6%	6.7%	582,558
LF status unidentifiable	Male	† 0%	† 100%	† 15.6%	† 15.6%	† 9.8%	† 0%	† 31.3%	† 0%	†39.2%	†2,165
	Female	† 59.1%	† 27.0%	† 13.9%	† 4.0%	† 8.3%	† 0%	† 0%	† 10.5%	† 0%	†3,981
Marital Status Total										
	Partnered	12.8%	76.3%	51.5%	35.7%	18.9%	15.4%	18.6%	12.2%	10.7%	1,810,884
	Nonpartnered	15.7%	64.9%	41.2%	37.7%	17.2%	20.2%	12.7%	17.5%	10.1%	882,737
	Not elsewhere included	† 13.6%	80.9%	* 48.2%	* 49.3%	† 22.1%	† 15.3%	† 22.2%	† 16.2%	†21.1%	*16,009

Marital Status by Sex

Partnered	Male	12.7%	76.6%	48.9%	32.1%	20.8%	18.7%	15.8%	14.4%	11.0%	908,101
	Female	13.0%	76.0%	54.2%	39.4%	16.9%	12.0%	21.4%	10.1%	10.3%	902,783
Nonpartnered	Male	14.4%	64.6%	37.5%	33.7%	21.5%	24.9%	8.0%	24.0%	11.0%	395,882
	Female	16.8%	65.2%	44.2%	40.9%	13.7%	16.4%	16.5%	12.2%	9.4%	486,854
Not elsewhere included	Male	† 4.1%	91.8%	† 59.8%	* 61.2%	† 32.6%	† 17.9%	† 23.8%	† 17.9%	† 22.4%	†9,596
	Female	† 27.7%	* 64.7%	† 30.7%	† 31.5%	† 6.4%	† 11.4%	† 19.7%	† 13.7%	†19.1%	*6,413

Location Total

	Auckland	16.1%	71.1%	43.8%	31.5%	17.7%	20%	13.1%	11.1%	16.4%	809,880
	Wellington	13.5%	72.9%	33.8%	41.5%	27.4%	18.7%	14.6%	15.5%	*7.1%	293,561
	Christchurch	10.2%	73.5%	51.0%	38.6%	21.2%	16.3%	13.7%	17.1%	19.8%	335,545
	Rest of NZ	13.3%	73.3%	53.5%	37.9%	15.9%	14.8%	20.3%	14.6%	5.3%	1,270,643

Location by Sex

Auckland	Male	13.7%	73.9%	40.2%	30%	19.9%	25.4%	* 10.6%	13.3%	16.9%	396,694
	Female	18.5%	68.5%	47.2%	32.9%	15.6%	14.8%	15.4%	9.0%	15.8%	413,187
Wellington	Male	14.6%	74.3%	32.9%	37.0%	31.1%	23.0%	* 11.7%	21.5%	*9.3%	151,818
	Female	12.4%	71.5%	34.8%	46.3%	23.4%	14.1%	17.8%	* 9.2%	†4.7%	141,743
Christchurch	Male	* 9.6%	73.2%	47.7%	35.7%	23.1%	17.7%	* 12.0%	19.2%	18.7%	156,136
	Female	10.8%	73.6%	53.9%	41.2%	19.5%	15.0%	15.2%	15.2%	20.8%	179,409
Rest of NZ	Male	13.3%	72.3%	51.6%	32.8%	18.9%	17.5%	16.3%	18.4%	6.0%	608,932
	Female	13.2%	74.2%	55.2%	42.5%	13.2%	12.3%	24.0%	11.2%	4.7%	661,711

Sex Total

	Male	13.1%	73.1%	45.6%	32.8%	21.1%	20.6%	13.5%	17.3%	11.2%	1,313,580
	Female	14.4%	72.2%	50.6%	39.9%	15.8%	13.6%	19.7%	10.9%	10.0%	1,396,050
	Total	13.8%	72.6%	48.1%	36.4%	18.4%	17.0%	16.7%	14.0%	10.6%	2,709,630

(1)   Percentages will not add to 100% because this is a multiple response question

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

Table 17b: Participation in Eight Most Frequently Engaged in Activities in Past Six Months by Selected Characteristics Cross Classified by Sex: Absolute Sample Errors for Row Percentages [1]

Selected characteristics		Gaming activities								
		Did not bet in past 6 months	Lotto	Other lotteries or raffles	Instant Kiwi	Betting on horse or dog races	Money bets with friends	TeleBingo	Gaming machines not in casinos	Casino gaming machines
Age Group Total										
	18-24	3.5%	5.0%	4.9%	4.3%	3.4%	4.6%	2.8%	3.9%	2.7%
	25-34	2.0%	3.1%	3.3%	3.3%	2.6%	2.7%	2.2%	3.5%	2.5%
	35-44	2.0%	2.6%	3.2%	2.6%	2.6%	1.9%	2.4%	1.7%	1.5%
	45-54	2.2%	2.9%	3.6%	3.0%	2.8%	2.5%	2.9%	2.4%	2.6%
	55-64	3.2%	3.4%	3.5%	3.5%	3.5%	2.4%	3.3%	2.0%	3.0%
	65 plus	2.0%	2.5%	2.7%	2.5%	1.9%	1.1%	2.3%	1.4%	1.5%
Age Group by Sex										
18-24	Male	5.0%	7.2%	7.1%	7.7%	5.0%	7.6%	† 3.5%	6.7%	4.3%
	Female	5.0%	7.0%	6.1%	7.0%	4.2%	5.5%	4.8%	4.6%	4.1%
25-34	Male	3.2%	4.7%	4.8%	4.8%	4.0%	4.0%	3.0%	5.0%	4.5%
	Female	2.0%	3.5%	4.2%	4.3%	3.5%	3.3%	3.4%	3.4%	2.4%
35-44	Male	2.8%	3.4%	4.7%	4.2%	3.9%	3.4%	3.5%	2.9%	2.4%
	Female	2.7%	3.8%	4.1%	3.4%	3.5%	2.5%	3.0%	2.1%	1.7%
45-54	Male	3.4%	4.5%	5.4%	4.3%	4.4%	4.0%	4.0%	3.9%	3.5%
	Female	3.5%	4.1%	4.7%	4.8%	2.9%	2.7%	4.0%	3.0%	3.5%
55-64	Male	4.3%	4.9%	5.5%	5.0%	5.2%	4.0%	4.4%	3.6%	4.1%
	Female	3.9%	4.8%	5.0%	4.8%	4.2%	3.0%	5.2%	2.8%	4.4%
65 plus	Male	3.5%	4.1%	4.3%	3.5%	3.6%	2.0%	3.5%	2.4%	2.0%
	Female	2.7%	3.3%	3.4%	3.3%	2.3%	1.4%	3.0%	1.7%	2.2%
Ethnicity Total										
	European	0.9%	1.2%	1.3%	1.4%	1.2%	1.2%	1.0%	1.0%	1.1%
	NZ Māori	3.1%	4.5%	5.4%	5.2%	4.5%	4.9%	5.0%	5.0%	2.8%
	Other	4.8%	4.4%	5.2%	4.7%	3.7%	3.9%	4.1%	† 4.3%	4.3%

Ethnicity by Sex

European	Male	1.4%	1.8%	2.1%	2.1%	1.9%	1.9%	1.4%	1.9%	1.5%
	Female	1.2%	1.6%	1.6%	1.9%	1.4%	1.4%	1.4%	1.2%	1.5%
NZ Māori	Male	† 5.2%	7.2%	7.8%	8.7%	7.5%	8.1%	6.4%	7.4%	† 4.1%
	Female	3.9%	6.7%	6.9%	6.6%	4.6%	5.4%	7.1%	6.2%	3.9%
Other ethnic group	Male	5.7%	6.3%	7.1%	6.7%	5.1%	5.5%	5.3%	† 6.1%	7.4%
	Female	7.0%	7.2%	8.0%	6.4%	5.0%	† 5.4%	5.2%	† 4.1%	† 6.3%

Labour Force (LF) Status Total

	Employed	1.1%	1.4%	1.9%	1.6%	1.6%	1.5%	1.3%	1.4%	1.3%
	Unemployed/ Not in the LF	2.0%	2.5%	2.3%	2.2%	1.6%	1.4%	1.7%	1.9%	1.4%
	LF status unidentifiable	† 24.6%	† 21.4%	† 20.5%	† 14.4%	† 11.0%	N/A	† 17.6%	† 15.2%	† 27.1%

Labour Force Status by Sex

Employed	Male	1.5%	1.9%	2.6%	2.3%	2.1%	2.3%	1.7%	2.1%	1.9%
	Female	1.5%	2.2%	2.6%	2.3%	1.9%	1.9%	2.0%	1.6%	1.5%
Unemployed/	Male	4.0%	4.7%	3.8%	4.1%	3.2%	2.8%	2.9%	3.6%	2.5%
Not in the LF	Female	2.3%	3.1%	2.6%	2.7%	1.6%	1.5%	2.3%	1.8%	1.8%
LF status unidentifiable	Male	N/A	N/A	† 41.6%	† 41.6%	† 19.9%	N/A	† 64.2%	N/A	† 78.9%
	Female	† 41.0%	† 32.5%	† 19.6%	† 8.6%	† 17.9%	N/A	N/A	† 22.5%	N/A

Marital Status Total

	Partnered	1.0%	1.3%	1.8%	1.6%	1.4%	1.2%	1.3%	1.2%	1.2%
	Nonpartnered	1.9%	2.3%	2.5%	2.5%	1.8%	2.1%	1.7%	2.1%	1.3%
	Not elsewhere included	† 10.2%	9.8%	15.1%	14.8%	† 16.0%	† 14.9%	† 15.5%	† 14.2%	† 12.1%

Marital Status by Sex

Partnered	Male	1.6%	2.0%	2.7%	2.3%	2.4%	2.0%	2.1%	1.9%	1.7%
	Female	1.3%	1.8%	2.3%	2.2%	1.6%	1.4%	1.8%	1.4%	1.5%
Nonpartnered	Male	3.2%	4.1%	3.7%	3.9%	3.0%	3.7%	2.3%	3.7%	2.2%
	Female	2.3%	3.3%	3.1%	3.3%	2.2%	2.8%	2.4%	2.4%	2.2%
Not elsewhere included	Male	† 8.4%	10.3%	† 20.7%	20.7%	† 30.1%	† 25.5%	† 25.5%	† 23.6%	† 19.8%

	Female	† 22.8%	24.2%	† 22.1%	† 23.3%	† 8.8%	† 16.6%	† 19.6%	† 16.4%	† 17.9%

Location Total

Auckland	1.5%	2.3%	2.7%	2.6%	1.8%	2.1%	1.9%	1.6%	2.5%
Wellington	2.9%	3.3%	3.3%	4.6%	4.6%	3.3%	2.5%	3.8%	2.3%
Christchurch	2.0%	3.9%	3.2%	3.7%	4.3%	2.9%	2.7%	2.6%	2.3%
Rest of NZ	1.6%	1.9%	2.1%	2.0%	1.6%	1.6%	1.7%	1.8%	0.9%

Location by Sex

Auckland	Male	2.2%	3.2%	3.8%	4.0%	3.1%	3.7%	3.3%	2.8%	3.8%
	Female	2.4%	3.0%	3.3%	2.3%	1.7%	2.8%	2.1%	1.8%	3.0%
Wellington	Male	3.9%	4.9%	6.3%	5.9%	6.2%	5.7%	3.9%	6.0%	3.3%
	Female	3.1%	6.0%	4.4%	6.9%	4.5%	3.5%	5.1%	3.7%	† 2.9%
Christchurch	Male	3.3%	4.3%	5.4%	6.6%	6.4%	5.2%	4.6%	4.7%	4.2%
	Female	3.1%	6.3%	4.2%	4.3%	3.9%	4.2%	3.3%	3.7%	3.7%
Rest of NZ	Male	2.4%	2.9%	3.2%	2.8%	2.5%	2.6%	2.3%	2.7%	1.5%
	Female	1.7%	2.4%	2.6%	2.8%	1.8%	1.7%	2.4%	1.8%	1.1%

Sex Total

Male	1.4%	1.8%	2.1%	2.1%	1.8%	1.9%	1.6%	1.8%	1.4%
Female	1.2%	1.7%	1.8%	1.7%	1.2%	1.3%	1.4%	1.2%	1.2%
Total	1.0%	1.3%	1.4%	1.3%	1.2%	1.1%	1.1%	1.1%	1.0%

(1) The sampling errors presented in this table are absolute sampling errors, not relative sampling errors

† Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

* Relative sampling error is between 30% and 50%

N/A Absolute sampling error cannot be calculated because there are no, or too few, respondents in the cell

4.3 Problem Gambling

Introduction

As discussed earlier, estimation of the prevalence of problem and probable pathological gambling within the adult New Zealand population was the major objective of the present survey. These and related findings are presented in this section.

As outlined previously, the SOGS-R, originally developed for the 1991 New Zealand national survey and since used in a slightly adapted form in the majority of problem gambling prevalence studies conducted internationally, was included in the 1999 survey. This version of the SOGS-R provides both current (past six months) and lifetime timeframes. Most problem gambling prevalence studies conducted since 1991 have included these timeframes although the current frame has usually been extended from the original six months to 12 months.

In problem gambling prevalence surveys it is customary to categorise respondents as non-problem gamblers, problem gamblers and probable pathological gamblers on the basis of their responses to questions on the SOGS-R or one of the other screens that have been developed recently. The rationale for selecting the SOGS-R in the present survey was outlined earlier in this report.

To recap previous discussion, the term <u>probable</u> distinguishes the results of surveys based on screening instruments such as the SOGS-R from classification derived from clinical diagnosis. Respondents scoring three or four out of a possible 20 points on the SOGS-R items are classified as problem gamblers. Those scoring five or more points are classified as probable pathological gamblers. <u>Lifetime</u> problem and probable pathological gamblers are people who have indicated that, at some time in their lives, they met the SOGS-R criteria for problem or probable pathological gambling. <u>Current</u> problem and probable pathological gamblers (in the present survey and 1991 survey) are people who have met these criteria in the past six months.

Not all <u>lifetime</u> problem and probable pathological gamblers meet sufficient criteria to be classified as <u>current</u> problem and probable pathological gamblers. In Chapter Two, it was noted that there are a number of possible reasons why this is the case.

Again by way of reiteration, research involving the SOGS-R has shown that the <u>lifetime</u> screen is very good at detecting serious gambling problems among people who currently experience the disorder. However, in general population surveys it appears to do this at the expense of generating a substantial number of <u>false</u> <u>positives</u> (people who score five or more on the SOGS-R who do <u>not</u> have problems when assessed clinically). False positives may or may not be counterbalanced by false negatives (people who do not score five or more on the SOGS-R but <u>do</u> have problems when assessed clinically). The <u>current</u> SOGS-R, on the other hand, appears to produce fewer false positives but substantially more <u>false</u> <u>negatives</u>. Consequently, the current measure probably provides a weaker screen for identifying people with serious gambling problems and may well produce under-estimates of the prevalence of problem and probable pathological gambling when used in community settings. However, its focus on current behaviour, together with indications that it has greater efficiency (i.e. overall it produces fewer classification errors) than the

lifetime measure, means that it is likely to be a more useful tool for detecting change in prevalence over time - both in replication surveys and longitudinal studies.

The issue of false positives and negatives is complicated because it has yet to be demonstrated that clinical assessments of problem or pathological gambling are necessarily more valid or reliable than the SOGS-R per se. An alternative approach is to start from the position that the SOGS-R 'measures what it measures'. What 'it' actually is, is determined by examining the relationship of SOGS-R performance to performance on other relevant measures. Clinical assessments are only one of many measures pertinent to this enterprise.

This approach to extending our understanding of what the SOGS-R measures is referred to as <u>construct</u> <u>validation</u>. Construct validation involves refining the meaning of a particular measure (or, to be more precise, the underlying construct that the measure purports to assess) by embedding it within a wide variety of relevant studies. As research of this type accumulates, knowledge about the construct in question is expanded. In the case of the SOGS-R, because it has been used in many studies throughout the world, quite a lot is known about how it performs in relation to other measures of theoretical and practical relevance. As further information of this type accumulates, it is also possible to apply it retrospectively to the interpretation of earlier studies and extract 'added value' or additional understanding from them. Much of the information contained in this section of the report makes a contribution to the extension of the construct validation of the SOGS-R and enhances our understanding of the findings of previous research.

The inclusion of multiple indicators (measures) of a construct (in the present instance problem and pathological gambling) in the same study is another approach that can be taken to extend the construct validation of a particular measure. This can also be regarded as a form of 'triangulation', whereby the underlying construct is examined or illuminated from multiple perspectives. Some secondary measures of problem gambling are included in the present survey. Examples include questions asking respondents whether they themselves consider that they currently have, or have had, a problem with gambling, whether or not they have felt anxious about their gambling and whether they have ever sought help to try to stop gambling. In phase two of the survey, an alternative problem gambling screen (the Fisher DSM-IV Screen) is administered to sub-samples of phase one participants.

Prevalence Rates

Prevalence rates are based on the proportion of respondents who score on increasing numbers of items that make up the lifetime and current scales of the SOGS-R. Table 18 presents information about the proportion of respondents who score on an increasing number of items on the lifetime and current SOGS-R. Confidence intervals for the estimates are provided in brackets.

It is evident that the large majority (83.1%) of survey participants did not report <u>ever</u> having experienced any gambling problems on the SOGS-R. A moderate number (13.9%) reported having at some stage in their lives experienced one or two problems but fell short of the cut-off for problem gambling. In the case of <u>current</u> problems, 91.2 percent of participants reported having experienced no problems in the past six months and 7.5 percent reported having experienced one or two problems.

Table 18: Scores on Lifetime and Current SOGS-R Items[1]

Number of Items	Lifetime		Past 6 Months	
Non-problem Gamblers				
0	83.1%	(81.9%, 84.3%)	91.2%	(90.2%, 92.1%)
At Risk Gamblers				
1	10.7%	(9.8%, 11.7%)	6.1%	(5.3%, 7.0%)
2	3.2%	(2.6%, 3.9%)	1.4%	(1.0%, 1.9%)
Problem Gamblers				
3	1.3%	(0.9%, 1.8%)	0.6%	(0.4%, 0.8%)
4	0.6%	(0.4%, 0.9%)	0.2%	(0.1%, 0.5%)
Probable Pathological Gamblers				
5	0.3%	(0.1%, 0.6%)	0.2%	(0.1%, 0.4%)
6	0.1%	(0.1%, 0.3%)	0.1%	(0%, 0.2%)
7	0.2%	(0.1%, 0.3%)	0.1%	(0%, 0.2%)
8	0.1%	(0%, 0.2%)	0.1%	(0%, 0.2%)
9	0.1%	(0%, 0.3%)	0%	
10 or more	0.2%	(0.1%, 0.4%)	0.1%	(0%, 0.3%)

(1)   Cells with confidence intervals which exceed the estimate should be treated with extreme caution

By adding the percentages of people who score within the various SOGS-R ranges referred to above, prevalence estimates can be determined for current and lifetime problem and probable pathological gambling. This information is also provided in Table 19a. Absolute sampling errors for these estimates are provided in Table 19b.

The total adult population prevalence estimates for the 1999 national survey are:

Current problem gambling	**0.6 to 1.1 percent**
Current probable pathological gambling	**0.3 to 0.7 percent**
Lifetime problem gambling	**1.4 to 2.5 percent**
Lifetime probable pathological gambling	**0.7 to 1.4 percent**

It should be noted that the lifetime estimates also include current problem and probable pathological gamblers. The estimated confidence intervals are constructed so that 95 percent of the time the true prevalence will fall inside them. The confidence intervals in the present instance were calculated using a method recommended by Korn and Graubard (1998). This was done because when a population proportion is very low (approaching zero) or very high and the product of the sample size and proportion is small, the sampling distribution of its estimator is generally not well approximated by a normal distribution; in particular, the sampling distribution is typically asymmetric in contrast to the normal distribution which is symmetric. Hence, when prevalence estimates are very low or very high, or the domain size is small, confidence intervals based on the normal distribution can be inaccurate.

The method recommended by Korn and Graubard (1998) is to modify exact binomial confidence intervals calculated using the F distribution by using the effective domain size, which is the actual domain size divided by the design effect (DEFF) of the estimate. This means that the user needs more information than the point estimate and the sampling error to construct appropriate confidence intervals.

The complex designs Korn and Graubard considered were more clustered than the design used for the Gaming Survey, but also had fewer clusters. Statistics New Zealand has carried out a series of simulations for national and large sub-national populations (such as in Table 19a) for the design used in the Gaming Survey. This study confirmed that the Korn and Graubard (1998) method gave the desired coverage probabilities.

136

For some sub-populations where the domain sizes varied from 3500 down to 80 and for the prevalence of problem gambling and probable pathological gambling, Statistics New Zealand also calculated confidence intervals from bootstrap samples of the data collected in the survey. These confidence intervals were generally close to the Korn and Graubard intervals. More details can be found in Statistics New Zealand Research Report #7. The confidence intervals calculated by the Korn and Graubard method for these sub-populations (they correspond to information provided in Tables 19a and 19b) are presented in Appendix 5. The results of these SNZ studies suggest that use of the Korn and Graubard method of calculating confidence intervals is conservative and thus will not lead to incorrect inferences being drawn for this survey.

For Table 19a the domain size is the sample size, 6452, and the DEFFs range from about one to about 2.5. Because of the large (relative to the prevalence estimates) domain size, these asymmetric confidence intervals have lower limits and upper limits which are almost the same as those based on the normal approximation. So for this table, little harm would come from using the confidence intervals based on the normal distribution.

At the time of the survey, according to Statistics New Zealand, the total population of adults aged 18 years and over was 2,709,630. **Based on these figures we estimate that between 15,400 and 30,700 New Zealand residents aged 18 years and over can be classified as <u>current</u> <u>problem</u> <u>gamblers</u>. In addition, we estimate that between 7,300 and 20,100 can be classified as <u>current</u> <u>probable</u> <u>pathological</u> <u>gamblers</u>.**

We further estimate that between 38,300 and 68,600 New Zealanders can be classified as <u>lifetime</u> <u>problem</u> <u>gamblers</u> and that between 19,700 and 39,100 can be classified as <u>lifetime</u> <u>probable</u> <u>pathological</u> <u>gamblers</u>.

These prevalence estimates are similar to those obtained from the recent Swedish national survey but appear to be lower than those of the earlier 1991 New Zealand national survey. Formal examination of possible differences between the 1991 and 1999 national survey prevalence estimates is reported in the next section of this chapter.

Current versus Lifetime Prevalence Estimates

The combined current problem and probable pathological gambling group is 57 percent smaller than its the combined lifetime problem and probable pathological gambling group. This difference between <u>lifetime</u> and <u>current</u> prevalence rates has generally been interpreted as providing an indication of the number of people who once had a gambling problem but who do not currently experience significant problems. The magnitude of the difference in the present survey is similar to that found in previous surveys, most of which used a 12 months current measure. It suggests that approximately one out of two people who have ever experienced gambling problems in New Zealand are <u>currently</u> experiencing such problems.

Although generally regarded as a stable indicator of problem gambling, a longitudinal follow-up of problem and probable pathological gamblers from the 1991 New Zealand national survey (Abbott, Williams & Volberg, 1999) found that <u>lifetime</u> SOGS-R scores tend to 'track down' and partly reflect current gambling problems. Further research is required to examine change in lifetime SOGS-R performance over time and what this

change means. Findings to date suggest that the lifetime measure provides a highly conservative estimate (i.e. under-estimate) of lifetime problem gambling. This statement is based on the substantial number of 1991 national survey lifetime problem and probable pathological gamblers who did not score as lifetime problem and probable pathological gamblers when they were re-administered the SOGS-R seven years later. The longitudinal follow-up findings imply that differences between 'lifetime' and current rates in prevalence surveys similarly under-estimate the degree of change over time due to 'natural recovery' or treatment.

Comparing Problem Gambling Prevalence Rates from Different Surveys

As indicated in Chapter Two, the great majority of problem gambling prevalence studies conducted since 1991 have used a version of the SOGS-R that provides both current and lifetime measures of problem and probable pathological gambling. As mentioned earlier, most of these surveys have been conducted in North America and those completed since 1993, on average, obtained significantly higher rates than those conducted prior to this date.

Figure 6 shows prevalence rates for lifetime problem and probable pathological gambling from the most recent provincial and state-level North American surveys and the Swedish (SW) and 1991 and 1999 New Zealand (NZ) national surveys. All of the surveys referred to in Figure 6 used the SOGS-R.

The 1999 New Zealand probable pathological gambling rates appear to be comparable to those of the Swedish national survey and lower than those of the 1991 New Zealand national survey and recent North American surveys. In the case of the North American studies, jurisdictions with the highest lifetime rates tend to be ethnically heterogeneous.

Figure 7 shows prevalence rates for current problem and probable pathological gambling for the surveys included in Figure 6. The current (12 month) prevalence rate for the 1999 Australian national survey (AUS) is also included. This study did not include a lifetime measure. Unlike the 1991 and 1999 New Zealand national surveys that used a six month current measure, all of the other surveys used a 12 month timeframe. It is possible that the six months version of the SOGS-R yields somewhat lower estimates than the 12 month current version, however this has yet to be fully examined. In the meantime, some caution is required in directly comparing findings from six and 12 month measures.

Like the lifetime rates, the current 1999 New Zealand probable pathological gambling prevalence rate is comparable to that of the Swedish national survey and lower than those of the other surveys. The rate is substantially lower than that of the 1999 Australian national survey. The New Zealand current problem gambling rate is also somewhat lower than its Swedish counterpart.

Figure 6: Lifetime Prevalence Rates in Selected Jurisdictions

Prevalence

Legend: ☐ Lifetime Problem ■ Lifetime Probable Pathological

Chart showing lifetime prevalence rates (0.0% to 12.0%) by jurisdiction: QE 1996, OR 1997, NB 1996, MI 1997, CT 1996, MT 1998, CO 1997, MS 1996, NY 1996, AL 1998, BC 1996, SW 1998, NZ 1991, NZ 1999
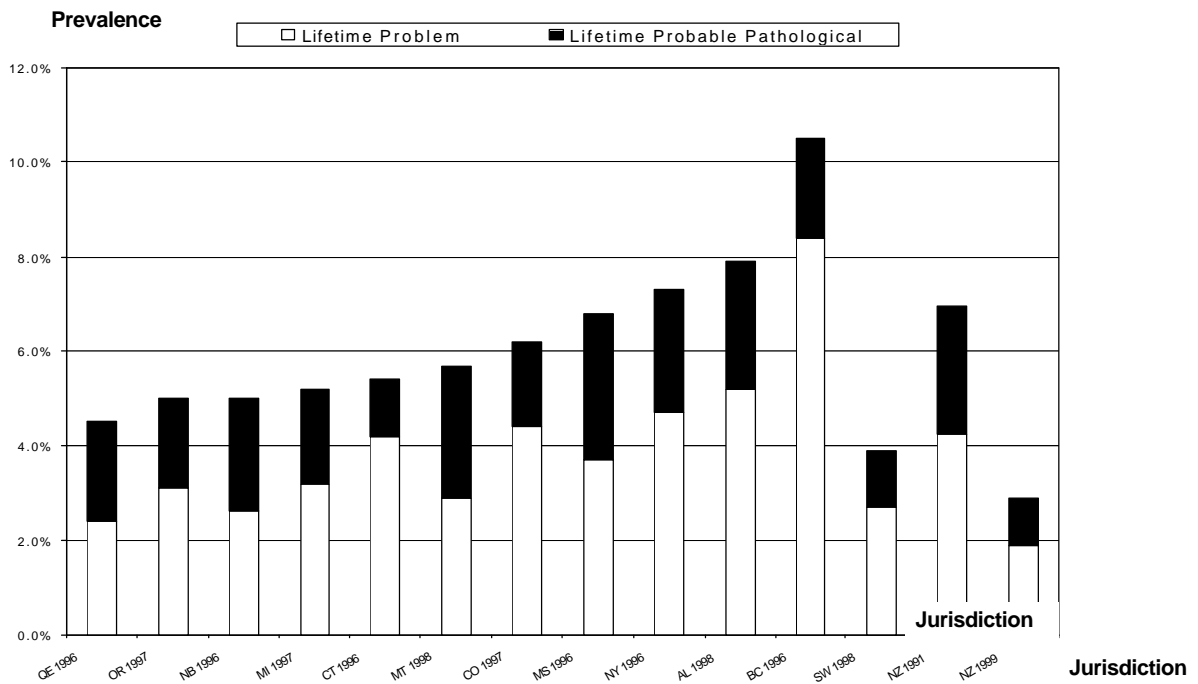
Jurisdiction

Figure 7: Current Prevalence Rates in Selected Jurisdictions

Prevalence

Legend: ☐ Current Problem ■ Current Probable Pathological

Chart showing current prevalence rates (0.0% to 6.0%) by jurisdiction: CO 1997, CT 1996, OR 1997, M 1997, MT 1998, NY 1996, BC 1996, NB 1996, AL 1998, MS 1996, AUS 1999, SW 1998, NZ 1991(1), NZ 1999(1)

Jurisdiction
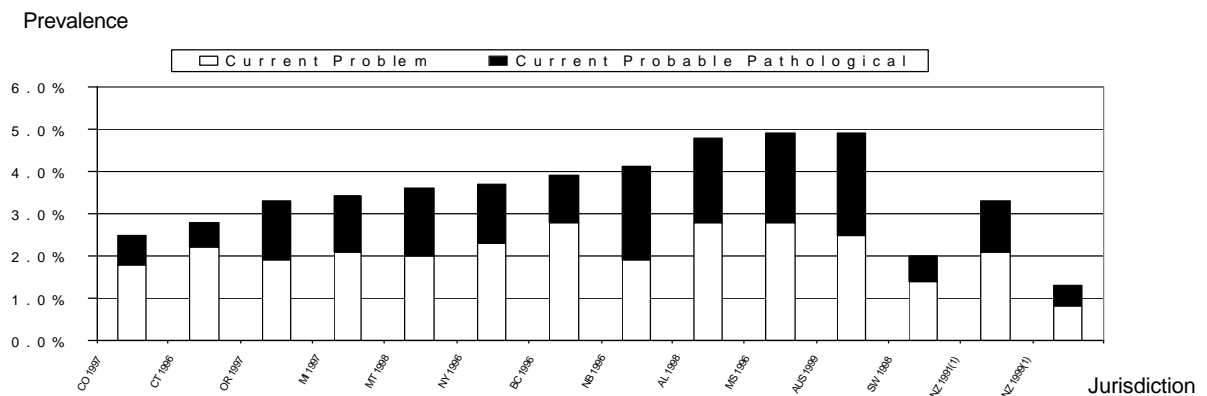
(1)   The 1991 and 1999 NZ studies used 6 month versions of the SOGS-R. The other studies used 12 month versions.

Key for Figures 6 and 7

QE	Quebec	MT	Montana
OR	Oregon	CO	Colorado
NB	New Brunswick	MS	Mississippi
MI	Michigan	NY	New York
CT	Connecticut	AL	Alberta
BC	British Columbia	SW	Sweden
NZ	New Zealand	AUS	Australia

In the case of current problem and probable pathological gambling prevalence, rates tend to be highest in North American jurisdictions where casino gambling or widespread electronic gaming machines have recently been introduced, such as New Brunswick (NB), Alberta (AL) and Mississippi (MS). Australia (AUS), relative to other jurisdictions, has a very high availability of gaming machines, probably the highest in the world (Productivity Commission, 1999.)

Prevalence Among Sociodemographic Groups

Earlier we noted significant differences in gambling participation and expenditure between a variety of sociodemographic groups. In the 1991 national survey and in most previous problem gambling prevalence surveys, current and lifetime prevalence rates have also differed among subgroups within the population. 1999 survey data, outlined in Table 19a, shows that there are substantial differences in prevalence rates for various groups. Table 19b provides absolute sample errors for the prevalence estimates in Table 19a.

Because many of the subgroups have large relative sampling errors, especially in the case of the current prevalence estimates, most of the comparisons between groups must be treated with caution or extreme caution. More reliable comparisons can be made by focussing on the 'no problem' category, although some of these subgroups are also small and have large sampling errors. From inspection of Table 19a, groups with the largest percentages of people without current gambling problems include:

- Females
- People aged 65 or older
- Europeans
- Asians
- People born in Europe, Australia or North America
- Migrants resident less than 4 years
- People with school qualifications only
- People with degree or higher qualifications
- Unemployed people
- People not in the labour force
- Legislators, administrators and managers
- Professionals
- Technicians and associate professions
- Retired people
- People at home looking after children
- Christians other than Anglicans, Presbyterians and Catholics
- People living in households with 2 members
- People with a household income of $30,000 to $40,000
- People with a household income of $70,001 or more
- People living in Wellington
- People living in parts of the country other than Auckland, Wellington and Christchurch.

All of the above groups had 99 percent or more of their members in the no problem category. Omitted groups had lower percentages of no problem gamblers

Table 19a: Lifetime and Current Gambling Problem Prevalence by Selected Characteristics: Row Percentages

Selected characteristics	Lifetime gambling status			Current gambling status		
	No problem	Problem (1)	Pathological (2)	No problem	Problem (1)	Pathological (2)
Sex						
Male	95.9%	* 2.8%	* 1.2%	98.4%	* 1.2%	† 0.4%
Female	98.1%	* 1.1%	* 0.9%	99.1%	† 0.4%	† 0.5%
Age group						
18-24	97.3%	† 2.1%	† 0.6%	98.9%	† 0.6%	† 0.4%
25-34	95.1%	* 3.2%	† 1.7%	98.1%	† 1.0%	† 0.9%
35-44	97.0%	* 2.5%	† 0.6%	98.8%	† 0.9%	† 0.3%
45-54	97.4%	† 1.2%	† 1.5%	98.3%	† 1.0%	† 0.7%
55-64	97.0%	† 1.5%	† 1.6%	98.9%	† 0.9%	† 0.2%
65 plus	99.2%	† 0.5%	† 0.2%	99.7%	† 0.3%	† 0%
Ethnicity						
European	98.1%	1.3%	* 0.6%	99.1%	* 0.6%	† 0.3%
NZ Mäori	92.9%	† 3.6%	† 3.5%	96.7%	† 2.1%	† 1.3%
Pacific Island	89.0%	† 7.8%	† 3.2%	95.7%	† 2.1%	† 2.2%
Asian	97.1%	† 2.9%	† 0%	100%	† 0%	† 0%
Other ethnic group	97.9%	† 0.8%	† 1.2%	98.8%	† 0%	† 1.2%
Country of birth						
New Zealand	97.0%	1.9%	* 1.1%	98.7%	* 0.9%	† 0.4%
Europe/Australia/ North America	98.9%	† 1.0%	† 0.1%	99.6%	† 0.5%	† 0%
Other countries	94.4%	† 3.8%	† 1.8%	97.7%	† 1.0%	† 1.3%
Number of years since arrival in NZ						
Less than 4 years	98.4%	† 0.9%	† 0.7%	99.3%	† 0%	† 0.7%
4 years or more	96.7%	† 2.4%	† 0.9%	98.7%	† 0.8%	† 0.5%
Not in subject population	97.0%	1.9%	* 1.1%	98.7%	* 0.9%	† 0.4%
Highest qualification						
No formal qualification	95.9%	† 2.5%	† 1.6%	98.5%	† 1.0%	† 0.6%
School qualification	97.2%	† 2.4%	† 0.4%	99.3%	† 0.6%	† 0.1%
Vocational or trade qualification	97.1%	* 1.6%	* 1.3%	98.3%	* 1.0%	† 0.7%
Degree or higher qualification	98.5%	† 1.2%	† 0.3%	99.5%	† 0.5%	† 0%
Labour force status						
Employed	97.0%	* 2.0%	* 1.0%	98.5%	* 0.9%	† 0.7%
Unemployed	94.2%	† 4.0%	† 1.9%	99.8%	† 0.2%	0%
Not in the labour force	97.6%	† 1.4%	† 1.0%	99.2%	† 0.7%	† 0.1%
Labour force status unidentifiable	93.2%	† 6.8%	† 0%	100%	† 0%	† 0%

Occupation

141

Legislators, administrators and managers	97.7%	† 1.9%	† 0.4%	99.1%	† 0.9%	† 0%
Professionals	98.4%	† 1.2%	† 0.4%	99.2%	† 0.8%	† 0%
Technicians and associate professionals	98.3%	† 1.0%	† 0.8%	99.1%	† 0.6%	† 0.3%
Clerks	97.6%	† 1.4%	† 1.1%	98.9%	† 0.5%	† 0.6%
Service and sales workers	97.1%	† 2.0%	† 1.0%	97.8%	† 1.6%	† 0.7%
Agriculture and fishery workers	97.5%	† 1.7%	† 0.8%	98.8%	† 0.4%	† 0.8%
Trades workers	97.5%	† 0.2%	† 2.3%	98.0%	† 0.2%	† 1.8%
Plant and machine operators and assemblers	93.2%	† 5.2%	† 1.7%	97.6%	† 1.7%	† 0.8%
Elementary occupations	92.5%	† 5.7%	† 1.9%	96.6%	† 1.6%	† 1.8%
Not in subject population	97.2%	* 1.7%	† 1.1%	99.2%	† 0.7%	† 0.1%
Main activity for those not in the labour force						
Studying	94.9%	† 2.8%	† 2.3%	96.5%	† 2.5%	† 1.1%
Retired	98.5%	† 0.8%	† 0.7%	99.3%	† 0.7%	0%
At home looking after children	98.0%	† 0.7%	† 1.4%	99.5%	† 0.3%	† 0.3%
Other (3)	96.0%	† 2.6%	† 1.4%	100%	† 0%	† 0%
Not in subject population	96.8%	* 2.2%	* 1.0%	98.5%	* 0.9%	† 0.6%
Marital status						
Married/Living with a partner	97.0%	* 1.8%	* 1.2%	98.7%	* 0.8%	† 0.5%
Separated/Divorced/ Widowed	97.6%	† 1.5%	† 0.9%	98.9%	† 0.8%	† 0.3%
Never married	96.9%	† 2.5%	† 0.7%	98.9%	† 0.7%	† 0.4%
Not elsewhere included	96.3%	† 3.7%	† 0%	97.4%	† 2.6%	† 0%
Religion						
No religion	97.3%	* 1.9%	† 0.8%	98.9%	† 0.8%	† 0.3%
Anglican	97.8%	† 1.4%	† 0.8%	98.5%	† 1.1%	† 0.4%
Presbyterian	97.4%	† 1.3%	† 1.4%	98.9%	† 0.5%	† 0.6%
Catholic	95.0%	† 2.6%	† 2.4%	97.4%	† 1.5%	† 1.1%
Other Christian	97.3%	† 2.0%	† 0.7%	99.3%	† 0.4%	† 0.3%
Other religion	96.0%	† 3.5%	† 0.5%	98.9%	† 0.6%	† 0.5%
Not elsewhere included	97.8%	† 2.2%	† 0%	† 100%	† 0%	† 0%
Household size (includes children)						
1	98.1%	† 1.1%	† 0.8%	98.8%	† 1.2%	† 0%
2	97.7%	* 1.7%	† 0.6%	99.1%	† 0.6%	† 0.3%
3	97.7%	† 1.1%	† 1.3%	98.9%	† 0.3%	† 0.8%
4	96.4%	† 2.2%	† 1.4%	98.0%	† 1.1%	† 0.9%
5 or more	95.0%	† 3.6%	† 1.5%	98.5%	† 1.2%	† 0.3%
Household income						
$20,000 or less	97.1%	† 1.9%	† 1.0%	98.8%	† 0.6%	† 0.7%
$20,001 to $30,000	96.0%	† 2.5%	† 1.5%	98.9%	† 0.9%	† 0.3%
$30,001 to $40,000	98.6%	† 1.3%	† 0.2%	99.5%	† 0.5%	† 0%
$40,001 to $50,000	96.7%	† 1.6%	† 1.7%	97.6%	† 1.5%	† 0.9%

$50,001 to $70,000	96.9%	† 2.0%	† 1.1%	98.3%	† 1.0%	† 0.8%
$70,001 or more	97.7%	* 1.6%	† 0.7%	99.0%	† 0.8%	† 0.2%
Not elsewhere included	95.8%	† 2.6%	† 1.6%	98.9%	† 0.6%	† 0.6%
Location						
Auckland	95.8%	* 2.9%	† 1.3%	98.5%	† 0.7%	† 0.8%
Wellington	98.0%	† 1.6%	† 0.3%	99.2%	† 0.8%	† 0%
Christchurch	96.7%	† 2.0%	† 1.3%	97.7%	† 1.9%	† 0.4%
Rest of New Zealand	97.7%	* 1.3%	* 1.0%	99.0%	* 0.6%	† 0.3%
Total	97.0%	1.9%	* 1.0%	98.7%	* 0.8%	* 0.5%

(1)   Problem includes those gamblers classed as problem gamblers (3-4 SOGS-R)

(2)   Pathological gamblers includes those gamblers classed as probable pathological gamblers (5 or more SOGS-R)

(3)   Other includes those at home not looking after children

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

With respect to <u>lifetime</u> gambling problems, groups containing more than 98 percent <u>non</u>-problem gamblers include:

- · Females
- · People aged 65 or older
- · Europeans
- · People born in Europe, Australia or North America
- · Migrants resident less than 4 years
- · People with a degree or higher qualification
- · Professionals
- · Technicians and associate professionals
- · Retired people
- · People at home looking after children
- · People living alone
- · People with a household income of $30,000 to $40,000
- · People living in Wellington.

The groups with higher percentages of non-problem gamblers (and lower percentages of problem gamblers) are generally similar for both the current and lifetime measure. However, there are a few exceptions. These exceptions include Asians, people who are unemployed, not in the labour force or who have school qualifications only. With respect to <u>current</u> SOGS-R performance, all of the Asian respondents, 99.8 percent (99.4-100%) of unemployed respondents, 99.2 percent (98.6-99.8%) of people not in the labour force and 99.3 percent (98.7- 99.9%) of people with school qualifications only are in the no problem category. However, the percentages are considerably lower for these groups when <u>lifetime</u> SOGS-R performance is considered.

143

Table 19b: Absolute Sample Errors for Lifetime and Current Gambling Problem Status by Selected Characteristics[1]

Selected characteristics	Lifetime gambling status			Current gambling status		
	No problem	Problem (2)	Pathological (3)	No problem	Problem (2)	Pathological (3)
Sex						
Male	1.0%	0.9%	0.5%	0.6%	0.5%	† 0.3%
Female	0.6%	0.4%	0.4%	0.4%	† 0.2%	† 0.3%
Age group						
18-24	1.4%	† 1.2%	† 0.7%	0.9%	† 0.7%	† 0.6%
25-34	1.5%	1.4%	† 0.9%	1.0%	† 0.7%	† 0.7%
35-44	1.1%	1.1%	† 0.4%	0.6%	† 0.5%	† 0.3%
45-54	1.0%	† 0.6%	† 0.8%	1.0%	† 0.7%	† 0.6%
55-64	2.1%	† 1.3%	† 1.8%	1.4%	† 1.3%	† 0.5%
65 plus	0.6%	† 0.4%	† 0.3%	0.3%	† 0.3%	N/A
Ethnicity						
European	0.4%	0.3%	0.2%	0.3%	0.2%	† 0.2%
NZ Mäori	2.9%	† 2.1%	† 2.3%	2.0%	† 1.6%	† 1.3%
Pacific Island	8.1%	† 7.7%	† 3.4%	3.4%	† 2.4%	† 2.9%
Asian	2.9%	† 2.9%	N/A	N/A	N/A	N/A
Other ethnic group	2.8%	† 1.7%	† 2.4%	2.4%	0%	† 2.4%
Country of birth						
New Zealand	0.6%	0.5%	0.4%	0.4%	0.3%	† 0.2%
Europe/Australia/ North America	0.8%	† 0.8%	† 0.2%	0.5%	† 0.5%	† 0%
Other countries	4.2%	† 3.9%	† 1.7%	1.7%	† 1.2%	† 1.4%
Number of years since arrival in NZ						
Less than 4 years	2.2%	† 1.9%	† 1.3%	1.3%	N/A	† 1.3%
4 years or more	2.3%	† 2.2%	† 0.8%	1.0%	† 0.6%	† 0.7%
Not in subject population	0.6%	0.5%	0.4%	0.4%	0.3%	† 0.2%
Highest qualification						
No formal qualification	1.5%	† 1.3%	† 1.1%	0.9%	† 0.8%	† 0.5%
School qualification	2.1%	† 2.1%	† 0.4%	0.6%	† 0.5%	† 0.3%
Vocational or trade qualification	0.7%	0.6%	0.5%	0.5%	0.4%	† 0.4%
Degree or higher qualification	0.9%	† 0.8%	† 0.4%	0.5%	† 0.5%	N/A
Labour force status						
Employed	0.7%	0.6%	0.4%	0.4%	0.3%	† 0.3%
Unemployed	5.6%	† 5.4%	† 2.0%	0.4%	† 0.4%	† 0%
Not in the labour force	1.0%	† 0.7%	† 0.8%	0.6%	† 0.6%	† 0.2%
Labour force status unidentifiable	15.2%	† 15.2%	N/A	N/A	N/A	N/A

Occupation

Legislators, administrators and managers	1.6%	† 1.4%	† 0.5%	0.8%	† 0.8%	† 0.1%
Professionals	1.0%	† 0.9%	† 0.6%	0.7%	† 0.7%	N/A
Technicians and associate professionals	1.3%	† 1.1%	† 0.8%	1.1%	† 0.9%	† 0.7%
Clerks	1.9%	† 1.0%	† 1.4%	1.3%	† 0.6%	† 1.2%
Service and sales workers	2.0%	† 1.4%	† 1.1%	1.9%	† 1.2%	† 1.0%
Agriculture and fishery workers	1.7%	† 1.4%	† 1.1%	1.3%	† 0.6%	† 1.1%
Trades workers	1.7%	† 0.5%	† 1.6%	1.6%	† 0.5%	† 1.5%
Plant and machine operators and assemblers	4.9%	† 4.8%	† 1.8%	2.0%	† 1.7%	† 1.1%
Elementary occupations	4.1%	† 3.4%	† 2.6%	3.0%	† 1.4%	† 2.7%
Not in subject population	1.0%	0.8%	† 0.8%	0.5%	† 0.5%	† 0.2%

Main activity for those not in the labour force

Studying	4.8%	† 3.9%	† 3.2%	4.1%	† 3.3%	† 2.1%
Retired	1.1%	† 0.5%	† 0.9%	0.9%	† 0.9%	N/A
At home looking after children	1.9%	† 0.8%	† 1.8%	0.8%	† 0.5%	† 0.6%
Other (4)	3.8%	† 3.4%	† 1.9%	N/A	N/A	N/A
Not in subject population	0.7%	0.7%	0.4%	0.4%	0.3%	† 0.3%

Marital status

Married/Living with a partner	0.7%	0.6%	0.5%	0.5%	0.4%	† 0.3%
Separated/Divorced/ Widowed	1.1%	† 1.0%	† 0.5%	0.6%	† 0.5%	† 0.4%
Never married	1.5%	† 1.4%	† 0.6%	0.7%	† 0.5%	† 0.5%
Not elsewhere included	5.4%	† 5.4%	N/A	5.1%	† 5.1%	N/A

Religion

No religion	0.9%	0.8%	† 0.4%	0.6%	† 0.5%	† 0.3%
Anglican	1.0%	† 0.9%	† 0.7%	0.8%	† 0.7%	† 0.5%
Presbyterian	1.7%	† 0.9%	† 1.4%	1.0%	† 0.6%	† 0.8%
Catholic	2.3%	† 1.5%	† 1.5%	1.6%	† 1.3%	† 1.0%
Other Christian	1.3%	† 1.3%	† 0.5%	0.5%	† 0.4%	† 0.4%
Other religion	3.5%	† 3.4%	† 1.0%	1.4%	† 1.0%	† 1.0%
Not elsewhere included	3.5%	† 3.5%	N/A	N/A	N/A	N/A

Household size (includes children)

1	0.8%	† 0.7%	† 0.5%	0.7%	† 0.7%	† 0.1%
2	0.7%	0.6%	† 0.4%	0.4%	† 0.4%	† 0.3%
3	1.0%	† 0.7%	† 0.8%	0.7%	† 0.3%	† 0.6%
4	1.7%	† 1.3%	† 0.9%	1.1%	† 0.7%	† 0.7%
5 or more	2.2%	† 2.1%	† 1.2%	1.2%	† 1.1%	† 0.5%

Household income

$20,000 or less	1.3%	† 1.1%	† 0.8%	0.9%	† 0.4%	† 0.8%
$20,001 to $30,000	2.1%	† 1.9%	† 1.2%	1.1%	† 1.1%	† 0.4%
$30,001 to $40,000	0.8%	† 0.8%	† 0.2%	0.4%	† 0.4%	N/A
$40,001 to $50,000	1.4%	† 1.0%	† 1.3%	1.3%	† 1.0%	† 1.0%
$50,001 to $70,000	1.5%	† 1.3%	† 0.9%	1.0%	† 0.7%	† 0.7%
$70,001 or more	1.0%	0.8%	† 0.6%	0.7%	† 0.7%	† 0.3%
Not elsewhere included	2.9%	† 2.3%	† 1.8%	1.1%	† 0.8%	† 0.8%

145

Location						
Auckland	1.5%	1.4%	† 0.8%	0.8%	† 0.6%	† 0.6%
Wellington	0.9%	† 0.9%	† 0.4%	0.7%	† 0.7%	N/A
Christchurch	1.4%	† 1.1%	† 1.0%	1.0%	† 1.0%	† 0.4%
Rest of New Zealand	0.7%	0.6%	0.5%	0.4%	0.3%	† 0.3%
Total	0.6%	0.5%	0.3%	0.3%	0.3%	0.2%

(1)   The sampling errors presented in this table are absolute sampling errors, not relative sampling errors

(2)   Problem includes those gamblers classed as problem gamblers (3-4 SOGS-R)

(3)   Pathological gamblers includes those gamblers classed as probable pathological gamblers (5 or more SOGS-R)

(4)   Other includes those at home not looking after children

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

N/A   Absolute sampling error cannot be calculated because there are no, or too few, respondents in the cell

Specifically, 97.1 percent (94.2% - 100%) of Asians, 94.2 percent (88.6-99.8%) of unemployed people, 97.6 percent (96.6-98.6%) of people not in the labour force and 97.2 percent (95.1-99.3%) of people with school qualifications only are in the lifetime no problem category. These differences are potentially important in that they suggest that although these groups are currently predominantly comprised of non-problem gamblers, previously the proportion of non-problem gamblers in each was considerably lower. However, it should be cautioned that the upper confidence bounds surrounding these estimates are high and this finding may be unreliable. Another way to look at this matter of differences between lifetime and current prevalence is to consider 'conversion percentages' for each group.

The conversion percentage is the proportion of lifetime problem and probable pathological gamblers who currently are in the no problem category. Given the small sample sizes and wide confidence intervals referred to above, this statistic should be treated with caution. Conversion percentages for the four groups mentioned above are shown in Table 20. Some other groups that contain proportionately large numbers of unemployed people, beneficiaries or people without post-high school qualifications are also included in the table, along with the conversion percentage for the total number of lifetime problem and probable pathological gamblers. In the table, the combined problem gambling-probable pathological gambling group is referred to as problem gamblers.   Justification for combining these two groups is provided below.

From Table 20, it is evident that overall, approximately 57 percent of lifetime problem and probable pathological gamblers do not currently score within the problem/probable pathological range. As indicated previously, this group is typically considered to represent people who previously experienced significant gambling problems but who do not currently. However, it was also noted that findings from the follow-up of 1991 New Zealand national survey participants show that this index is likely to underestimate the degree of recovery that occurs over time because it does not include many people who were in fact problem gamblers in the past.

Table 20: Population Counts and Conversion Percentages for Selected Groups [1]

Group	Lifetime Problem Gamblers	Current Problem Gamblers	Conversion Percentage
Asians	3,392	0	100%
Unemployed	5,937	228	96.2%
Not in the labour force	19,168	6,921	63.9%
School qualification only	15,823	4,094	74.1%
No formal qualification	24,899	9,159	63.2%
18-24 years	9,971	3,870	61.2%
25-34 years	27,096	10,664	60.6%
Mäori	22,491	10,672	52.5%
Pacific Island	12,153	4,729	61.1%
Elementary occupations	10,427	4,688	55.0%
Household income - $20,000 or less	14,977	6,279	58.1%
Total	80,108	34,691	56.7%

(1)   The figures for the various sociodemographic groups, when summed, greatly exceed the total number of lifetime and current problem gamblers. This is because problem gamblers can be in multiple groups.

The very high conversion rates (i.e. relatively few lifetime problem and probable pathological gamblers currently score within the problem range) for survey participants who were Asians, unemployed or who had school qualifications only are particularly striking. There were no Asian <u>current</u> problem gamblers. In the case of unemployed lifetime problem and probable pathological gamblers, only about four percent scored three or more on the current SOGS-R. There is no obvious reason why the majority of these participants scored as problem gamblers on the lifetime measure but not the current measure. However, possible explanations include the following:

- They have high rates of 'natural' or 'self recovery' from problem gambling

- Their reduced incomes following benefit reductions and other changes in the New Zealand economy during the mid-1990s contributed in some way to a decrease in gambling expenditure and problem gambling

- While prepared to acknowledge problems in the past, they are reluctant to do so for problems occurring currently.

In the 1991 national survey, 17 percent of lifetime probable pathological gamblers and 29 percent of current probable pathological gamblers were unemployed. In the present study, only 6.6 percent of lifetime probable pathological gamblers were unemployed and none of the current probable pathological gamblers were in this category. These differences and the high conversion percentage that was noted for this group is relevant to later comparisons of the overall prevalence rates from the 1991 and 1999 national surveys.

Prevalence by Type of Gambling

In Chapter Two, reference was made to the association between problem gambling and participation in particular forms of gambling. Table 21a shows current and lifetime prevalence estimates for people who participated in each of the eight types of gambling most commonly engaged in by the survey participants. Estimates are provided for both weekly and past six months participants. Absolute sampling errors are given in Table 21b. In these tables, the problem and probable pathological groups are combined. As with the

findings presented in Table 19a, a number of these estimates must be treated with caution or extreme caution, especially in the case of those concerning weekly participation. Had the two problem and probable pathological gambling groups been considered separately, the error terms would have been too large to allow meaningful comparisons to be made. Further justification for combining these groups is outlined later in this section.

With respect to past six months participation, high current and lifetime rates for combined problem-probable pathological gambling are evident for gaming machines (both in and outside casinos), betting on horse or dog races, money bets with work-mates and friends and TeleBingo. People who played gaming machines weekly or more often outside of casinos or who bet on horse or dog races had very high prevalence rates, although these estimates need to be treated with caution.

Table 21a: Participation in Eight Frequently Played Activities Cross-Classified by Frequency of Participation and by Lifetime and Current Problem Status: Row Percentages

Gaming activities	Lifetime Gambling Status		Current Gambling Status	
	No problem	Problem (1)	No problem	Problem (1)
Participated in activity in past six months (2)				
Lotto	96.8%	3.2%	98.5%	1.6%
Other lotteries or raffles	96.6%	3.4%	98.2%	* 1.8%
Instant Kiwi	95.8%	4.2%	97.7%	* 2.3%
Betting on horse or dog races	93.3%	* 6.7%	96.2%	* 3.8%
Money bets with workmates or friends	94.8%	* 5.2%	96.9%	* 3.1%
TeleBingo	94.8%	5.2%	96.8%	* 3.2%
Gaming machines not in casinos	91.1%	8.9%	94.9%	* 5.1%
Casino gaming machines	91.4%	* 8.6%	94.0%	* 6.0%
Participated in activity once a week or more (3)				
Lotto	95.7%	4.3%	97.9%	* 2.1%
TeleBingo	96.1%	† 3.9%	97.3%	† 2.7%
Instant Kiwi	92.4%	† 7.6%	96.5%	† 3.5%
Other lotteries or raffles	91.3%	† 8.7%	93.7%	† 6.3%
Betting on horse or dog races	81.6%	* 18.4%	87.5%	* 12.5%
Gaming machines not in casinos	74.2%	* 25.8%	81.1%	* 18.9%
Money bets with workmates or friends	87.4%	† 12.6%	89.7%	† 10.3%
Daily Keno	94.4%	† 5.6%	99.4%	† 0.6%
Total	97.0%	3.0%	98.7%	1.3%

(1)   Problem includes those gamblers classified as problem gamblers (3-4 SOGS-R) and probable pathological gamblers (5 or more SOGS-R)

(2)   The eight most common activities are those most commonly participated in by adults aged 18 years and over in the past six months

(3)   The eight most common activities are those most commonly participated in by adults aged 18 years and over

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

148

Table 21b: **Participation in Eight Frequently Played Activities Cross-Classified by Frequency of Participation and By Lifetime and Current Problem Status: Absolute Sampling Errors for Row Percentages [1]**

Gaming activities	Lifetime Gambling Status		Current Gambling Status	
	No problem	Problem (2)	No problem	Problem (2)
Participated in activity in past six months (3)				
Lotto	0.6%	0.6%	0.4%	0.4%
Other lotteries or raffles	0.7%	0.7%	0.6%	0.6%
Instant Kiwi	1.0%	1.0%	0.7%	0.7%
Betting on horse or dog races	2.0%	2.0%	1.4%	1.4%
Money bets with workmates or friends	1.7%	1.7%	1.5%	1.5%
TeleBingo	1.5%	1.5%	1.2%	1.2%
Gaming machines not in casinos	2.3%	2.3%	1.7%	1.7%
Casino gaming machines	2.8%	2.8%	2.3%	2.3%
Participated in activity once a week or more (4)				
Lotto	0.9%	0.9%	0.8%	0.8%
TeleBingo	2.2%	† 2.2%	1.7%	† 1.7%
Instant Kiwi	3.9%	† 3.9%	2.0%	† 2.0%
Other lotteries or raffles	5.9%	† 5.9%	5.5%	† 5.5%
Betting on horse or dog races	6.1%	6.1%	5.6%	5.6%
Gaming machines not in casinos	9.3%	9.3%	8.3%	8.3%
Money bets with workmates or friends	15.9%	† 15.9%	15.7%	† 15.7%
Daily Keno	6.2%	† 6.2%	1.2%	† 1.2%
Total	0.6%	0.6%	0.3%	0.3%

(1)   The sampling errors presented in this table are absolute sampling errors, not relative sampling errors

(2)   Problem includes those gamblers classified as problem gamblers (3-4 SOGS-R) and probable pathological (5 or more (SOGS-R)

(3)   The eight most common activities are those most commonly participated in by adults aged 18 years and over in the past six months

(4)   The eight most common activities are those most commonly participated in by adults aged 18 years and over.

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

Item Analysis

Table 22 provides estimates of the number of people in the total population that would answer each item on the SOGS-R positively (i.e. responded in a way that would result in them obtaining a score on that question). Endorsement of individual items from the SOGS-R ranged from a high of approximately nine percent for the lifetime question "do you think you ever spent more time or money gambling than you intended" to a low of less than 0.1 percent for a few of the borrowing items.

One of the SOGS-R items asked respondents whether or not they felt that they had ever had a problem with gambling. One-point-six percent indicated that they had felt this way some time in their lives; 0.5 percent in the past six months. These estimates are approximately half the corresponding combined problem-probable pathological gambling SOGS-R prevalence estimates based on performance on all of the items.

149

Information is also provided separately for male and females. From inspection of Table 22 it is evident that while males and females respond with similar frequency to some items (e.g. 'go back another day to win money you lost'), most items are more likely to receive positive responses from males.

Table 22: Number Giving Positive Responses to Each Lifetime and Current SOGS-R Question by Sex: Population Counts

SOGS-R questions	Lifetime SOGS-R			Current SOGS-R		
	Male	Female	Total	Male	Female	Total
Go back another day to win money you lost	* 14,312	* 15,462	29,774	* 12,130	* 15,125	27,255
Claimed to win when in fact you lost	* 36,779	* 19,180	55,958	* 18,933	† 10,046	* 28,979
Gambled more than intended	148,724	89,929	238,653	65,486	42,944	108,430
Been criticised for gambling	66,335	35,870	102,204	26,652	* 16,698	43,350
Felt guilty about gambling	64,852	58,839	123,691	31,039	* 26,606	57,645
Wanted to stop but did not feel able	* 24,590	† 13,185	* 37,775	* 14,264	† 8,482	* 22,746
Hidden evidence of gambling from others	* 33,506	* 18,828	52,333	† 16,426	† 9,840	* 26,265
Argued about gambling	* 11,545	† 8,977	* 20,522	† 5,095	† 5,896	† 10,992
Lost time from work or school due to gambling	* 9,574	† 3,607	* 13,181	† 2,284	† 2,833	† 5,117
Not paid back money due to gambling	† 4,646	† 1,092	† 5,738	† 485	† 544	† 1,030
Borrowed from household to gamble or pay gambling debts	† 10,263	* 15,972	* 26,235	† 4,842	† 8,778	* 13,619
Borrowed from spouse or partner	* 20,392	* 21,235	41,627	† 7,970	† 10,924	* 18,894
Borrowed from other relatives	* 13,959	† 8,374	* 22,333	† 6,482	† 3,290	† 9,772
Borrowed from banks or financial institutions	† 2,654	† 1,206	† 3,860	† 491	† 1,206	† 1,696
Borrowed from credit cards	* 15,801	† 6,990	* 22,791	† 9,477	† 1,280	† 10,757
Borrowed from a loan shark	† 1,712	† 0	† 1,712	† 0	† 0	† 0
Sold stocks or bonds	† 2,283	† 0	† 2,283	† 761	† 0	† 761
Sold personal or family property	† 2,012	† 403	† 2,415	† 491	† 403	† 894
Bounced checks to get money to gamble	† 2,824	† 742	† 3,566	† 0	† 0	† 0
Felt you had a problem with gambling	* 27,492	* 15,564	43,056	† 5,841	† 6,905	* 12,746

† Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell
* Relative sampling error is between 30% and 50%

Comparing Problem and Non-problem Gamblers

Introduction

The purpose of this section is to examine differences between problem gamblers and non-problem gamblers. Comparisons of this type have particular relevance to the identification of risk factors for problem gambling. In this section, the problem and probable pathological gambling groups have been combined and are referred to as problem gamblers. The decision to combine the two groups was based on the results of a series of multivariate analyses, specifically:

- 'Naïve' discriminant analyses incorporating all sociodemographic variables without regard to the degree of discrimination implied by any particular variable

- Step-wise discriminant analyses

- Reduced discriminant analyses using only the variables identified in the stepwise analyses as providing any statistical separation between no problem, problem and probable pathological groups

- Correspondence analyses.

From these analyses, conducted with respect to both current and lifetime problem gambling, it was concluded that no logical or statistical separation between problem and probable pathological gambling states was justified. Similar results were obtained from a discriminant function analysis conducted on the 1991 national survey data set (Abbott & Volberg, 1991; Volberg & Abbott, 1994).

Sociodemographic Differences and Risk Factors

Chi-square tests of association were used to assess differences between problem and non-problem gamblers with respect to sociodemographic differences.

Table 23 shows that problem gamblers in New Zealand are sociodemographically distinct from non-problem gamblers.

From Table 23 we note that <u>current</u> problem gamblers are significantly more likely to be one or more of Mäori or Pacific Island ethnicity, lack formal educational qualifications and be employed. Gender and location differences fell just short of conventional (.05) levels of statistical significance.

Because many of these sociodemographic variables are related to each other and examination of them individually in relation to problem gambling can lead to problems in interpretation, multivariate analyses were conducted to assess their relative and independent capacity to predict problem gambling status. The results from two forms of analysis, binary logistic regression and correspondence analysis are reported here.

With respect to <u>current</u> problem gambling status, all sociodemographic variables shown in Table 23 were considered for inclusion in a multiple logistic regression model. The variables identified as the most powerful, independent predictors of current problem gambling status are shown in Table 24. Odds ratios and their associated confidence intervals are shown. Although Table 24 shows some consistency with the results of the Chi-square analyses outlined in Table 23, there are a number of notable differences.

151

Table 23: Sociodemographic Characteristics of Current Problem Gamblers and Non Problem Gamblers

Selected characteristics		Current Gambling status		Significance (p value)
		Non-Problem	Problem	
Sex	Male	48.3%	61.9%	0.0873
	Female	51.7%	38.1%	
Ethnicity	European	78.2%	53.8%	
	NZ Mäori	11.5%	30.8%	
	Pacific Island	4.0%	13.6%	0.0042
	Asian	4.4%	0%	
	Other ethnic group	1.9%	1.8%	
Marital status	Married/Living with a partner	66.8%	70.1%	
	Separated/Divorced/Widowed	13.2%	11.7%	0.8844
	Never married	19.5%	17.0%	
	Not elsewhere included	0.6%	1.2%	
Age group	18-24	13.5%	11.2%	
	25-34	20.4%	30.7%	
	35-44	21.6%	20.5%	0.2110
	45-54	17.3%	23.3%	
	55-64	11.7%	10.3%	
	65 plus	15.5%	3.9%	
Country of birth	New Zealand	79.4%	80.3%	
	Europe/Australia/North America	12.2%	4.2%	0.0787
	Other countries	8.4%	15.5%	
	Not elsewhere included	0%	0%	
Years since arrival in NZ	Less than 4 years	3.6%	1.8%	
	4 years or more	16.9%	17.8%	0.8577
	Not elsewhere included	0.2%	0%	
	Not in subject population	79.4%	80.3%	
Highest qualification	No formal qualification	22.5%	26.4%	
	School qualification	21.2%	11.8%	0.0414
	Vocational or trade qualification	42.2%	55.9%	
	Degree or higher qualification	14.1%	5.9%	
Labour force status	Employed	65.9%	79.4%	
	Unemployed	3.8%	0.7%	0.0145
	Not in the labour force	30.1%	20.0%	
	Labour force status unidentifiable	0.2%	0%	
Religion	No religion	30%	26.7%	
	Anglican	17.7%	20.6%	
	Presbyterian	12.9%	11.0%	
	Catholic	13.0%	26.7%	0.1085
	Other Christian	20.5%	10.8%	
	Other religion	4.8%	4.2%	
	Not elsewhere included	1.1%	0%	
Household size (includes children)	1	11.1%	10.5%	
	2	33.1%	23.6%	
	3	19.5%	16.3%	0.3934
	4	19.3%	30.2%	
	5 or more	16.7%	19.5%	
	Not elsewhere included	0.3%	0%	
Household income	$20,000 or less	19.2%	18.1%	
	$20,001 to $30,000	15.1%	13.5%	

152

	$30,001 to $40,000	14.1%	5.7%	
	$40,001 to $50,000	11.3%	21.8%	0.2663
	$50,001 to $70,000	13.5%	18.3%	
	$70,001 or more	17.2%	13.9%	
	Not elsewhere included	9.7%	8.6%	
Location	Auckland	29.8%	35.1%	
	Wellington	10.9%	6.7%	0.0568
	Christchurch	12.2%	22.7%	
	Rest of New Zealand	47.0%	35.5%	

Adjusted Chi-square P Values Used

When the effects of other variables were controlled, Table 24 shows that Christchurch residence emerged as a significant predictor. Religion also emerged as a significant factor with Catholics being at somewhat higher risk and 'other Christians' at somewhat lower risk. Males also had a higher risk relative to females. Pacific Islanders, with an odds ration of 6.2, are clearly at particularly high risk.

Table 24: Current Problem Gambling - Sociodemographic Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
Mäori	4.48	(2.1, 9.4)
Pacific Island	6.17	(2.2, 17.4)
Christchurch residence	2.48	(1.3, 4.6)
Catholic	1.92	(0.9, 4.0)
Other Christian	0.45	(0.2, 1.3)
Household income $40,001-$50,000	2.10	(1.1, 4.0)
Male	1.73	(0.9, 3.5)
Vocational or trade qualification	1.58	(0.9, 2.8)

Concordant = 72.0% R^2 = 0.091
Discordant = 21.2%
Tied = 6.8%

Correspondence analyses (Greenacre & Hastie, 1987) were also conducted to identify whether or not the problem and non-problem groups could be separated on the basis of their sociodemographic differences and, if so, to determine which variables played the dominant role in effecting this discrimination.

Correspondence analysis is a weighted principal component analysis of contingency tables, in the present case two-way contingency tables constructed by cross-tabulating problem gambling with the sociodemographic variables included in Table 23. A graphical representation of the association between rows and columns of the contingency table is produced, with each row and column represented by a point in Euclidian space determined by cell frequencies.

The correspondence map resulting from the analysis of the current problem and no-problem gambling data set is provided in Figure 8. Interpretation of this map requires consideration of some technical details concerning correspondence analysis and other findings from the particular analysis undertaken.

Figure 8: Current Gambling Pathology Correspondence Map
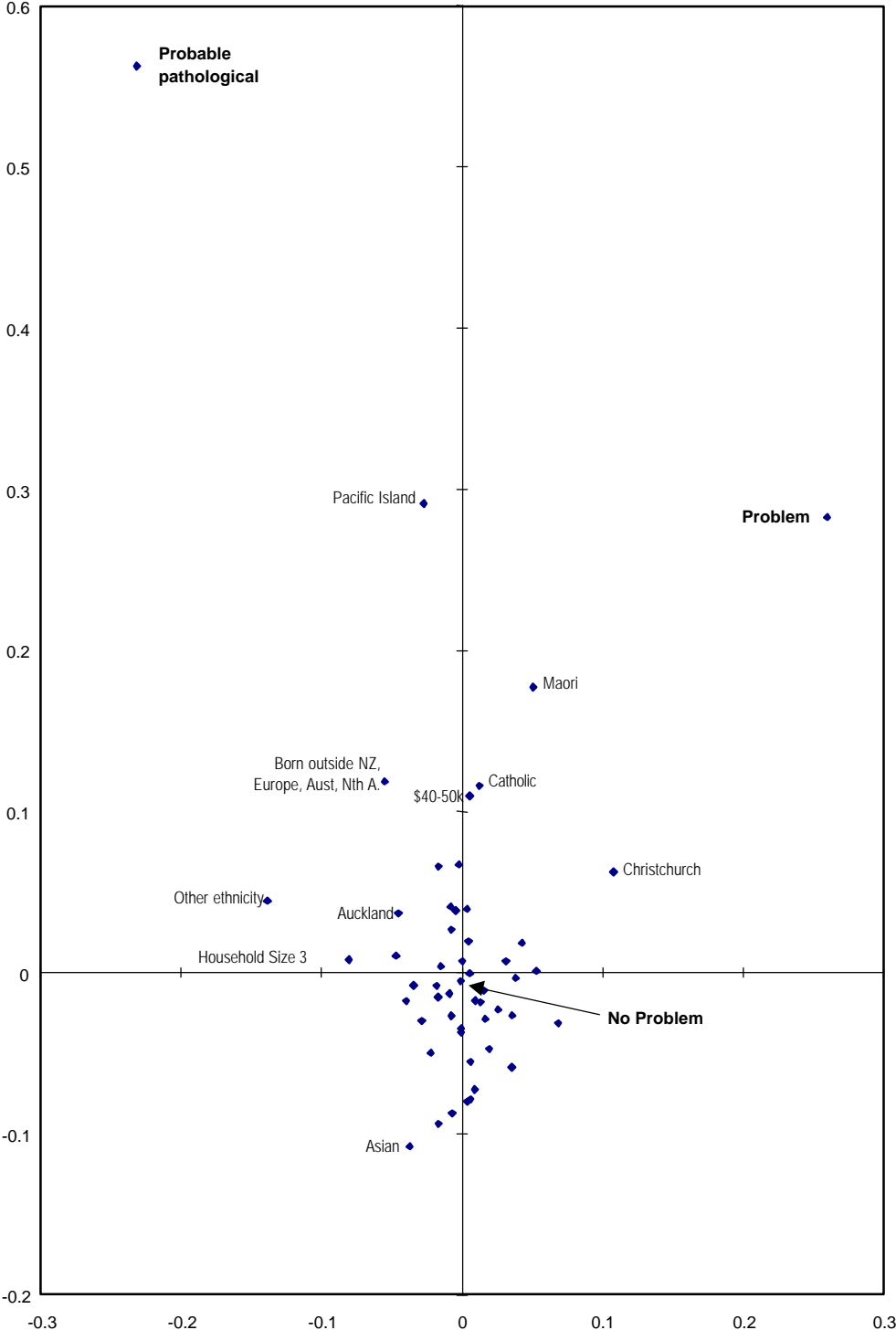
Of most importance in the present analysis is the fact that over three quarters of the total Chi-square and inertia is explained by the vertical dimension. In correspondence analysis inertia can be considered analogous to the concept of 'variance explained' in principal components or factor analysis, and is proportional to the dimension share of the overall Chi-square statistic. This implies interpretation of the model should concentrate on an essentially one-dimensional vertical examination of the correspondence map, with the horizontal dimension contributing little to interpretation.

The correspondence map indicates that for the current gambling pathology row points, the vertical dimension is largely determined simultaneously by probable pathological and problem gamblers. This is because the points are both distant from the centroid, however little separated on the vertical scale relative to the no problem category, which is very close to the centroid. This suggests separation between the two categories of gambling pathology might be explained more by horizontal separation, however, because the horizontal dimension contributes less than one quarter of total inertia, it can be reasonably assumed little differentiates these points.

On the other hand, the no problem category is situated very close to the centroid, among the vast majority of sociodemographic variables. Because the no problem category is so close to the centroid relative to the problem and probable pathological categories, it makes little to no contribution to interpretation of the current gambling pathology row points.

Turning to the sociodemographic column points, it is clear that the vast majority of points are located close to the centroid, and therefore contribute little to interpretation of the map. However, a number of points are located considerably higher on the vertical scale, suggesting an association with current <u>problem</u> and <u>probable</u> <u>pathologica</u>l gambling. **The variable categories most associated with these current problem states are, respectively:**

- **Pacific Island ethnicity**
- **Mäori**
- **Born outside New Zealand, Europe, Australia and North America**
- **Catholic**
- **Those from households with incomes between $40,001 and $50,000.**

These results are consistent with findings reported elsewhere. In summary, it can be concluded that the combined effect of current <u>problem</u> and <u>probable</u> <u>pathological</u> gambling is explained primarily by just these few categories from the range of sociodemographic variables considered.

The sociodemographic predictors of <u>lifetime</u> problem gambling were also examined by Chi-square, logistic regression, and correspondence analyses.

Table 25 shows the results of the Chi-square analyses conducted on the <u>lifetime</u> data. From this table it is evident that statistically significant differences are present for gender, ethnicity, age, household size and location. Some of these differences were not found in the comparable analysis of the <u>current</u> problem gambling data (see Table 23). Specifically, gender, age, household size and location differences between the <u>current</u> problem and no problem groups were not significant. It is possible, however that some of these differences failed to

reach significance because of the smaller current problem gambler sample size and the consequent loss of statistical power.

Similar to the current problem data, a logistic regression analysis was conducted to identify which of the various sociodemographic variables were the strongest, independent predictors of problem gambling status. The results of this analysis are shown in Table 26. As with the current problem gambling findings, these results show some consistency with those from the Chi-square analysis. However, again, a number of differences are evident. In the logistic regression analysis, Catholics and people lacking formal qualifications were found to be at somewhat higher risk. Household income also emerged as a significant predictor with those in the second lowest income category being at low risk.

Although Auckland residence was confirmed as a significant risk factor, when the effects of other variables were controlled, Christchurch residence was also found to be associated with lifetime problem gambling. While the logistic regression models summarised in Tables 24 and 26 identify the strongest risk factors from the sociodemographic variables included in the analysis, they do not show the relative risk of being a problem gambler for each subcategory.

For example, in Table 26 people born in New Zealand, Europe, Australia and North America are reported as being at low risk. While this implies that people in the remaining ethnic subcategories have a high risk of being problem gamblers, the degree of risk is not shown for this group.

Table 27 shows the odds ratios for all of the other variable subcategories associated with the sociodemographic categories that were indicated as statistically significant in Table 26. Within each category, the subcategory with the weakest relationship with problem gambling (the reference group) is reported as having an odds ratio of one. The likelihood that people in each of the other subcategories is a problem gambler is expressed in relation to that of people in the reference group. For example, females are shown as having an odds ratio of one. Males have a ratio of 2.48, which means males are 148 percent or almost two-and-a-half times more likely to be lifetime problem gamblers than females.

While Table 27 is more easily interpretable than Table 26 and facilitates the examination of ordinal trends, model fit is generally poorer when user-defined models specifying inclusion of all subcategories are employed without regard to the degree of explanatory power implied by any particular category of a variable. Many of the reported odds ratios in user-defined models are statistically insignificant in that the confidence intervals include one, which suggests no statistically significant difference from the reference group.

User-defined logistic regression analysis was not conducted for current problem status because of the smaller sample size of the problem group and consequent increase in the number of odds ratios with excessively large confidence intervals.

Table 25: Sociodemographic Characteristics of Lifetime Problem Gamblers and Non-Problem Gamblers

Selected characteristics		Lifetime Gambling status		Significance (p value)
		Non-Problem	Problem	
Sex	Male	47.9%	66.7%	0.0006
	Female	52.1%	33.3%	
Ethnicity	European	78.7%	51.2%	
	NZ Māori	11.3%	28.1%	
	Pacific Island	3.7%	15.2%	0.0006
	Asian	4.4%	4.2%	
	Other ethnic group	1.9%	1.3%	
Marital status	Married/Living with a partner	66.8%	67.9%	
	Separated/Divorced/Widowed	13.2%	10.8%	0.8861
	Never married	19.4%	20.6%	
	Not elsewhere included	0.6%	0.7%	
Age group	18-24	13.5%	12.4%	
	25-34	20.1%	33.8%	
	35-44	21.5%	22.2%	0.0017
	45-54	17.4%	15.6%	
	55-64	11.7%	11.9%	
	65 plus	15.7%	4.1%	
Country of birth	New Zealand	79.4%	79.4%	
	Europe/Australia/North America	12.4%	4.5%	0.0693
	Other countries	8.2%	16.1%	
	Not elsewhere included	0%	0%	
Years since arrival in NZ	Less than 4 years	3.6%	1.9%	
	4 years or more	16.9%	18.7%	0.8032
	Not elsewhere included	0.2%	0%	
	Not in subject population	79.4%	79.4%	
Highest qualification	No formal qualification	22.2%	31.1%	
	School qualification	21.2%	19.8%	0.2226
	Vocational or trade qualification	42.4%	42.2%	
	Degree or higher qualification	14.2%	7.0%	
Labour force status	Employed	66.0%	68.1%	
	Unemployed	3.6%	7.4%	0.4433
	Not in the labour force	30.1%	23.9%	
	Labour force status unidentifiable	0.2%	0.5%	
Religion	No religion	30%	27.1%	
	Anglican	17.8%	13.0%	
	Presbyterian	12.9%	11.4%	
	Catholic	12.9%	22.5%	0.2673
	Other Christian	20.4%	18.7%	
	Other religion	4.7%	6.4%	
	Not elsewhere included	1.1%	0.8%	
Household size (includes children)	1	11.2%	7.1%	
	2	33.2%	25.4%	
	3	19.6%	15.3%	0.0132
	4	19.3%	23.6%	
	5 or more	16.4%	28.6%	
	Not elsewhere included	0.3%	0%	
Household income	$20,000 or less	19.2%	18.7%	
	$20,001 to $30,000	14.9%	20.4%	
	$30,001 to $40,000	14.2%	6.8%	

157

	$40,001 to $50,000	11.4%	12.8%	0.3145
	$50,001 to $70,000	13.5%	14.3%	
	$70,001 or more	17.3%	13.1%	
	Not elsewhere included	9.5%	13.8%	
Location	Auckland	29.5%	42.3%	
	Wellington	10.9%	7.2%	0.0244
	Christchurch	12.3%	13.7%	
	Rest of New Zealand	47.2%	36.8%	

Adjusted Chi-square P Values Used

Table 26: Lifetime Problem Gambling – Sociodemographic Logistic Regression Results

Characteristic	Odds Ratio	Confidence Interval
Male	2.32	(1.5, 3.6)
Mäori	3.56	(2.2, 5.8)
Pacific Island	4.31	(1.6, 11.3)
Aged 25-34	2.12	(1.4, 3.2)
Catholic	1.88	(1.0, 3.4)
Auckland	1.93	(1.2, 3.0)
Christchurch	1.75	(1.0, 3.1)
Household income $30,001-$40,000	0.42	(0.2, 0.8)
No formal qualifications	1.52	(0.9, 2.6)
Born in NZ/Europe/Australia/North America	0.47	(0.2, 1.0)

Concordant = 69.7% R^2 = 0.105
Discordant = 25.7%
Tied = 4.5%

Table 27: Sociodemographic Predictors of Lifetime Problem and Probable Pathological Gambling: Results of Multiple Logistic Regression Analysis

Characteristic	Odds Ratio	Confidence interval
Male	2.48	(1.5 , 4.0)
Female	1.00	
Aged 18-24	2.97	(0.9 , 9.8)
Aged 25-34	7.85	(2.9 , 20.9)
Aged 35-44	4.57	(1.7 , 12.7)
Aged 45-54	4.18	(1.5 , 11.8)
Aged 55-64	3.78	(1.1 , 12.7)
Aged 65 or over	1.00	
European	1.28	(0.2 , 8.8)
NZ Mäori	4.14	(0.6 , 28.6)
Pacific Island	4.22	(0.4 , 41.3)
Asian	1.14	(0.1 , 13.3)
Other Ethnic Group	1.00	
Born in New Zealand	1.84	(0.8 , 4.3)
Born in Europe/Australia/North America	1.00	
Born outside of NZ/Europe/Australia/North America	1.95	(0.3 , 11.9)
No religion	1.09	(0.6 , 2.1)
Anglican	1.30	(0.6 , 2.6)
Presbyterian	1.46	(0.5 , 3.9)

158

Catholic	2.16	(1.0 , 4.6)
Other Christian	1.00	
Other religion	1.03	(0.3 , 3.3)
Not elsewhere specified	0.84	(0 , 16.1)
Auckland	2.20	(1.1 , 4.4)
Wellington	1.00	
Christchurch	1.86	(0.8 , 4.1)
Rest of New Zealand	1.07	(0.5 , 2.1)
Household income $20,000 or less	3.46	(1.5 , 7.9)
Household income $20,001-$30,000	3.10	(1.4 , 6.7)
Household income $30,001-$40,000	1.00	
Household income $40,001-$50,000	2.36	(1.1 , 5.1)
Household income $50,001-$70,000	2.32	(0.9 , 5.7)
Household income $70,001 or more	1.70	(0.8 , 3.8)
Not elsewhere included	3.22	(1.0 , 10.4)
No formal qualifications	2.48	(1.1 , 5.6)
Highest qualification - school qualification	2.08	(0.6 , 7.4)
Highest qualification - Vocational or trade qualification	1.77	(0.8 , 3.9)
Highest qualification - Degree or higher qualification	1.00	

Concordant = 71.8 $R^2 = 0.122$
Discordant = 25.6%
Tied = 2.6%

The results of the correspondence analysis undertaken with respect to lifetime problem gambling status are summarised in Figure 9. Similar to current gambling status, over three-quarters of total Chi-square and inertia is explained by the vertical dimension, in fact almost 80 percent. Again this implies interpretation of the model should concentrate on an essentially one-dimensional vertical examination of the correspondence map, with the horizontal dimension contributing little to interpretation.

As with current gambling pathology, the correspondence map indicates that for the lifetime gambling pathology row points, the vertical dimension is largely determined simultaneously by probable pathological and problem gamblers. This is because the points are both distant from the centroid, however little separated on the vertical scale relative to the no problem category, which is again very close to the centroid. Also, because the horizontal dimension contributes less than one quarter of total inertia it can be reasonably assumed little differentiates the problem and probable pathological points.

Again, as with current gambling pathology, the lifetime no problem category is situated very close to the centroid, among the vast majority of sociodemographic variables. Because the no problem category is so close to the centroid relative to the problem and probable pathological categories, it makes little to no contribution to interpretation of lifetime gambling pathology row points.

Figure 9: Lifetime Gambling Pathology Correspondence Map
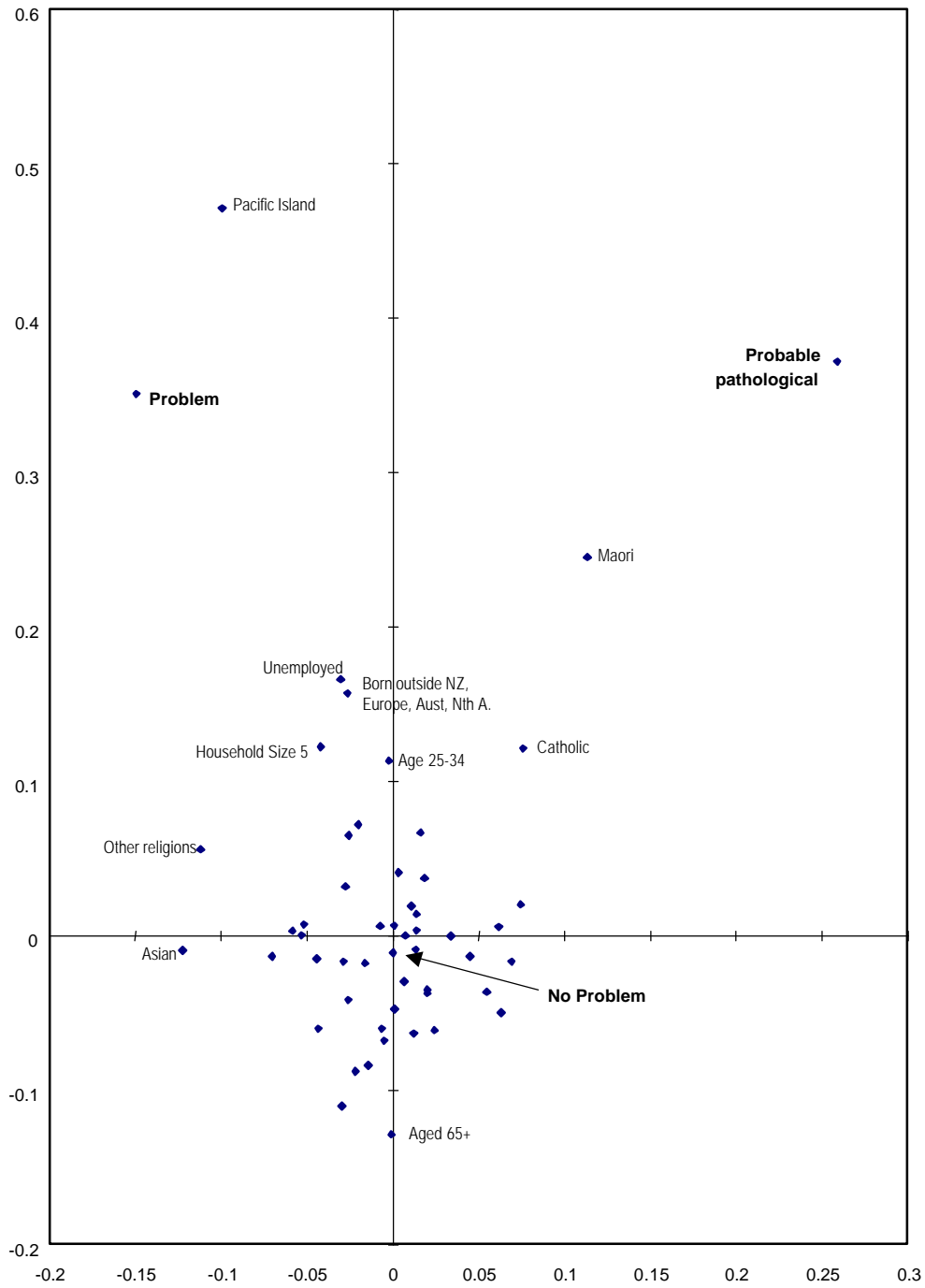
Once again, the vast majority of sociodemographic column points are located close to the centroid, and therefore contribute little to interpretation of the map. However, a number of points are located considerably higher on the vertical scale, suggesting association with lifetime problem and probable pathological gambling. The variable categories most associated with these lifetime problem gambling states are, respectively:

- Pacific Island ethnicity
- Mäori
- Unemployed
- Born outside New Zealand, Europe, Australia and North America
- Catholic
- those from households of five or more people; and
- those aged 25 to 34 years.

As with the current data these results are consistent with findings reported elsewhere and, in summary, it can be concluded that the combined effect of lifetime problem and probable pathological gambling is explained primarily by just these few categories from the range of sociodemographic variables. Further, the grouping of lifetime problem and probable pathological gamblers for subsequent analyses is justified by their both being positioned high on the vertical axis, relative to the no problem category located very close to the centroid.

Gambling Participation and Expenditure Risk Factors

As was the case with sociodemographic factors, participation in the various forms of gambling are inter-related to varying degrees. This means that they cannot be regarded as independent predictors of problem gambling. Consequently, logistic regression analyses were also conducted to determine which forms of gambling participation were most strongly and independently associated with problem gambling. Three sets of analyses were conducted.

The first set of regression analyses was confined to <u>past six months gambling participation</u> in each of the ten forms of gambling most frequently engaged in. The second set included both gambling frequency and expenditure. In these analyses, respondents were classified as non-gamblers, past six-month gamblers, regular non-continuous gamblers and regular continuous gamblers. In addition, they were grouped into one of six average monthly gambling expenditure categories, namely no expenditure, less than $10, $10-$20, $20-$30, $30-$40 and $40 or more.

Table 28: Current Problem Gambling - Gaming Participation Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
TeleBingo	2.45	(1.3, 4.6)
Gaming Machines at a Casino	2.50	(1.2, 5.3)
Other Casino Games	3.43	(1.6, 7.6)
Gaming Machines outside Casinos	3.05	(1.6, 5.9)
Horse or Dog Races	2.25	(1.2, 4.2)
Money Bets with Friends or Work-mates	1.74	(0.9, 3.3)

Concordant = 80.6%
Discordant = 11.1%
Tied = 8.3%

The results of the analysis to identify gambling participation predictors for current problem gambling status are shown in Table 28. They are similar to those given in Table 21a. The exception is other casino games, which emerged as the most powerful predictor with an odds ratio of 3.43. This form of gambling was not included in Table 21a as this table was confined to the eight most frequently engaged in activities and past six months participation in other casino games was ranked tenth.

Table 29: Current Problem Gambling - Gambling Category and Expenditure Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
Regular Continuous Gambler	5.28	(2.8, 10.0)
Monthly expenditure $40 or more	14.78	(5.6, 38.8)

Concordant = 80.1%
Discordant = 4.2%
Tied = 15.6%

Table 29 provides the results of the second logistic regression analysis that included the gambling frequency and average monthly expenditure measures. The odds ratio for expenditure of NZ$40 or more per month is particularly high.

The results of the corresponding logistic regression analyses for lifetime problem gambling status are given in Tables 30 and 31.

The types of past six month gambling participation most strongly associated with lifetime problem gambling are generally the same types that were found to be associated with current problem gambling. The exceptions are money bets with friends or work-mates and playing cards for money. The former appears to be a risk factor for current problem gambling but not lifetime problem gambling. Playing cards for money, on the other hand, appears as a risk factor for lifetime problem gambling but not current problem gambling. Readers will recall that these models are exploratory, so if a variable is judged to be a significant risk factor this could be for several reasons. For example, it could be truly significant or it could interact with some other variables and these variables or interactions between them have not been taken into account in the exploratory models. Alternatively, it could have to do with observing a small number of gamblers with problems. Hence, in this case the interesting absence of specific gaming participation for a class of problem gamblers needs further analysis to decide if it is indeed a useful predictor.

Table 30: Lifetime Problem Gambling - Gaming Participation Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
TeleBingo	1.57	(1.0, 2.4)
Gaming Machines at a Casino	1.73	(1.0, 2.9)
Other Games at a Casino	2.33	(1.3, 4.3)
Gaming Machines outside Casinos	2.49	(1.6, 3.9)
Horse or Dog Races	1.87	(1.2, 2.9)
Card Games for Money	3.69	(2.0, 6.7)

Concordant = 67.7%
Discordant = 16.6%
Tied = 16.3%

Table 31: Lifetime Problem Gambling - Gambling Category and Expenditure Logistic Regression Results

162

Variable	Odds Ratio	Confidence Interval
Regular Non-continuous Gambler	0.51	(0.3, 0.9)
Regular Continuous Gambler	2.16	(1.2, 3.8)
Monthly Expenditure $30-$40	2.42	(1.0, 6.0)
Monthly Expenditure $40 or more	7.66	(4.3, 13.5)

Concordant = 70.2%
Discordant = 12.9%
Tied = 16.8%

As with current problem gambling, it is evident that weekly or more frequent participation in continuous forms of gambling and average monthly gambling expenditure of $40 or more are major risk factors for lifetime problem gambling. However, two additional factors appear to be significant predictors. Regular non-continuous gamblers have a <u>lower</u> probability of being lifetime problem gamblers and monthly average gambling expenditure of $30 to $40 is also associated with higher risk.

Further information on gambling expenditure differences between problem gamblers and non-problem gamblers is provided in Table 32.

Table 32: Average Typical Monthly Expenditure for Problem and Non-Problem Gamblers

Current Problem Status		Lifetime Problem Status	
No Problem	Problem	No Problem	Problem
$34.07 ($2.25)	†$526.28 ($350.03)	$33.28 ($2.28)	†$284.50 ($166.61)

†   Relative sampling error exceeds 50%

In Table 32, absolute sample errors are provided in brackets following the average monthly expenditure for each group. Average expenditure is only calculated for those people who said they gambled in the past six months. Both of the problem groups report spending substantially more per month on gambling activities than their non-problem gambling counterparts. There is also much greater variation in the amounts spent by problem gamblers compared to non-problem gamblers.

Current problem gamblers reported particularly high expenditure. Eighty-nine percent of people in this category reported typically spending $40 or more per month on gambling. This compares with 22.3 percent of current non-problem gamblers. All current problem gamblers indicated that they had spent at least some money on gambling in the past six months.

<u>Lifetime</u> problem gamblers reported somewhat lower gambling expenditure, although 69 percent spent $40 or more per month. In contrast to the <u>current</u> problem gamblers, six percent of lifetime problem gamblers reported that they had not spent money on gambling during the past six months and a further eight percent said they typically spent less than $10 per month on average. Only three percent of current problem gamblers were in this low expenditure category. These findings provide support for the construct validation of the SOGS-R in that all of the current problem gamblers reported spending money on

163

gambling activities, most of them substantial sums. In the case of lifetime problem gamblers, many of whom were no longer in the problem gambling category, a substantial minority reported no or low expenditure. The majority, however, reported high expenditure.

It can be further determined from these expenditure data that New Zealand's estimated 34,692 current problem gamblers (1.3% of adults) collectively account for approximately 19 percent of total reported typical monthly gambling expenditure. The estimated 80,108 lifetime problem gamblers (3.0% of adults) account for approximately 24 percent of total reported typical monthly gambling expenditure. This latter group includes current problem gamblers.

Other Differences between Problem and Non-problem Gamblers and Additional Risk Factors

A number of additional differences between the problem and non-problem groups were examined. A variety of variables were considered and are included in Table 33. Some of these variables are likely to be additional risk factors. As mentioned earlier, their selection was guided by the findings of previous research and theory concerning the development of problem and pathological gambling. The variables considered here are more likely to be correlates or consequences of problem gambling rather than antecedents or risk factors. The findings in Table 33 relate to <u>current</u> problem gambling.

The factors outlined in Table 33 were also examined for <u>lifetime</u> problem gamblers. The overall pattern of findings was very similar, although for most variables the differences between problem and non-problem groups were less marked than is evident for those outlined in Table 33.

From Table 33, it is evident that problem gamblers generally have a preferred form of gambling and that relative to non-problem gamblers, they are much more likely to report that betting on horse and dog races and playing gaming machines (both in- and outside casinos) are their favourite activities. While a substantial number favour Lotto, they are less likely to do so than are non-problem gamblers.

Relative to non-problem gamblers, problem gamblers are much more likely to say that they gamble for the excitement of participation or the challenge it presents. They are also much more likely to report that their gambling is a habit or hobby and are less likely to gamble to support worthy causes. When engaging in their favourite forms of gambling, problem gamblers report much more often gambling alone.

As expected, relative to non-problem gamblers, problem gamblers reported much more frequently that they spent more time gambling, lost larger sums of money, commenced gambling earlier in childhood, felt nervous about the amount of money they gambled and wanted help to stop gambling. They also somewhat less often reported feeling generally very happy with their lives in the past six months. These findings further extend the construct validation of the SOGS-R as a measure of current problem gambling.

Reports on other people whom respondents consider to have a problem with gambling are of interest. As in some previous studies, including the 1991 New

Zealand survey, a significantly larger number of problem gamblers than non-problem gamblers believed that a parent or other close family member had a problem with gambling.

It is of further interest that approximately a third of total respondents indicated that they knew someone who they believed has a gambling problem.

Table 33: Other Differences between Current Problem Gamblers and Non-problem Gamblers [1] [2]

Variable [3]	Non-problem Gamblers N=2,674,938		Problem Gamblers N=34,692	
Favourite form of gambling				
No favourite	26.7%	(1.2%)	†2.7%	(†3.4%)
Lotto	24.6%	(1.2%)	†13.0%	(†13.5%)
Instant Kiwi	6.2%	(0.7%)	†6.1%	(†5.6%)
TeleBingo	5.5.%	(0.7%)	†2.0%	(†4.0%)
Gaming Machines in Casinos	3.9%	(0.5%)	†11.8%	(†8.3%)
Other Casino Games	2.3%	(0.4%)	†7.7%	(†7.6%)
Gaming Machines outside Casinos	3.5%	(0.6%)	†21.3%	(†11.5%)
Betting on Horse or Dog Races	9.5%	(0.9%)	*25.8%	(†11.8%)
Housie for money	1.2%	(0.3%)	†5.3%	(†7.8%)
Reasons for gambling				
Socialising	15.3%	(0.9%)	†17.3%	(†12.6%)
Excitement/Challenge	12.5%	(0.9%)	*31.8%	(13.5%)
To win money	53.3%	(1.5%)	60.2%	(15.7%)
To support worthy causes	27.9%	(1.4%)	†14.4%	(†13.4%)
Entertainment/Fun	37.2%	(1.4%)	*38.7%	(13.1%)
A hobby/habit	4.1%	(0.5%)	†14.8%	(†9.2%)
Curiosity	3.1%	(0.4%)	†1.1%	(†2.3%)
Other reasons	6.1%	(0.6%)	†14.9%	(†9.0%)
Usual people gambled with when doing most enjoyable activities				
Alone	28.0%	(1.2%)	*50.2%	(15.6%)
With spouse/partner	36.5%	(1.3%)	†26.3%	(†14.3%)
With other family members	21.6%	(1.0%)	*29.8%	(†13.5%)
With friends or co-workers	31.7%	(1.4%)	*32.6%	(11.7%)
With other individual or group	3.0%	(0.5%)	†3.8%	(†5.3%)
Usual time spent gambling				
Less than one hour	70.4%	(1.4%)	†19.1%	(†10%)
More than six hours	*0.9%	(0.3%)	†6.1%	(†5.9%)
Largest amount lost in one day of gambling				
$10 to $99	44.7%	(1.3%)	*37.1%	(13.4%)
$100 or more	6.4%	(0.7%)	60.6%	(13.5%)
Age when first gambled				
Less than 10 years old	2.8%	(0.4%)	†15.8%	(†10.1%)
10 to 14 years	11.0%	(1.0%)	†13.6%	(†9.3%)
15 to 19 years	34.3%	(1.3%)	*30.6%	(11.6%)
20 years or older	31.4%	(1.2%)	*36.5%	(14.0%)
Ever nervous about amount of money gambled	6.5%	(0.8%)	58.3%	(14.4%)
Ever wanted help to stop gambling	†0.6%	(†0.3%)	*36.1%	(15.4%)
How happy during last six months				
Very happy	58.4%	(1.3%)	46.2%	(12.4%)

165

Somewhat happy	35.1%	(1.3%)	42.2%	(12.7%)
Somewhat unhappy	4.7%	(0.6%)	†11.6%	(†6.9%)
Very unhappy	1.2%	(0.3%)	†0%	N/A
People thinks have a problem with gambling				
No one	68.0%	(1.2%)	*40.4%	(15.3%)
Father	3.6%	(0.5%)	†15.0%	(†10.2%)
Mother	1.5%	(0.4%)	†6.1%	(†6.3%)
Another close family member	9.3%	(0.8%)	†22.0%	(†14.0%)
A friend or someone else	18.4%	(0.9%)	*22.1%	(10.9%)

(1)   Problem includes problem (3-4 SOGS-R) and probable pathological gamblers (5 + SOGS-R

(2)   Absolute sampling errors are shown in brackets

(3)   Some of the figures do not add up to 100% because they are from multiple response questions or because data from some categories are omitted

†   Relative sampling error exceeds 50% and/or has less than 10 respondents in the cell

*   Relative sampling error is between 30% and 50%

N/A   Absolute sampling error cannot be calculated because there are no, or too few respondents in the cell

Unfortunately, it is not known what criteria members of the general adult population use when making these judgements or how they correspond to SOGS-R or DSM-IV diagnostic criteria.

As with the various predictors considered to this point, many of the variables outlined in Table 33 are likely to be inter-related. This complicates efforts to understand their relationship with problem gambling. To help interpret these results, additional step-wise logistic regression analyses were conducted (in SAS) using many of the variables included in Table 33 followed by user-defined logistic regression analyses in WesVar Complex Samples. Some additional variables were included, for example, the gambling activity that participants reported having first engaged in when they started gambling. The following factors were considered for inclusion in these analyses:

- Reasons for Gambling
    Socialising
    Excitement/Challenge
    To win money
    To support worthy causes
    For entertainment/fun
    As a hobby/habit
    Curiosity
    Other

- Person usually gambled with
    Alone
    Spouse or partner
    Other family members
    Friends or co-workers
    Other individual or group

- Usual time spent gambling
    Less than 1 hour
    1 to 2 hours
    3 to 5 hours
    6 or more hours

- Largest amount lost in one day
  Less than $1
  $1 to $9
  $10 to $99
  $100 to $999
  $1000 or more

- Age when first gambled
  Less than 13 years
  13 to 15 years
  16 or 17 years
  18 or 19 years
  20 to 24 years
  25 years or older

- First gambling activity
  Lotto
  Instant Kiwi
  Other lotteries
  Casino/Gaming machines
  Horse or dog races
  Card games for money

- A person in the respondent's life has a gambling problem

- The respondent ever felt nervous about gambling

- The respondent had been in trouble with the law because of gambling.

Multiple levels of each of these factors were treated as binary (yes/no) variables in the logistic regression analyses. Initially, all of these binary risk factors were included in the logistic regression model. However, it was found that some variables had an extremely high correlation with problem gambling. The variables in question were the largest amount of money lost in one day of gambling, and nervousness and trouble with the law as a result of gambling.

Large gambling losses, especially if followed by 'chasing' to recoup losses, can be regarded as an experience that leads to the development of problem gambling. However, it can also be considered a symptom or consequence of problem gambling. Similarly, feeling nervous because of gambling or getting into trouble with the law as a result of gambling can be regarded both as phases in the development of problem gambling and as an expression of problem gambling. As the focus of this aspect of the study was to identify antecedent predictors or risk factors for problem gambling, it was decided to exclude these three variables from subsequent analyses. However, as indicated above, the very high level of association of factors such as these with problem gambling status as measured by the SOGS-R is consistent with the view that this instrument is a valid indicator of the problem gambling construct.

The results of the logistic regression analysis to identify other major risk factors for current problem gambling are outlined in Table 34.

Many of the risk factors are common to current and lifetime problem gambling. For example, of the strongest predictors, gambles as a hobby/habit, usually gambles alone and someone in the respondent's life has a gambling problem, apply to both current and lifetime problem gambling.

Gambles for excitement/challenge is an additional risk factor for <u>lifetime</u> problem gambling. Gambling for this reason or as a hobby/habit is more frequently associated with continuous forms of gambling such as track betting and gaming machine participation, forms of gambling that have a strong link with problem gambling.

Table 34: Current Problem Gambling - Other Risk Factors Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
Gambles for entertainment/fun	0.53	(0.3, 1.0)
Gambles as a hobby/habit	3.13	(1.3, 7.8)
Usually gambles alone	2.72	(1.2, 6.1)
Usually gambles with spouse/partner	0.52	(0.2, 1.3)
Usually gambles with friends or co-workers	0.44	(0.2, 0.9)
Usually gambles for less than one hour	0.04	(0, 0.1)
First gambled at age 18 or 19 years	0.27	(0.1, 1.0)
First gambled between 20 to 24 years	0.38	(0.2, 0.9)
First gambling activity Instant Kiwi	2.53	(0.6, 10.3)
Someone in respondent's life has a gambling problem	2.61	(1.2, 5.6)

Concordant = 83.6% $R^2 = 0.27$
Discordant = 11.8%
Tied = 4.6%

The results of the logistic regression analysis to identify other risk factors for <u>lifetime</u> problem gambling are given in Table 35.

Table 35: Lifetime Problem Gambling - Other Risk Factors Logistic Regression Results

Variable	Odds Ratio	Confidence Interval
Gambles for excitement/challenge	1.86	(1.1, 3.3)
Gambles to support worthy causes	0.48	(0.2, 1.1)
Gambles as a hobby/habit	2.05	(1.1, 3.8)
Gambles for other reason	1.73	(0.6, 5.0)
Usually gambles alone	2.61	(1.5, 4.5)
Usually gambles with other family members	1.51	(0.9, 2.5)
Usually gambles with friends or co-workers	0.51	(0.3, 0.8)
Usually gambles for less than one hour	0.15	(0.1, 0.3)
First gambled before the age of 13 years	3.39	(1.7, 6.9)
First gambled between 13 to 15 years	1.88	(0.8, 4.4)
First gambled at 16 or 17 years	2.16	(1.1, 4.3)
First gambled aged 25 years or over	3.10	(1.4, 6.9)
First gambled in a casino or on gaming machines	2.83	(1.7, 4.9)
First gambled playing card games for money	2.66	(1.3, 5.6)
Someone in respondent's life has a gambling problem	2.89	(1.9, 4.5)

Concordant = 82.4% $R^2 = 0.23$
Discordant = 16.1%
Tied = 1.5%

Usually gambling with friends or co-workers, or with spouse or partner, are associated with having a reduced likelihood of being a problem gambler. However, in addition to gambling alone, usually gambling with other family members also predicts <u>lifetime</u> problem gambling.

People who report gambling for less than one hour per gambling session are very unlikely to be either a current or lifetime problem gambler.

With respect to <u>current</u> problem gambling the age at which one first starts gambling does not appear to be a high risk factor since either the age category does not appear in the model, or where it does, the odds ratio is less than one. However, with respect to <u>lifetime</u> problem gambling, there appears to be a high risk associated with commencing gambling before 13 years of age (OR = 3.39) or commencing at age 25 years or older (OR = 3.10).

Also with respect to <u>current</u> problem gambling, having first gambled through Instant Kiwi participation appears to be a strong risk factor. In the case of <u>lifetime</u> problem gambling, commencing gambling at a casino or on gaming machines, and playing card games for money, are strong risk factors. Given age restrictions on access to gaming machines and casinos, it is likely that problem gamblers who commenced gambling at a very young age did so by playing cards for money or buying Instant Kiwi tickets. The group that developed problems beyond the age of 24 years, on the other hand, is likely to have commenced gambling in a casino or on gaming machines at other locations. Alternatively, this may reflect gender or cohort differences rather than behaviour at different ages. Longitudinal investigation is required to help clarify this issue.

Although the logistic regression analyses assist in examining the relationships between these various factors and problem gambling, the cross sectional nature of the study and limitations of some of the measures used places constraints on interpretation of the findings. For example, the temporal sequence of events is not always clear (i.e. which comes first). As mentioned earlier, some factors considered antecedents to problem gambling might, to varying degrees, be consequences of it. Some of the measures, such as first gambling activity and the lifetime SOGS-R items, are dependent upon the recall of events that may be quite distant in time, and are subject to recall bias.

A further difficulty in interpreting the results of these analyses arises from cohort effects that cannot be readily identified although they can sometimes be inferred. For example, as mentioned, reporting Instant Kiwi as the first form of gambling engaged in was a risk factor for current problem gambling but not lifetime problem gambling. However, playing cards for money as the first form of gambling activity was a risk factor for lifetime problem gamblers but not for their current counterparts. This difference may have arisen because the lifetime category includes relatively more people who developed their gambling problems before the advent of Instant Kiwi whereas the <u>current</u> category includes relatively more people whose problem gambling has a recent onset. While further analysis may tease out some of these sorts of relationships, for example by including interaction terms such as age by form of gambling first engaged in, this type of investigation is severely constrained by the relatively small number of problem gamblers in the sample and the non-longitudinal nature of the 1999 survey.

Help Seeking

One percent (0.6-1.4%) of total respondents said they had at some point in their lives wanted help to stop gambling. Corresponding figures for people who had ever gambled and people classified as regular continuous gamblers are 1.7 percent (0.1-4.3%) and 3.0 percent (1.4-4.6%) respectively.

Over a third (36.1%; 20.7-51.5%) of current problem gamblers and over a quarter (26.7%; 17.4-36%) of lifetime problem gamblers said they had wanted help to stop gambling.

A much smaller proportion of people (0.4%; 0.2-0.6%) said that they had tried to get help to stop gambling. This represents a total of 9,521 (3,246-15,796) people within the total adult population. **While the large absolute sample error means that some caution is required in considering this a correct estimate of people in this situation, it is of interest that the point estimate of 9,521 is similar to the total number of people with gambling problems who have sought professional help from specialist problem gambling Helpline and counselling services since they commenced operation**. In Chapter Two, it was shown that a total of approximately 8,500 problem gamblers have sought assistance from the national Helpline and counselling services since they were first established.

4.4 Comparing the 1991 and 1999 Surveys

Introduction

One major goal of the present study is to compare the results with those of the earlier 1991 New Zealand national survey. Of particular interest is determining whether reported gambling participation patterns and problem gambling prevalence rates have changed between 1991 and 1999. In this section, selected findings from the two surveys are examined in light of this question.

The tables in this section present several comparisons of data from the 1991 and 1999 national surveys. These include comparisons of the samples, of gambling participation and of current and lifetime problem and probable pathological gambling prevalence rates. Because interpretation of these tables is also influenced by the methodologies used in the two studies, some consideration is given to similarities and differences in methodology.

As mentioned in Chapter Two, the 1991 national survey, like the present survey, involved telephone interviews with a large sample of New Zealanders aged 18 years and over. Both made provision for interviews to be conducted in languages other than English for the small number of respondents who requested this when offered. The 1991 survey also used a questionnaire that was very similar to that used in the present survey and incorporated essentially the same measures of gambling participation, expenditure and problem gambling. Abbott and Volberg, the principal investigators in the present study, also designed and directed the 1991 survey.

Although similar in many respects, there are a number of differences between the two studies. These differences include the research organisation subcontracted to collect and analyse the data, the sample designs and resulting samples, the questionnaires, the weighting and estimation process and the data analysis. Each of these differences is considered.

Data Collection

The National Research Bureau, a private social and market research organisation, undertook the data collection in 1991. In 1999, Statistics New Zealand, the official agency responsible for gathering national statistical information, including the census, conducted the data collection. As mentioned in Chapter Three, the main reason for involving Statistics New Zealand in the 1999 survey was to ensure that an adequate response rate was achieved. Although conducted under the Statistics Act, participation in the 1999 survey was not compulsory. However, prior to being telephoned, households selected for inclusion in the survey were sent a letter signed by the Government Statistician and participants could be expected to have perceived it as an 'official' survey.

While the involvement of Statistics New Zealand was considered essential to ensure that a satisfactory response rate was achieved, it is possible that its involvement per se resulted in differences in the composition of the sample. The involvement of this agency may also have had some influence on the way participants responded to interview questions. However, the extent and nature of any such influence, if present, is unknown.

Sample Design

There are a number of differences between the two surveys with respect to sample design. These differences include the method employed to generate the telephone numbers used, the way in which under-coverage of Mäori and Pacific Island populations was handled, and methods of dealing with non-response.

The frame for the 1991 survey was "all people aged 18 years and over living in a private residence with a telephone number that is one digit above a residential number listed in the 1991 Telecom White Pages." This method of sampling was used to allow unlisted numbers (whether confidential or established/changed since printing of the telephone directories) a chance to be included in the sample. While having the advantage of picking up a number of unlisted numbers, one of the pilot surveys reported in Chapter Three found that this procedure was not particularly effective in this regard. It also has a disadvantage in that it does not allow the determination of probabilities of selection of any units in the survey population, nor units in the sample.

The basis for the frame for the 1999 survey was the current electronic listing of white pages. This did not allow for coverage of unlisted numbers, but it did permit measurement of the probabilities given to each number in the listed population. This procedure also meant that telephone numbers that were unlisted because they had been connected since the last printing of Telecom directories were covered.

If people with unlisted numbers (approximately 8 percent of residential telephone numbers) differ markedly from their counterparts with listed numbers with respect to gambling behaviour, this could be expected to partly account for differences between the results of the two studies.

Neither of the 1991 and 1999 surveys included the approximately five percent of private residential dwellings that do not have a telephone. This percentage has not changed appreciably since 1991. There are indications from the Swedish national survey, referred to in Chapter Two, that people who cannot be reached by residential telephone have a higher prevalence of problem gambling than people who are accessible in this way. People in this situation may lack telephones, have had them disconnected or have unlisted numbers.

While the relatively small proportion of households (approximately 5%) that do not have telephone numbers may result in a slight underestimation of problem gambling prevalence, as mentioned above, this potential source of bias is common to both of the New Zealand studies. However, this is a particularly important consideration for Mäori and Pacific Island estimates because of substantially lower access to residential telephones in these groups. From the 1996 census, it is known that approximately 15 percent of people in these sub-populations do not have access to a residential telephone. The 1991 and 1999 surveys handled this issue in different ways.

The 1991 survey attempted to deal with the problem of under-coverage by including a targeted supplementary sample that boosted the numbers of Mäori and Pacific Island people in the total sample. Although the sample was not subsequently post-stratified by ethnicity, when the overall sample was post-stratified by age, gender and household size, Mäori and Pacific representation approximated proportions expected on the basis of the latest census.

The 1999 survey did not incorporate a supplemental sample but adjusted the weights of Mäori and Pacific Island respondents so that their contribution to the estimates reflect the known sizes of these groups in the population as a whole. This sample was also post-stratified by age, gender and household size.

Neither of these methods completely removes the potential for bias due to the lack of coverage of these sub-populations in the frame. However, both used procedures that adjusted for their initial under-representation.

In contrast to the 1991 survey, the 1999 survey did not allow for the substitution of non-responding telephone numbers. All numbers used in the 1999 sample were selected at the beginning and attempts were made to contact all of them in the survey. This means the probabilities of selection were determined at the outset.

In addition to sending a letter to most selected households prior to telephone contact, the 1999 survey also differed from the baseline survey in that more calls were initially made to households and, once an eligible person was identified, to that person to obtain an interview. In the 1991 survey up to five calls were made to households and up to three to eligible persons. In the 1999 survey up to eight calls were made to households and up to five to eligible persons. These changes, as well as the official authority implied by SNZ acting as the data collection agency, probably contributed to the attainment of the substantially higher response rate in the 1999 survey.

It is possible that by making additional call-backs, relatively more people were included who are difficult to reach because they spend more time out of their homes or have busy or chaotic lives. It is conceivable that problem gamblers are over-represented in this group. However, in one of the pilot studies, many people who indicated some reluctance to participate said that this was because they did not gamble much and did not think the study was relevant to them. Procedures were subsequently introduced to assure potential participants that it was important that all people selected were interviewed. **Consequently, the 1999 survey may have included <u>both</u> relatively more people with lower levels of gambling involvement and more with high levels of involvement and gambling problems.**

Procedures used to select participants within households also differed between the two surveys. Both used methods designed to ensure random selection. The 1991 survey used the 'next birthday' method whereas the 1999 survey used a selection grid procedure based on the Kish method. The latter method was used in the present survey because it reduces the chance of respondent self-selection and is likely to produce a more representative probability sample. However, it is uncertain what effect these different methods had, if any, on the nature of the 1991 and 1999 attained samples.

The 1999 survey also differed in that it included a small number (41) of face-to-face interviews with people with hearing or language difficulties. This difference, however, given that it involved only 41 out of 6,452 interviews (six tenths of one percent of the total sample), is unlikely to have been significant.

A number of the features of the 1991 sample design mean that it is difficult to assign probabilities of selection to each unit in the 1991 sample. This survey employed no survey weights other than those derived from post-stratification, while the 1999 study was a probability-based and weighted survey. There is a consequent potential for bias in the results of the 1991 survey but it is unclear in which direction or of what scale.

As mentioned earlier in this report, while it is highly desirable to use identical methodologies in replication studies, in the present situation there was an over-riding concern to ensure that a high response rate was achieved and that the overall quality of the survey was maximised. In particular, in designing the 1999 survey, more importance was given to being able to assign probabilities of selection to each unit so that it was possible to be more confident that the survey results are unbiased. Without these probabilities it is necessary to make some assumptions about certain processes being random, or that variables of interest are not related to the varying probabilities that have been assigned to people in the population. **Although the 1999 survey still has potential bias from under-coverage and unlisted numbers, overall, the principal investigators, Statistics New Zealand and external statistical auditors are confident that it is more robust technically than the earlier baseline survey and one of the most robust gambling surveys conducted to date world-wide.**

However, the changes made to the 1999 'replication' do involve a trade-off. The compromise includes some loss of comparability between the 1991 and 1999 surveys. These differences complicate interpretation of some of the comparisons of interest between the results of the two surveys.

Achieved Samples

1999 survey achieved sample details were provided in Chapter Three. Table 36 presents information from both surveys to facilitate comparison between the two surveys. The three demographic variables included in this table all had a strong relationship with problem gambling status in the 1991 and 1999 national surveys. Consequently, differences in representation within the surveys could influence prevalence rates.

The information provided in Table 36 is important for two reasons. First, it allows comparison of the 1991 and 1999 achieved samples, both in relation to each other and in relation to what would be expected on the basis of Census information at the time each survey was conducted. Second, comparison of the 1991 and 1999 expected percentages indicates how the composition of the New Zealand population has changed with respect to

the demographic variables included in the table. Both have implications for the interpretation of the survey findings.

As is typical of social surveys, especially those conducted by telephone, males, younger people and members of ethnic minorities are under-represented in both the 1991 and 1999 surveys. In part this is due to lower telephone ownership. Lifestyle differences (e.g. people in these groups are more likely to be out of the house when interviewers call) and greater reluctance to participate in surveys are additional reasons. Pacific Islanders, for cultural and economic reasons and as a consequence of their younger average age, are more likely to reside in larger households. Sampling procedures that select only one respondent per household are a major reason why Pacific Islanders and, to a somewhat lesser extent, Mäori, are under-represented. Older respondents and Europeans, on the other hand, are usually over-represented in surveys of this type. In large part, this is because they are much more likely than younger adults to be living in one-person households and to be willing to participate in telephone surveys.

Table 36: Comparing the Samples in 1991 and 1999: Achieved and Expected Percentages [1]

Category	Achieved 1991	Expected 1991	Achieved 1999	Expected 1999
Male	45.5%	48.6%	44.2%	48.5%
Female	54.5%	51.4%	55.8%	51.5%
18-24 years	13.2%	16.1%	7.2%	13.5%
25-29 years	11.8%	11.3%	8.5%	10.0%
30-39 years	24.8%	21.3%	22.3%	21.8%
40-49 years	18.2%	17.4%	18.8%	19.5%
50-64 years	18.0%	18.1%	20.4%	20.2%
65 + years	13.9%	15.7%	22.7%	15.4%
Mäori	8.0%	8.1%	6.7%	11.8%
Pacific Island	2.3%	3.7%	1.3%	4.1%
Other	89.7%	88.2%	-	-
Asian	-	-	2.7%	4.4%
European/Other	-	-	89.4%	79.8%

(1)   The 1991 expected percentages were based on the 1991 Census; the 1999 expected percentages on the 1996 Census, adjusted for subsequent net migration, births and deaths as of 31 March 1999

From inspection of Table 36 it is evident that while gender differences were minor between the two survey samples, younger people (18-29 years) and ethnic minorities, especially Pacific Islanders, were more markedly under-represented in the 1999 survey. In the case of younger participants, this difference is diminished somewhat when allowance is made for their relative reduction in the general population. Nevertheless, it remains significant. In the case of Mäori and Pacific Islanders, however, the difference is accentuated when their relative increase in the general population is noted. It should be noted here that somewhat different methods were used in the two surveys to define ethnicity. It is unclear what effect, if any, this difference had.

Asian representation was not determined in 1991. In the 1999 survey, while more satisfactory than Pacific Island representation, Asian respondents were also under-represented.

174

In the 1991 survey, people aged 65 years and older were represented in approximate proportion to their relative numbers within the general population. However, in 1999 they were substantially over-represented.

The 'better' representation of Mäori and Pacific Islanders in the 1991 sample was a consequence of the over-sampling of these groups and the resulting boosted sub-samples. However, these boosted samples did not address high levels of under-coverage due to houses with no telephone or differential non-response in these categories. **With regard to the other sample differences, it would appear that the involvement of Statistics New Zealand and changes in recruitment procedures were more effective in increasing the percentages of older people and females. They do not appear to have enhanced the participation of people within those demographic groupings that are generally under-represented in social surveys**. In both surveys under-coverage and differential non-response within groups that have potentially high problem gambling prevalence complicate interpretation of their findings, especially within these groups. They also have an unspecifiable influence on gambling participation and problem gambling prevalence estimates.

In both surveys, the samples were subsequently weighted to bring them into line with population expectations. This procedure largely compensates for their disproportionate representation within the survey samples. However, where these adjustments are large, it means that the response rate for the sub-sample involved was low relative to other groups. As indicated in the preceding paragraph, if the members of such sub-samples who are not included in the survey differ from those who do participate with respect to gambling participation and/or problem gambling, this difference could influence the survey results. With respect to the 1999 survey, it is possible that this could particularly be the case for younger participants and Pacific Islanders.

Changes in the population structure between the two surveys could also influence the survey results. Between 1991 and 1999, there has been an increase in the proportion of people aged 40 years and older in the New Zealand population and a more substantial decrease in the proportion of young adults. This could be expected to result in a reduction in certain forms of gambling participation and problem gambling prevalence within the population as a whole.   On the other hand, Mäori, Pacific Islanders and Asians have increased in numbers between 1991 and 1999. Given that the two former groups had high problem gambling prevalence rates in both surveys, this change could be expected to result in an increase in problem gambling prevalence.

Other changes within New Zealand society, apart from the advent of new forms of gambling and increase in the availability of some existing forms such as gaming machines, could also influence gambling participation and the prevalence of problem gambling. The most likely factors are those that are strongly associated with problem gambling and have changed over time.   Ethnicity and age, already discussed, were the second and third strongest predictors, respectively, of problem gambling in 1991. Being unemployed was the strongest predictor in 1991. Unemployment rates were ten percent in 1991 and 7.2 percent in the 1999 March quarter. Being single and male were the next strongest predictors in 1991. Little change is evident in these characteristics of the population between 1991 and 1999.

Questionnaires

The 1991 and 1999 questionnaires are described earlier in this report. Particular care was taken to ensure that the content remained as similar as possible to facilitate comparison between the results obtained from the two surveys. The major difference involved the addition of items within the gambling participation section of the SOGS-R to reflect the new forms of gambling that had been introduced since the 1991 survey. Some changes were made to a small number of the sociodemographic questions. These changes, and the reasons for making them, are mentioned in Chapter Three. A few additional questions were also added to the latter part of the survey, following administration of the gambling participation and scored SOGS-R items.

Analysis

As is the case with the great majority of health and social surveys, including problem gambling surveys, the sample designs used in both the 1991 and 1999 surveys are technically complex. Some of the implications of this for the analysis of survey data and, in particular, the calculation of confidence intervals, were discussed in Chapters Two and Three. The way in which this matter of design complexity and the further issue of determining reliable confidence intervals for rare events were dealt with in the present survey was also covered in Chapter Three. However, neither of these considerations was taken into account in the 1991 survey or in any previous problem gambling survey conducted internationally. This further complicates the comparison of findings from the two New Zealand national surveys.

Two approaches are taken here with respect to design complexity and the calculation of confidence intervals for rare events when making comparisons between findings from the two surveys. The first approach is to simply present data from both surveys without attempting to make any statistical adjustments. As mentioned earlier, the percentages or point prevalence estimates are not affected by these two sources of bias and can be compared across the two studies. The confidence intervals for the 1991 survey results, on the other hand, must be considered approximations only.

Statistics New Zealand statisticians examined the 1991 data set and concluded that the design effect is not large. Consequently, many of the published confidence intervals are likely to be similar to those that would be obtained using procedures that account for design complexity. This said, it is likely that in some specific instances, large differences may be present. As it is not known when this is the case, caution is required. This also means that similar caution must be exercised with respect to making inferences that apparent differences are statistically significant. A second approach is taken with some key comparisons, specifically those pertaining to problem gambling. In these situations, adjustments have been made to attempt to account for these features.

With respect to the 1991 problem gambling prevalence estimates, the sample errors were initially calculated assuming simple random sampling with replacement. For the purposes of making more accurate comparisons with results from the 1999 survey, these errors have been adjusted using a design effect of 1.3. This is an estimate of the likely design effect introduced by using a two-stage selection method where one person is selected per chosen household. The size of this design effect was determined by examining the variance of a sample stratified by household size and allocated in proportion to the numbers of dwellings in those strata (using 1991 Census data). The ratio of this variance

176

to a simple random sample of people was approximately 1.3. The 1991 confidence intervals were further adjusted by logit transformation with a view to providing more accurate estimates. While likely to be more accurate than the original 1991 estimates, they remain at best approximations in that the precise 1991 design effect is unknown.

The procedures just outlined are expected to account for both the complex sample design and the low point prevalence estimates and produce confidence intervals that may more readily be compared with those calculated for the 1999 sample. In the case of the 1999 prevalence estimates, the confidence intervals were adjusted by applying Korn and Graubard's method for calculating confidence intervals for proportions with a small expected number of positive counts. This was not possible for the 1991 data since the actual design effects are unknown.

Changes in Gambling Participation

There have been substantial changes in reported gambling participation in New Zealand between 1991 and 1999. Table 37 provides an overview of these changes. There appears to be a slight increase in the percentage of respondents who report that they have never gambled, or gambled in the past but not in the past six months. There is also a modest increase in the percentage who indicate having participated in the past six months but not in the past week. No change is evident in the group that reports gambling weekly or more on non-continuous forms of gambling only. The most notable change is in the group that acknowledges engaging this frequently in continuous forms of gambling. The percentage dropped from 18 percent in 1991 to ten percent in 1999. Possible reasons for and implications of these changes will be considered in Chapter Five.

Table 37: Comparing Gambling Involvement in 1991 and 1999

Gambling Pattern	1991	1999
Non-gamblers	5%	6%
Infrequent Gamblers	6%	8%
Past 6 Months Gamblers	41%	46%
Regular Non-continuous Gamblers	30%	30%
Regular Continuous Gamblers	18%	10%

The next table, Table 38, provides further information on gambling involvement in New Zealand in 1991 and 1999.

Confidence intervals are not shown for the data in Table 38 but were provided in the previous section for 1999 participation. They were not provided in the report on the 1991 survey and cannot be precisely determined. Consequently, conclusions based on the measured differences between the 1991 and 1999 participation rates should be treated with caution.

With respect to lifetime gambling participation, involvement in Lotto and housie are similar in the two surveys. Participation in a number of other forms of gambling appears to have decreased from 1991 to 1999, namely other lotteries and raffles, Instant Kiwi, money bets with friends and work-mates, and playing cards or dice for money. Betting on horse and dog races is the only form existing in 1991 that appears to have increased somewhat. However, a substantial number of participants report having participated in new forms of gambling introduced since 1991, particularly gaming machines in casinos and TeleBingo.

Somewhat smaller numbers acknowledge having participated in other casino games, other sports betting and Daily Keno.

Apart from betting on horse and dog races, money bets with friends and work-mates, and Housie, past six months involvement in the other more popular forms of gambling available in 1991 appears to have decreased. Over ten percent of respondents, however, report this frequency of involvement with gaming machines both within and outside casinos and TeleBingo.

Table 38: Changes in Lifetime, Past Six Months and Weekly or More Gambling Participation

Form of Gambling	Ever Participated		Past 6 Months		Weekly or More	
	1991	1999	1991	1999	1991	1999
Lotto	87%	86%	78%	73%	42%	35%
Other lotteries or raffles	82%	77%	57%	48%	7%	3%
Instant Kiwi	68%	61%	51%	36%	13%	6%
Other instant scratch ticket	23%	-	11%	-	1%	-
Betting on horse or dog races	45%	48%	15%	18%	4%	3%
Football pools	13%	-	4%	-	0%	-
Other sports betting	-	10%	-	5%	-	1%
Gaming machines [1]	41%	-	16%	-	3%	-
Gaming machines - non-casino	-	37%	-	14%	-	2%
Gaming machines in casinos	-	36%	-	11%	-	0%
Overseas casinos	25%	-	3%	-	0%	-
'Casino' evenings	20%	-	2%	-	0%	-
Casinos - other games	-	16%	-	5%	-	0%
Money bets - friends/workmates	40%	34%	16%	17%	2%	1%
Housie	18%	17%	3%	3%	1%	1%
Daily Keno	-	9%	-	3%	-	1%
TeleBingo	-	26%	-	17%	-	6%
Card games for money	21%	15%	5%	3%	1%	0%
Dice games for money	11%	4%	1%	0%	0%	0%
Internet	-	0%	-	0%	-	0%
Other gambling activity	3%	3%	-	-	-	-

(1)   For 1999, gaming machine participation is shown separately for within and outside of casinos. In 1991 there were no casinos in New Zealand.

More substantial changes appear to be evident in the case of weekly or more frequent participation. This is particularly evident for Instant Kiwi and other lotteries and raffles. However, apart from Housie, all of the forms of gambling available in 1991 appear to show reduced participation in 1999. TeleBingo is the only new activity that is engaged in on a regular basis by a substantial number of people. Although, individually, many of the apparent reductions in participation in the various continuous forms of gambling are

unlikely to be statistically significant, collectively, as is evident in Table 38, they aggregate to produce a relatively large decline in weekly gambling participation.

Changes in Problem Gambling Prevalence

Table 39 indicates that <u>current</u> problem and probable pathological gambling prevalence have decreased in New Zealand from 1991 to 1999. The confidence intervals for the point prevalence estimates do not overlap. This means that the differences are statistically significant, assuming the adjustments made to the 1991 confidence intervals are consistent with both the 1991 methodology and the inherent population variability characteristic at the time.

Table 39: Comparison of Current Problem and Probable Pathological Gambling Prevalence Estimates from the 1991 and 1999 National Surveys

Selected characteristics		1991 - Current Gambling Status			1999 - Current Gambling Status		
		No problem %	Problem %	Pathological %	No problem %	Problem %	Pathological %
New Zealand		96.7	2.1	1.2	98.7	0.8	0.5
		(96.0 , 97.3)	(1.7 , 2.7)	(0.9 , 1.6)	(98.3 , 99.0)	(0.6 , 1.1)	(0.3 , 0.7)
Age Group	18-24	93.0	4.0	3.0	98.9	0.6	0.4
		(90.1 , 95.1)	(2.5 , 6.4)	(1.7 , 5.2)	(97.5 , 99.7)	(0.1 , 1.8)	(0.1 ,1.6)
	25 plus	97.4	1.7	0.8	98.7	0.8	0.5
		(96.8 , 98)	(1.3 , 2.3)	(0.6 , 1.3)	(98.3 , 99.0)	(0.6 , 1.2)	(0.3 , 0.8)
Sex	Male	96.0	2.0	2.0	98.4	1.2	0.4
		(94.8 , 96.9)	(1.4 , 2.9)	(1.4 , 2.9)	(97.7 , 98.9)	(0.7 , 1.9)	(0.2 , 0.8)
	Female	97.0	2.0	1.0	99.1	0.4	0.5
		(96.1 , 97.7)	(1.4 , 2.8)	(0.6 , 1.6)	(98.5 , 99.4)	(0.2 , 0.7)	(0.2 , 1.0)

Age and gender differences are also shown in Table 39. Although reductions are evident for both of the age groups considered, the most substantial changes are in the under 25 years group. In 1991, young adults had significantly higher current problem and probable pathological gambling prevalence rates than their older counterparts. No such difference was evident between these two age groups in 1999.

Both males and females have lower prevalence rates in 1999 than they did in 1991. For <u>males</u>, the reduction in <u>current probable pathological gambling</u> prevalence is large and significant statistically. For <u>females</u>, this is the case for <u>current problem gambling</u>. In <u>1991</u>, although males and females had similar <u>current problem gambling</u> prevalence rates, <u>males</u> had significantly higher <u>current probable pathological gambling</u> rates. In <u>1999</u>, the <u>situation is reversed</u>, i.e. there is no gender difference with respect to probable pathological gambling

but males have a significantly higher current problem gambling prevalence rate than females.

As with the <u>current</u> rates, relatively large and statistically significant reductions are apparent for both <u>lifetime</u> problem and probable pathological gambling prevalence (see Table 40).

Table 40:   Comparison of Lifetime Problem and Probable Pathological Gambling Prevalence Estimates from the 1991 and 1999 National Surveys

Selected characteristics		1991 - Lifetime Gambling Status			1999 - Lifetime Gambling Status		
		No problem %	Problem %	Pathological %	No problem %	Problem %	Pathological %
New Zealand		93.1	4.3	2.7	97.0	1.9	1.0
		(92.1 , 93.9)	(3.6 , 5.0)	(2.2 , 3.3)	(96.4 , 97.6)	(1.4 , 2.5)	(0.7 , 1.4)
Age Group	18-24	86.0	9.0	5.0	97.3	2.1	0.6
		(82.3 , 89)	(6.6 , 12.2)	(3.3 , 7.6)	(95.5 , 98.5)	(1.1 , 3.8)	(0.1 , 1.8)
	25-29	89.0	5.0	6.0	95.9	3.0	1.1
		(85.4 , 91.8)	(3.2 , 7.7)	(4.0 , 8.9)	(93.2 , 97.7)	(1.4 , 5.5)	(0.4 , 2.5)
	30-39	93.0	5.0	2.0	95.8	2.6	1.6
		(91.0 , 94.6)	(3.7 , 6.8)	(1.2 , 3.3)	(94.2 , 97.0)	(1.6 , 4.0)	(0.9 , 2.6)
	40-49	96.0	2.0	2.0	96.9	2.1	1.0
		(94.0 , 97.3)	(1.1 , 3.5)	(1.1 , 3.5)	(95.5 , 98.0)	(1.2 , 3.5)	(0.4 , 1.8)
	50-64	96.0	3.0	1.0	97.3	1.3	1.4
		(94.0 , 97.3)	(1.9 , 4.8)	(0.4 , 2.3)	(95.7 , 98.5)	(0.6 , 2.4)	(0.5 , 3.1)
	65+	96.0	2.0	2.0	99.2	0.5	0.2
		(93.7 , 97.5)	(1.0 , 3.8)	(1.0 , 3.8)	(98.4 , 99.7)	(0.2 , 1.2)	(0 , 0.8)
Sex	Male	90.0	6.0	4.0	95.9	2.8	1.2
		(88.3 , 91.5)	(4.9 , 7.4)	(3.1 , 5.2)	(94.8 , 96.8)	(2.0, 3.9)	(0.8 , 1.9)
	Female	96.0	3.0	1.0	98.1	1.1	0.9
		(95.0 , 96.8)	(2.3 , 3.9)	(0.6 , 1.6)	(97.4 , 98.6)	(0.7 , 1.6)	(0.5 , 1.4)
Ethnic Group	European	95.0	3.0	2.0	98.1	1.3	0.6
		(94.1 , 95.8)	(2.4 , 3.7)	(1.5 , 2.6)	(97.6 , 98.4)	(1.0 , 1.7)	(0.4 , 0.9)
	NZ Mäori	84.0	9.0	7.0	92.9	3.6	3.5
		(78.9 , 88.1)	(6.0 , 13.2)	(4.4 , 10.9)	(89.4 , 95.6)	(1.8 , 6.4)	(1.6 , 6.6)
	Pacific Island	69.0	16.0	15.0	89.0	7.8	3.2
		(57.6 , 78.5)	(9.2 , 26.3)	(8.5 , 25.1)	(78.0 , 95.7)	(2.0 , 19.5)	(0.7 , 8.6)
	Asian	89.0	10.0	1.0	97.1	2.9	0
		(78.3 , 94.8)	(4.6 , 20.5)	(0.1 , 11.4)	(92.6 , 99.3)	(0.7 , 7.4)	
	Other	93.0	5.0	2.0	97.9	0.8	1.2
		(85.0 , 96.9)	(1.9 , 12.5)	(0.4 , 8.8)	(92.9 , 99.7)	(0 , 4.7)	(0 , 6.8)

Because the sub-samples of lifetime problem and probable pathological gamblers are larger than their current counterparts, additional age categories and major ethnic groups have been considered. However, in some instances, the confidence intervals are quite wide and differences that appear large are not always statistically significant.

In 1991, relative to other age categories, high prevalence rates were found for people aged less than 25 years and for the next youngest age group, aged 25 to 29 years. In the 'replication' survey, large and significant reductions in both lifetime problem and probable pathological gambling prevalence are evident for people aged under 25 years. This was also the case for lifetime probable pathological gamblers, but not problem gamblers, in the 25 to 29 years age group. In the case of the other age groups, confidence intervals overlapped and the differences in point prevalence estimates were generally smaller. In 1999, the differences in prevalence rates between the two youngest age categories and the older age groups, other than the 65 year and older group, are no longer evident.

In 1991, males had significantly higher lifetime problem and probable pathological gambling rates than females. In 1999, this difference only applied to lifetime problem gambling prevalence rates. For males, both problem and probable pathological gambling prevalence rates were lower in 1999 than in 1991. In the case of females, the problem gambling rate was also lower in 1999 but there was no change in the probable pathological gambling rate.

With respect to ethnicity, for Europeans, both the lifetime problem and probable pathological gambling prevalence rates reduced significantly. For the remaining ethnic groups, while there were reductions in the point prevalence estimates, with one exception the confidence intervals overlapped. It should be noted that no Asian probable pathological gamblers were identified in the 1999 survey.

The differences reported above were not anticipated on the basis of research conducted prior to 1999. However, the findings of the longitudinal follow-up of 1991 survey participants did raise the possibility that prior expectations of an increase in problem and probable pathological gambling might not be corroborated in the present survey. However, it must be cautioned that although a number of the apparent reductions in prevalence reported here are statistically significant, it is possible that both the changes and their significant levels are artefacts of differences in design of the two studies, differential response in some 'at risk' groups (in both surveys), lack of complete design information for the 1991 survey, and demographic changes.

A conservative conclusion is that the findings of the present study and comparison of the 1991 and 1999 prevalence estimates are not consistent with the hypothesis that the prevalences of problem and probable pathological gambling have increased since 1991. Irrespective of whether or not actual prevalence rates have increased, remained the same, or decreased in recent years, it is the view of the authors of this report and external consultants that the 1999 results are likely to provide a more accurate account of gambling and problem gambling in the New Zealand adult population than was provided by the 1991 survey. These matters are considered further in the next chapter.

5. DISCUSSION AND CONCLUSIONS

5.1 Introduction

As indicated in section 1.6, the general aim of this study is to further scientific understanding of the nature of gambling and problem gambling in the New Zealand adult population, particularly with respect to their prevalence. In this latter regard, the key objectives are to provide reliable estimates of the prevalence of a) problem and probable pathological gambling, b) some major categories of gambling participation, and c) weekly participation in the most popular forms of gambling in the adult population.

The study was also designed to provide additional, related information concerning problem gambling and changes in gambling participation and problem gambling since the 1991 national survey. More specifically, with respect to problem gambling, there was particular interest in determining the:

- sociodemographic profile of problem and probable pathological gamblers
- prevalence of problem and probable pathological gambling among a number of different sub-populations
- risk factors for problem and probable pathological gambling
- proportion of people who had gambling problems at some stage in their lives that experience problems currently
- proportion of problem and probable pathological gamblers that recognise that they have a problem.

Finally, a further purpose of the study was to identify sub-groups of gamblers and problem gamblers and recruit people from these groups to participate in a second phase involving examination of various aspects of gambling and problem gambling in greater depth.

Apart from seeking to contribute to scientific understanding, these various matters were addressed with a view to:

- providing a solid baseline to enable future changes in the prevalence of gambling participation and problem gambling to be determined
- assisting in the development of gaming and related health and social policy
- contributing to establishing frameworks for future studies of the prevalence and wider economic and social impacts of gambling and problem gambling.

This concluding chapter critically examines the study with respect to these various aims and objectives and discusses some of the major findings in relation to previous New Zealand and international research.

183

5.2 Estimates of Problem Gambling Prevalence and Gambling Participation in the New Zealand Adult Population

Some Methodological Concerns and Issues

Given the primary objective of establishing reliable estimates of gambling participation and problem gambling, a major imperative was to conduct a sound national probability survey. In this regard, particular emphasis was given to ensuring that a large, representative sample of adult New Zealanders was interviewed, that a high response rate was achieved and that appropriate procedures were used to weight and analyse the survey data.

Sample Size, Design and Implications for the Reliability of Estimates and Statistical Analyses

The great majority of previous gambling and problem gambling prevalence surveys have involved small samples, typically totalling 1,000 to 1,500 participants. Exceptions, other than the present study, include the 1991 New Zealand national survey (Abbott & Volberg, 1991; 1996) and recent national surveys in Sweden (Rönnberg, Volberg & Abbott et al, 1999) and Australia (Productivity Commission, 1999).

One consequence of using small samples is that even prevalence estimates based on the whole sample contain large errors of measurement. Consequently, such estimates have wide confidence intervals and there is considerable uncertainty regarding the precise number of people in the population who participate in particular forms of gambling or who experience problems. There is even greater uncertainty when sub-groups (e.g. gender or ethnic groups) or relationships between variables (e.g. scores on problem gambling measures in relation to participation in particular forms of gambling) are considered. Published accounts of gambling and problem gambling surveys do not always provide confidence intervals for prevalence estimates; those that do rarely provide this information for sub-groups. Consequently these estimates, in some if not most instances, may be meaningless and conclusions based on them invalid.

Two other matters concerning confidence intervals have not, until now, been addressed in the gambling and problem gambling literature. As indicated elsewhere in this report, apart from the recent Swedish national survey, previous general population surveys have been technically complex, involving departures from simple random sampling. However, this complexity has not been taken into account in the determination of confidence intervals or in statistical examination of survey data. Generally, it can be expected that intervals will be wider if correct adjustments are made to take account of design complexity. In the case of some subgroups, this design effect will be considerable. In the absence of such adjustment, it is not known which estimates are reasonably reliable and which are not and, additionally, misleading results can be expected when inferential statistical analyses are conducted. Again, as mentioned previously, when proportions approach zero (as in the case of problem gambling estimates) or one, conventional methods of calculating confidence intervals are inadequate and frequently generate incorrect intervals. In the present study, a variety of methods have been used to take account of both the complexity of the design and small proportions.

Response Rates

The response rate for the survey (75%) is high relative to previous general population gambling and problem gambling surveys, other than the 1998 Swedish national survey that had a similar rate. By way of comparison, the recent United States national survey obtained a response rate of 51 percent (Gerstein et al, 1999). The Australian national survey obtained a rate of 47 percent for the initial 'screener' phase and a participation rate of 92 percent for the second phase when the full questionnaire was administered (Productivity Commission, 1999). Thus, the overall rate for the Australian survey is 43 percent. The response rate for the earlier 1991 New Zealand national survey, measured the same way as the United States and Australia national surveys, was 59 percent (Abbott & Volberg, 1991; 1996).

The authors of the Australian survey concluded that the response rate for their survey is "similar to the best of the surveys that have been carried out in recent times" (Productivity Commission, p. F27). Many published accounts of problem gambling surveys conducted in North America and Australia do not provide response rates (Abbott & Volberg, 1999). However, those that do rarely have rates that exceed 50 percent. The Australian survey response rate is consistent with those of previous surveys in this field and appears to be higher than those of most if not all sub-national Australian surveys.

During the design phase of the present survey, consortium partner Statistics New Zealand advised that that organisation did not consider a response rate below 70 percent would enable reliable population estimates to be determined or meet internal and external audit requirements. Shaffer, Hall & Vander Bilt (1997) also recommend that 70 percent should be the minimum acceptable rate. However, if this rate were adopted as the required standard, apart from the present study and the Swedish national survey, almost all of the extant population prevalence research would fall far short of it. This raises some important issues for the gambling studies field.

One consideration is how can high response rates be achieved? Chapter Three outlines the pilot studies, developmental work and resulting survey procedures that were used in the present study. Procedures used with the intent of maximising the <u>contact</u> rate included:

- making large numbers of calls, when required, to establish contact with households and to achieve interviews with the selected eligible respondent within each household
- calling at times, including weekends and evenings, when people are more likely to be at home
- varying the day of the week and times of the day when call-backs were made
- leaving a gap of a week, if initial call-backs were unsuccessful, before phoning back.

The non-contact rate for the survey was seven percent. This low rate is highly satisfactory. The Australian and Swedish national surveys both attained a rate of 14 percent, which is also low relative to the rates of most other problem gambling surveys.

Procedures used to enhance the <u>participation</u> rate included:

- incorporating the official government statistical agency in the research consortium undertaking the study and having this organisation recruit and interview participants
- cognitively testing and piloting the introduction and interview schedule and making changes prior to the survey to enhance participation and completion of the interview
- using experienced interviewers and providing full training specific to the survey, informed by performance during pilot studies
- ongoing monitoring and auditing of interviewer performance during data collection
- sending pre-notification letters to households with telephone numbers that had been selected for inclusion advising that they would be telephoned shortly and providing information about Statistics New Zealand
- reassuring reluctant respondents that the participation of all people, irrespective of their level of gambling, was wanted
- being flexible in the scheduling of interview times
- providing the option of being interviewed in the respondent's language of choice
- providing the option of a face-to-face interview for people with hearing difficulties or other communication problems.

The combined refusal rate for households and eligible respondents within households was 16 percent. This is a low refusal rate relative to the rates achieved by most previous general population gambling surveys. For example, the comparable rate for the 1991 New Zealand national survey was 34 percent. For the Australian national survey, it appears to be 45 percent, despite a number of procedures having been included to maximise participation.

The response rates for the initial pilot surveys were 54 percent using a selection grid and 56 percent using the next birthday method. Subsequent procedural changes increased the rate to 59 percent for the no letter sample. While considered unsatisfactory by Statistics New Zealand and the principal investigators, these rates are higher than those generally attained. It is likely that the involvement of Statistics New Zealand in data collection added five to ten percent to the rate that would have been achieved by a private survey company or university research team.

As indicated previously, the major factor in further enhancing the rate in one of the pilot studies, the letter sample, (74%) and the national survey (75%) was the addition of the pre-notification letter and information regarding Statistics New Zealand. If high response rates are sought in future studies, serious consideration should be given to the involvement of official statistical agencies and use of pre-notification information. In this regard, it is worth noting that the Swedish national survey involved Statistics Sweden in a similar role to that of Statistics New Zealand. In that study, while the overall response rate was 73 percent, the rate for the portion of the sample contacted by telephone was higher than in New Zealand. The telephone response rate was 77 percent.

Although considerable emphasis was given to attaining a high response rate in the present survey, are high rates really necessary in studies of this type? This is a very important question given the low rates generally achieved and the considerable cost involved in attaining rates in excess of 50 to 55 percent.

Low contact and high refusal rates (resulting in low response rates) are only important if they result in bias in the results. Such bias will arise if people omitted from surveys differ in significant ways from those who are surveyed. In the case of gambling and problem gambling surveys, the most important concern is whether or not non-participants have different gambling participation patterns and rates of problem gambling to those of participants.

It is generally assumed that heavy, continuous gamblers and groups at high risk for problem gambling are over-represented among people who are not contacted or who decline to participate in gambling surveys (Abbott & Volberg, 1999; Lesieur, 1994). This assumption is made because it is considered probable that people who gamble frequently or who have gambling problems are more likely to be out of their house at the time interviewers visit or telephone. Furthermore, if contact is established, it is assumed that they are more likely to decline to be interviewed about a topic they may not wish to discuss. Some evidence supports the view that heavy gamblers and problem gamblers more frequently decline interviews (Abbott & Volberg, 1999). For example, Dickerson, Baron, Hong and Cottrell (1996) found that frequent continuous gamblers more often than non-continuous gamblers terminated interviews and did not agree to proceed to second phase interviews when told that the survey was about gambling.

Germane information is also provided in the Productivity Commission report on the Australian national survey. Findings are cited from a survey of problem gamblers who were receiving counselling from problem gambling support agencies. Approximately a quarter of respondents said they would not have participated in a problem gambling survey prior to seeking help. Although interpreted as supporting differential non-response in the Commission report, this refusal rate does not, in fact, appear to be higher than the rates of most Australian general population surveys.

Many survey reports acknowledge that they may have missed a disproportionate number of problem gamblers and, for this reason, opine that their estimates of problem gambling prevalence are likely to be conservative. However, Abbott and Volberg (1992) noted in relation to the 1991 national survey:

> While it is not possible to provide data about those who refused to take part, anecdotal evidence points to refusals coming both from those who were sensitive about the subject, and also from those who were disinterested because of lack of involvement (p. 75).

Some support for lack of interest on the part of non-gamblers and infrequent gamblers was obtained during the initial pilot studies for the present survey. For this reason interviewers were asked, in the subsequent NPS, to reassure potential interviewees who were hesitant that their participation was sought irrespective of their level of gambling involvement.

From the foregoing, it appears conceivable that people from both ends of the gambling spectrum may typically be under-represented in gambling surveys. In the previous chapter, it was suggested that this was probably the case in the present survey. If the number of people omitted from the two extremes balance, prevalence estimates from surveys with low response rates may not be significantly biased. **However, given the uncertainty about the characteristics of people who are not**

contacted or who decline to participate, it is prudent to attain the highest possible response rate. While high response rates will not totally eliminate bias, the closer they are to 100 percent, the less room there is for differential responding to influence the findings.

Paradoxically, the attainment of high response rates in this survey and the recent Swedish national survey raises a problem. Surveys with high response rates are more likely than surveys with low rates to provide accurate gambling participation and problem gambling prevalence estimates. However, are 'apples' being compared with 'apples' when the findings from such studies are compared with those from other studies that have rarely interviewed more than half of the eligible respondents? This matter is of particular relevance to one of the objectives of the present study, namely the question or whether or not gambling participation patterns and problem gambling prevalence rates have changed since 1991. As indicated, the primary purpose of the 1999 survey is to obtain reliable estimates and provide a sound baseline for future surveys. In achieving this objective, one consequence is some loss of comparability with the earlier national study. Comparison with the findings of other surveys with even lower response rates than the 1991 New Zealand study is similarly compromised.

The 1991 New Zealand national survey attained a response rate of 59 percent; the 1999 survey 75 percent. The critical issue, in the present context, is whether the higher rate was achieved by including proportionately more infrequent, non-problematic gamblers, more frequent and problem gamblers, or more of the same 'mix' that was included in the 1991 sample? If more problem gamblers were included as a consequence of the somewhat different procedures used in 1999 and the survey-determined problem gambling prevalence had been higher, this higher rate could be a consequence of picking up more people with problems. It would <u>not</u> indicate an actual increase in problem gambling prevalence in the population. In fact, there could have been no change in the actual population prevalence or even a decrease. On the other hand, if more non-problem gamblers were included and the survey problem gambling prevalence rate had been higher, the degree of change in population prevalence inferred from the two survey estimates would be less than is actually the case. In fact, as outlined in Chapter Four, the 1999 problem gambling prevalence rates were <u>lower</u> than in 1991. **The unanswered question is whether this reflects a true reduction in the proportion of problem gamblers in the population or is an artefact resulting from the inclusion of relatively more infrequent, non-problem gamblers in 1999.** As indicated above, it is also possible that relatively more problem gamblers were included in 1999 and, if this were the case, the actual reduction in prevalence would be greater than that inferred from comparison of the 1991 and 1999 survey estimates.

Sample Composition

Although a high overall response rate was attained, some groups are under-represented in the national survey. As indicated in Table 7 and discussed briefly earlier, this is particularly so for people aged 18-24 years, Pacific Islanders and Mäori. People aged 65 years and older and Europeans and other ethnicities are somewhat over-represented. This pattern of over- and under-representation is characteristic of social and health surveys conducted in New Zealand and likely reasons for it are discussed in Chapter Three.

Although subsequent weighting of the sample partially corrects for the likely effects of these departures from expected population proportions, one consequence is that prevalence estimates for under-represented groups have lower reliability than would otherwise be the case. Given that these subgroups have lower response rates, there is also increased potential for the type of bias outlined earlier. Weighting does not correct for this form of bias, if it is present. Given that young adults, Mäori and Pacific Islanders had very high problem gambling prevalence rates in the 1991 national survey, bias in these sub-samples could also have a disproportionate effect on the overall population estimates derived from the survey. As discussed, uncertainty prevails in this regard as it is not known whether non-participants are predominantly infrequent gamblers or problem gamblers.

Substantive Findings: Gambling Participation and Expenditure

As outlined in Chapter Four, in 1999 it is estimated that approximately 94 percent of New Zealand adults have participated in at least one type of gambling activity at some stage in their lives. This level of participation is almost identical to lifetime participation rates obtained in the earlier 1991 national survey and the recent Swedish and Australian surveys. It is very similar to rates from recent Canadian provincial surveys and somewhat higher than that of the 1999 United States national survey and most recent state-level surveys conducted in that country.

Past six months participation in at least one form of gambling (86.2%; 85.2-87.2%) and past week participation (40.8%; 39.2-42.4%) is high by international standards. However, only Lotto is participated in weekly or more by a substantial number of adults and approximately three-quarters of regular (weekly or more) gamblers confine their frequent participation to Lotto and/or other non-continuous forms of gambling. The remaining quarter of regular gamblers participate in continuous forms, predominantly purchasing Instant Kiwi tickets, betting on horse and dog races and playing gaming machines. As mentioned at various points in this report, regular continuous gamblers are of particular interest because they have previously been shown to be at high risk for the development of gambling problems (Abbott & Volberg, 1991; 1996; 1999; Productivity Commission, 1999).

The New Zealand regular weekly participation rate of 41 percent is virtually the same as the recent national estimates for adult Australians (40%) and Swedes (42%). However, Australia differs from New Zealand and Sweden in that approximately 20 percent of Australian adults are regular continuous gamblers, double the New Zealand rate. Given that regular continuous gamblers account for a highly disproportionate amount of total gambling expenditure, it is not surprising that Australian adult per capita gambling expenditure is more than double that of New Zealand and Sweden.

Typical monthly gambling expenditure was calculated for survey participants who reported gambling on at least one form of gambling during the six months prior to the survey. In Chapter Four it was shown that in 1999, the average adult reported spending $41 per month on gambling, approximately $500 in the past 12 months. Based on this information, the annual expenditure for New Zealand adults was estimated to be approximately one billion dollars, very similar to the Department of Internal Affairs 1998 actual net expenditure figure for major forms of legal gambling.

189

Although the national expenditure estimate based on self-reports closely corresponds to 'actual' official estimates, this is probably in large part fortuitous in that there are substantial differences in the degree to which survey estimates and official expenditure correspond for the major categories of gambling. Whereas expenditure on horse and dog betting shows close alignment, self reported expenditure on Lotto and other lotteries is much higher than corresponding official expenditure. Estimates of gaming machine and casino gambling expenditure, on the other hand, fall far short of official accounts. This means that if gaming machine and casino gambling had accounted for a larger percentage of total actual net gambling expenditure (as it does in Australia), the overall estimate based on self report information would have been lower than the official total. If Lotto and lotteries had accounted for a larger share of official expenditure (as it did in 1991), the survey-based estimate would have been higher than the official total. In this regard, it is of interest that 1991 national survey reported expenditure was considerably higher than official net gambling expenditure at that time and more similar to official gambling 'turnover'.

Why does the degree of correspondence between self-reported and actual expenditure vary for different categories of gambling? In part this may occur because people vary in their interpretation of questions about gambling expenditure when phrased in the way they were in this survey (Blaszczynski, Dumlao & Lange, 1997). Some people respond by providing accounts of their net expenditure (losses). Others provide accounts of total expenditure, without deducting winnings. It appears likely that the ratio of people who report net expenditure rather than turnover differs for each form gambling. For example, Lotto/lottery estimates may be inflated because most respondents do not take account of winnings, which occur infrequently and are not 'captured' within the timeframe of the question. The timeframe could be expected to be more appropriate for track and sports betting, gaming machines, cards and casino games. Participants in these activities may also be more likely to deduct their session wins and report net expenditure. However, this would probably not explain the difference between track betting and gaming machines/casino gaming with respect to the degree of correspondence with official expenditure. Nor would it account for those forms of gambling where self-reports are much lower than actual expenditure. Additional factors may be important.

In the case of gaming machine and casino gambling, other possible reasons for under-reporting include:

- a belief that net expenditure is less than it actually is
- large losses occurring relatively infrequently and thus being omitted from accounts of 'typical' expenditure in a given timeframe
- reluctance to report accurately because of stigma associated with regular participation or high expenditure on these forms of gambling
- reluctance to disclose high expenditure when other people in the household might be listening

At this stage, it is known that the phrasing of questions can have an effect on expenditure reports and that gamblers, particularly regular and problem gamblers, have a tendency to under-estimate losses and believe that they win more than they lose gambling (Abbott & Volberg, 1999; Abbott, Williams & Volberg, 1999). This latter finding is of potential relevance to public education about gambling and programmes directed at promoting 'responsible gambling'. Apart from preliminary research on the impact of question phrasing and cognitive distortions that are common in relation to some forms of gambling, little is known about the factors that influence self-reports of gambling expenditure. These

factors can be expected to vary across different types of gambling and sociodemographic groups. This topic requires further investigation. In the meantime, caution should be exercised when comparisons are sought between accounts of expenditure across studies, over time or between different gambling activities.

Although not specified as a major or secondary objective of the study, gambling participation and gambling expenditure within particular sociodemographic groups were examined. Given the interest in problem gambling, emphasis was given to determining the sociodemographic characteristics of regular continuous gamblers, people who spend relatively large sums of money on gambling and people who participated in particular forms of gambling within the past six months. In addition, multivariate analyses were conducted in an attempt to control for inter-relationships between a number of the sociodemographic variables. The results of these analyses are outlined in Appendix 4. Although this provides an indication of the fundamentally most important correlates of the more popular forms of gambling, as mentioned earlier, these findings should be treated as preliminary rather than definitive.

As indicated above, average monthly reported gambling expenditure was approximately $41 per month. However, there is considerable variation in expenditure within the adult population. Over half of adults (53%) reported spending small sums on gambling activities, less than $20 per month. This finding is also typical of surveys conducted in other countries. For example, the Swedish national survey found that 58 percent of adults reported this level of expenditure. A smaller percentage, about a quarter of New Zealand adults, said they spent over $40 per month.

Also consistent with previous studies, was the finding that regular continuous gamblers had the highest average expenditure and included a number of people with very high expenditures. Although only ten percent of adults gambled weekly or more on continuous forms of gambling, this group included approximately a third of people who reported spending $40 or more per week. For reasons outlined earlier in this chapter, expenditure estimates for this group are highly conservative. The highest average levels of expenditure were reported for card games, followed by betting on horse and dog races, casino games, housie and 'other sports betting' on the Internet. **Although high expenditure was reported for one category of Internet betting, very small numbers of people reported any form of Internet betting. At this stage, Internet betting is insignificant in terms of participation and expenditure. However, the finding of very high expenditure for those who do participate, suggests that if Internet gambling becomes more popular in the future, it might account for a large proportion of total gambling expenditure and may also play an increasing role in the development of problem gambling.**

With respect to participation and expenditure, some groups were identified that contained relatively large percentages of regular continuous gamblers with high average expenditure. Others had much lower levels of regular involvement and expenditure. A few groups were found to have bimodal distributions, containing relatively large percentages of both high and low participation/expenditure groups. Pacific Islanders, people born in places other than New Zealand, Europe, Australia and North America and people of 'other religions' had participation/expenditure patterns of this type. Many of these people are migrants who are in the process of adapting to life in New Zealand. They may well have been recently introduced to gambling. They also appear to be characterised by considerable gender differences in gambling participation, with higher levels of male involvement.

191

However, the small sample sizes involved preclude meaningful examination of participation within these groups by gender or other sociodemographic variables.

As suggested previously, these bimodal groups are of theoretical interest. It is conceivable that they may be at high risk for the development of gambling problems. This hypothesis is proposed because a significant proportion of people within these groups have high levels of involvement in continuous forms of gambling, are likely to lack prior experience with these forms of gambling, and are exposed to stress associated with acculturation and high levels of unemployment and underemployment (Abbott, 1997). This conjecture requires further examination by more focussed research within these communities. While cross sectional surveys would be of some value in this regard, longitudinal studies that follow recent migrants over time and in-depth qualitative investigations might be more informative.

Pacific Islanders are of particular interest in that, in addition to having a bimodal distribution, this group also has high average expenditure relative to other ethnic groups. This means that the subgroup of Pacific Islanders that gambles regularly has very high expenditure.

Gambling preferences and participants' reasons for gambling were also examined. Approximately three-quarters of people who reported that they had ever gambled indicated that they had a preferred type. Lotto was by far the most popular, followed by betting on horse and dog races, Instant Kiwi and TeleBingo. Regular gamblers, especially regular continuous gamblers, were much more likely to report having a favourite form. Betting on horse or dog races was the form most favoured by regular continuous gamblers, followed by Lotto, Instant Kiwi and gaming machines outside casinos. Gambling preference patterns were generally consistent with reported gambling participation. These findings and the more detailed findings concerning preference differences across sub-populations outlined in Chapter Four, underline the importance of considering gambling as a collection of heterogeneous activities rather than as a unitary phenomenon.

Relatively little research has been undertaken to examine the reasons that lie behind preferences for different forms of gambling and the role that these various forms play in the lives of participants, their families and the wider community (Abbott & Volberg, 1999; Walker, 1992). Apart from being of intrinsic and scientific interest, research of this type has relevance to the gaming industry with respect to product development and marketing as well as to governments and other organisations interested in the costs and benefits of gambling. It is also of potential relevance to prevention programmers and treatment providers.

As in previous gambling surveys, winning money was the reason most often given for gambling. It is interesting that regular non-continuous gamblers more frequently give this reason than other participation groups. A recent review of relevant surveys in the United States found that gambling to win money as a reason for gambling has increased significantly over the past 20 years (Volberg, Toce & Gerstein, 1999). The review also noted that there has been a decline in gambling for excitement/challenge and concluded "Americans in the 1990s appear to be gambling less for entertainment value and more as though gambling were a non-salaried second job, like day-trading or selling real estate" (p. 10). If this is a valid interpretation, it suggests that gambling is playing a different role in peoples' lives. It would be of interest to examine this issue further and to see whether or not it is a trend that is occurring in other countries and whether it applies to some forms of gambling more than others.

Winning money was also the reason given most frequently by regular continuous gamblers for gambling. However, people in this group were much more likely than those in other participation categories to indicate that they gambled for entertainment/fun, for excitement/challenge, to socialise or because it is a hobby or habit. These reasons were also more frequently given by people aged under 35 years. **These findings suggest that continuous forms of gambling play a different part in peoples' lives than do Lotto and other non-continuous gambling activities. They further suggest that these types of gambling link to different motivational bases, are perceived differently and are more deeply embedded within participants' lifestyles and social interactions.**

It was suggested above that the increased pursuit of financial gain by gamblers might mean that gambling is assuming qualities of secondary paid employment. While this may be so and while earning a living is the main reason people give for undertaking paid work, paid employment also serves a variety of other important functions, both manifest and latent (Abbott, 1984). These functions include providing an identity or social status, structure to the waking day, social contacts, links to the wider community, opportunities to acquire new skills and knowledge and challenges of various kinds. It might be worth examining the extent to which involvement in different forms of gambling also meets these and other needs that have traditionally been met by paid employment. The particular needs met by gambling involvement may differ across occupational groups, including groups in the growing sector of the population that is underemployed, unemployed, retired or outside the paid workforce for other reasons. Research on this topic could be expected to assist in treatment planning for problem gamblers or in developing strategies for at-risk or non-problem heavy gamblers who seek to reduce their gambling involvement, for example by assisting in identifying substitute activities for gambling. There is also a need to study gambling in relation to other leisure activities and their role in peoples' lives.

Abbott, Williams & Volberg (1999) found that problem gamblers whose major form of gambling in 1991 was betting on horse and dog races had a much worse prognosis when assessed seven years later than those who were regular gaming machine participants in 1991. It is conceivable that this difference arose because track betting is much more deeply enmeshed in regular participants' lives than is the case for gaming machine participation. In any event, this finding highlights the potential value in examining the meaning of different forms of gambling for people and the role that these various forms play in their personal and social lives.

Substantive Findings: Problem Gambling

Conceptual and methodological issues relating to the definition and measurement of problem gambling are addressed in Chapter One and discussed further in relation to the survey findings in Chapter Four. Findings from previous relevant surveys are summarised and discussed in Chapter Two. More detailed examination of these various matters is provided in Abbott & Volberg (1999).

How Reliable are the Estimates?

The 1999 probable pathological and problem gambling prevalence estimates based on SOGS-R performance are provided in Chapter Four. How reliable are these estimates? This is a simple question to ask but a difficult one to answer definitively.

Some discussion of matters relevant to this issue is provided in Chapter Four. Sample size and response rates have been discussed earlier in the present chapter. It was noted that, relative to previous surveys, the sample size is large and the response rate appears to be the highest attained to date. In contrast to previous surveys, the present study is unique in that it includes special procedures to take account of the complex sample design and adjust for the confidence intervals associated with low proportions. For these and other reasons, it appears that this and the Swedish national survey are the most sound probability surveys of problem gambling prevalence undertaken internationally. This said, it should be appreciated that the confidence intervals surrounding the prevalence estimates remain relatively wide. For example, the 95 percent confidence interval surrounding the current probable pathological gambling estimate means that the number of such people could be as low as 7,300 or as high as 20,100. To significantly reduce the width of these confidence intervals would necessitate a substantial increase in the sample size. The cost of doing this would be prohibitive.

However, the issue of reliability does not stop here. Other matters to consider include:

- the characteristics of people within the population that were not included in the sample frame
- the characteristics of the 25 percent of the sample that either could not be contacted or declined to be interviewed
- the adequacy of the SOGS-R that was used to measure problem and probable pathological gambling
- additional information that has a bearing on the likely validity of the estimates.

Although some discussion of these matters has been provided at various points throughout this report, given the importance of this issue, this prior discussion is drawn together here and examined in relation to additional relevant considerations.

As outlined in Chapter Three, the target population did not include institutional populations such as old persons' homes, hospitals and psychiatric institutions and prisons.

People aged 65 years and older living in the community generally have very low problem gambling prevalence rates and it would be reasonable to assume that this is also the case for the sector of the elderly population that resides in institutions. There appears to be no reason to believe that people who are in-patients in general hospitals would have higher rates of problem gambling than those living in the community. Given that older people are more likely to be in hospital, rates are probably lower. Consequently, inclusion of these groups in a general population survey would reduce the overall prevalence estimates and add a negligible number of problem and probable pathological gamblers to the total count.

The prison population, on the other hand, can be expected to have a high prevalence of problem gambling, perhaps five to ten times that of the general adult population (Abbott & Volberg, 1999). The prison population in New Zealand is approximately 6,000. If it is conservatively assumed that five percent are current probable pathological gamblers and ten percent are current problem gamblers, this would add somewhere in the vicinity of 300 additional probable pathological gamblers and 600 problem gamblers to the respective population estimates. A small number of pathological gamblers, often with co-morbid alcohol or drug dependence, reside in specialist residential treatment programmes such as Odyssey House. While very few if any psychiatric in-patients have a primary diagnosis of pathological gambling, it is known that many people with alcohol or other drug

dependencies also experience gambling problems of varying severity. People suffering from some other forms of mental disorder also have elevated rates of problem and pathological gambling (Abbott & Volberg, 1999). The great majority of people who experience substance dependency or misuse or who have other mental disorders are not institutionalised. However, it is probable that those who are living in institutional situations will have a relatively high rate of problem and pathological gambling (Abbott & Volberg, 1999: Shaffer, Hall & Vander Bilt, 1997). Inclusion of this sector of the population might add another 100 to 200 current probable pathological gamblers and 200 to 400 current problem gamblers to the total.

Although some of the excluded groups are likely to contain a disproportionately large number of problematic gamblers, because the groups are very small in relation to the entire adult population, their inclusion would make relatively little difference to the general population prevalence estimates. For example, with respect to current probable pathological gamblers, the total number might shift from an estimate of 7,300-20,100 to 7,700-20,700.

Because the present survey is a study of adult problem gambling, people under the age of 18 years are excluded. Previous research on youth, including the recent Swedish national survey that included 15 to 17-year-olds, has indicated that this group has a high problem rate (Abbott & Volberg, 1999). For example, the Swedish current problem gambling prevalence rate for people aged 15-17 years was more than double that of the highest prevalence adult age group. Current probable pathological gambling rates for these two groups were more similar. If this were also the case in New Zealand, the inclusion of younger adolescents would increase the overall prevalence estimates.

However, contrary to the findings of previous problem gambling surveys where older adolescents and young adults generally have high rates, in the 1999 NPS the prevalence rates for the 18 to 24 year age group were not higher than those for adults aged over 24 years. This raises the possibility that younger New Zealand adolescents do not have elevated problem gambling rates either and that their inclusion, while adding to the total number of problem and probable pathological gamblers, would make little difference to overall prevalence <u>rate</u> estimates.

The Swedish study suggests that young people are much more likely than older adolescents and adults generally to have problems that fall short of the diagnostic threshold for pathological gambling. As might be expected, most appear to be in the early stages of problem development. To date, there has been no prevalence research on problem gambling among children and young adolescents in New Zealand or Australia. Apart from determining the extent of gambling problems in this sector of the population, research with young people could be expected to shed light on how problem gambling develops, how it relates to other risk-taking activities including substance use and misuse, how it influences school performance and transition to adulthood. Longitudinal studies could examine change over time. It is not known what percentage of young people who experience problems progress to pathological gambling or what percentage overcome their problems and how this is accomplished.

In addition to the groups discussed to this point, some additional sectors of the adult population were not included in the NPS-1 sample frame. The methodology used excludes persons who do not live in households with a telephone for private use, people with unlisted numbers and people who live in military barracks, as well as some other small groups such as those living on offshore islands.

People in military barracks may be at-risk for problem gambling given the age, gender and ethnic profile of this sub-population and the possibility that military cultures foster gambling involvement. The literature review (Abbott & Volberg, 1999) did not locate studies of this group. While prevalence rates might be elevated for people resident in military barracks, the size of this group is very small in New Zealand and even a high rate would have a minuscule impact on overall prevalence estimates. While of little significance in a national population context, it might be expected that military authorities and military health and welfare staff would have an interest in undertaking prevalence studies of this and other sectors of the armed forces.

Telephone ownership is high in New Zealand. According to the 1996 Population Census, 96 percent of people aged 18 years and over live in households with a telephone. Although high overall, the percentages are lower for Mäori (86%) and Pacific Islanders (84%), two groups that were found in both the 1991 and present national surveys to have high prevalence rates.

Approximately 13 percent of New Zealand households have unlisted white page directory numbers. Although use of the most up-to-date electronic directories included people with recently activated numbers, those with unlisted numbers were not included in study.

People Who Could Not be Contacted

As mentioned and discussed above, in addition to the groups that were outside the sample frame, no contact was established with seven percent of households selected and a further 16 percent of people contacted declined to be interviewed.

The critical question is whether the five percent of people without telephone access, eight percent of people omitted from electronic directory listings, seven percent that could not be contacted and 16 percent who declined to be interviewed differ in significant ways from those who were interviewed.

The last two groups were considered in this regard earlier in this chapter. Some additional relevant information was provided in the 1996 North Health problem gambling survey that was summarised in Chapter Three. The initial 'upper bound' response rate for this survey was 46 percent. The combined lifetime problem and probable pathological gambling estimate was 4.2 percent and the current probable pathological gambling estimate was 0.35 percent. Efforts were subsequently made to increase the response rate by making additional callbacks to homes that had not been contacted and by asking people who had declined an interview to reconsider. These procedures lifted the response rate to 62 percent. The combined lifetime problem and probable pathological gambling prevalence rate and current probable pathological gambling rate (4.1% and 0.44% respectively) were effectively unchanged.

While the North Health findings suggest that increasing the response rate does not alter prevalence estimates, it remains unknown whether or not the same result would be achieved if the response rate for the 1999 survey had been raised by a similar amount, i.e. from 75 to 91 percent. It is conceivable that people who are most difficult to contact or who are adamant that they do not wish to take part differ with respect to their gambling involvement from those who can be contacted with additional effort or who agree to change their mind about being interviewed.

The Swedish national study also provides information that is relevant to this matter. Brief mention was made of this in Chapter Four. The Swedish study is unique in that it employed a true, simple random sample of Swedish adults and adolescents. This was possible because, in Sweden, up-to-date registers with contact details are maintained for the entire population. Telephone contact was possible with approximately 90 percent of the sample and telephone interviews were conducted with the large majority of these people. Those who were not included in telephone directories, who did not answer their telephones despite large numbers of callbacks or who had had their telephone disconnected were sent mailed versions of the telephone questionnaire. A previous pilot study had administered the same questionnaire in both self-completion postal and telephone interview formats to a random sample of 2,000 people (Abbott, Rönnberg & Volberg, 1997). Half received the postal questionnaire and half were interviewed by telephone. High response rates were achieved for both formats and no difference was found in problem gambling prevalence. Consequently, it is reasonable to conclude that if a difference were found in the prevalence estimates for the different presentations in the subsequent national survey, this difference would indicate an actual difference rather than an artefact of the methodology.

What was found in the Swedish national survey? As mentioned earlier, in the lifetime condition, prevalence rates for both problem and probable pathological gambling were approximately double for the postal questionnaire sub-sample. The current prevalence estimates for this sub-sample were approximately three times higher than they were for those who had been interviewed by telephone.

The Swedish study is of particular interest in that it obtained responses from people who are not accounted for in other studies, including the New Zealand survey. The findings suggest that these omitted groups do have a higher prevalence of problem and probable pathological gambling than those included in previous surveys and that the estimates derived from these surveys are, as a consequence, conservative. However, the response rate for the postal questionnaire respondents, on this occasion, was substantially lower than that of the telephone interview participants. It is not known whether the residual group of non-respondents was similar to those who did respond. Future studies may be able to partially address this matter by utilising face-to-face interviews as well as postal questionnaires in the follow-up of people who cannot be contacted by telephone. However, no matter how assertive and exhaustive these efforts are, a residual group of people who cannot be located or who refuse to be interviewed will remain.

On the balance of probabilities, it seems reasonable to conclude that people who do not have telephones, have telephones that have been disconnected, have unlisted numbers or who are continually not available when called, have a higher probability of being problem gamblers than those who can be readily contacted. There is less certainty about people who decline to be interviewed. At this stage, there is insufficient information to quantify the likely effects of the omission of these groups from the present survey or previous surveys. However, had they been included in the NPS-1, it is assumed that the prevalence rate would have been somewhat higher.

SOGS-R

In the present survey, as in most surveys conducted internationally in recent years, problem and probable pathological gambling are measured by the revised version of the South Oaks Gambling Screen (SOGS-R). As explained earlier in this report, this screen differs from the original SOGS in that the 20 'clinical questions' are presented in both lifetime (ever experienced) and current (experienced in the past 6 or 12 months) formats. Although this measure has some shortcomings, which are discussed in Chapter Two and in Abbott and Volberg (1999), it remains the preferred instrument and has been used in three of the four recent national surveys. It is also being used in a British national survey and a second U.S. national survey, both of which will be completed in 2000.

Both the original and revised SOGS have been shown to have high reliability and concurrent validity (Abbott & Volberg, 1999). More specifically, the measures have high internal consistency and people obtain similar scores when re-tested after a gap of a few days or weeks. The original SOGS and lifetime version of the SOGS-R have been shown to be very good at detecting serious gambling problems among people who have been independently diagnosed as pathological gamblers.

As mentioned previously, the term 'probable pathological gambler' is used to distinguish people identified on the basis of their scores on screening instruments such as the SOGS-R from people diagnosed on the basis of clinical assessments conducted by mental health professionals. While a high score on the SOGS means that the individual so assessed will probably be diagnosed as a pathological gambler when examined clinically, and that a person with a low score will probably not be, correspondence between the two classification methods (one psychometric and one clinical) is less than one hundred percent.   To complicate matters, the degree of correspondence is not constant but changes from one setting to another.   In large part this variation is a consequence of changing base rates - i.e. the proportion of pathological gamblers in the population being assessed.

In some clinical contexts, for example an alcohol or drug treatment centre, base rates are high and people who are assessed on the basis of their SOGS scores as being probable pathological gamblers have a high probability of being pathological gamblers (true positives). Similarly, people with low scores in this setting have a high probability of not being pathological gamblers (true negatives). This means that the SOGS produces very few false positives - people who are classified on the basis of a SOGS score of five or more as probable pathological gamblers but who are not so diagnosed following independent clinical assessment. It also means that it generates very few false negatives - people who are classified on the basis of a SOGS score of less than five as not being probable pathological gamblers who are diagnosed as a pathological gambler following independent clinical assessment. It should be noted that high rates of false negatives could be expected in some clinical contexts, for example in an assessment centre that takes large numbers of compulsory referrals of suspected problem gamblers from work settings where a diagnosis of pathological gambling had negative consequences for employees.

In the general population, the pathological gambling base rate is very low. It has been well established from epidemiological studies of many different physical and mental disorders, that when clinically derived screens are used in general population surveys, their accuracy diminishes. This happens because the number of false positives increases, often greatly. In other words, many people who do not have the problem under investigation are incorrectly classified on the basis of their screen scores as having it. This has important implications for prevalence estimates.   It means that estimates are likely to greatly

overstate the extent of the problem. It has been argued that when the cut-off score derived from the original clinical validation of the SOGS is used in general population surveys, prevalence estimates may be inflated four- to five-fold (Dickerson, 1993; Walker & Dickerson, 1996).

Although increased numbers of false positives are present in general population surveys they do not necessarily, however, lead to overestimation of prevalence rates. As mentioned briefly earlier in this report, increased false positives will only have this effect if they are not balanced by increased numbers of false negatives - people with the problem being investigated who are incorrectly classified on the basis of their screen scores as not having it. Whether or not a screen such as the SOGS or SOGS-R is biased towards overestimation or underestimation will depend on its sensitivity, specificity and the prevalence rate in the population under scrutiny. Gambino (1997) has considered the performance of the SOGS in this regard. He explains:

> The argument that the SOGS overestimates prevalence because it generates excess false positives represents an incomplete logical mode. While false positives are a necessary condition for overestimation, they are not a sufficient condition. It must also be the case that false negatives are not equal to or greater than the number of false positives (p. 346).

Dickerson (1993) assumes that false negative rates do not increase in general population surveys. However, this is an improbable assumption. One reason is that in the initial validation of the SOGS and in most clinical situations, the pathological gamblers involved have generally acknowledged that they have a gambling problem and are thus unlikely to deny their problems when administered the SOGS. However, in general population surveys, the great majority of problem gamblers who are assessed will not be receiving treatment and relatively more will have less severe problems than those who seek help from treatment or counselling centres. It is expected that many of these people will not be aware that they have significant problems and that some will either deny their problems or not report them to interviewers. These people will be false negatives. Abbott and Volberg (1999) and Abbott, Williams and Volberg (1999) show how even quite low false negative rates can have a large impact on prevalence estimates and counteract higher rates of false positives.

Some support for the view that problem gamblers will under-report problems in population surveys is provided by the findings of the survey of problem gamblers receiving counselling that was referred to earlier (Productivity Commission, 1999). In addition to the 24 percent who said they would have refused to take part in a gambling survey prior to receiving counselling, 19 percent said they would have mostly or completely concealed any gambling problems. A further 14 percent said they would have concealed their problems somewhat. Less than one percent said they would have exaggerated their problems.

With the partial exception of Abbott and Volberg (1992), no general population problem gambling prevalence study has addressed, from an empirical base, the issue of false positives and false negatives in relation to the accuracy of prevalence estimates. Thus it is not known with any certainty whether the use of the SOGS or SOGS-R for this purpose leads to over or underestimates. Two approaches are available to examine this issue, namely:

- correcting for bias by using estimates of false negative and false positive error rates
- using a two-stage (double sampling) design where respondents are tested twice by separate measures and in which the second assessment (e.g. clinical diagnosis) is considered to be more accurate than the first.

An alternative is to abandon the use of screening tests and clinically interview all survey participants. This approach has been used once in the gambling studies field, in Spain, where it generated a prevalence rate consistent with those obtained in Spain and elsewhere by the SOGS, SOGS-R and other problem gambling screening measures (Abbott & Volberg, 1999). A further alternative, mentioned earlier in this report, is to assume that clinical diagnoses are not necessarily more valid than psychometric measures and that both 'measure what they measure'.

With respect to the first approach, that of using statistical procedures to correct bias, Gambino (1997) derived false positive and false negative estimates for the first problem gambling prevalence survey that used the SOGS (Volberg & Steadman, 1988) from sensitivity and specificity data collected by Lesieur and Blume (1987). Using these estimates, Gambino showed that the original prevalence estimate for Volberg and Steadman's study was unbiased. However, if the confidence interval for the revised estimate is considered, it appears that the original prevalence rate could have either under- or over-estimated the true prevalence by up to 50 percent.

As indicated earlier in this report, Abbott & Volberg (1992) used the second procedure as a part of the 1991 national survey. However the phase two assessments were not conducted with representative sub-samples of all phase one participants. Furthermore, although they used rating scales based on psychiatric diagnostic criteria for pathological gambling, the phase two assessments were not conducted by experienced clinicians and the inter-rater reliability of the interviewers was not determined. Consequently, it is not known whether the second phase assessment is a more accurate measure of pathological gambling than that provided by the phase one SOGS-R assessment.

Gambino (in press) has also examined the Abbott and Volberg (1992) data. With respect to lifetime SOGS-R, Gambino arrived at the same lifetime probable pathological gambling prevalence as Abbott and Volberg did, namely 2.7 percent. This result came about because the rate of false positives was balanced by the rate of false negatives. However, the revised current prevalence estimate was 6.4 percent, more than five times higher than Abbott and Volberg's original estimate. This result reflected the large number of false negatives produced by the current SOGS-R. Abbott and Volberg (1992; 1996) had previously expressed concern about the high number of false negatives produced by their new current measure. It was this concern that led most subsequent investigators to extend the timeframe of the current SOGS-R from six to 12 months. However, as mentioned earlier, the effect of this extension has not been assessed.

Abbott and Volberg (in press) provide reasons why they consider that Gambino's revised current estimate for the 1991 national survey is likely to be inflated and incorrect. A major reason is that the interviewer ratings, like DSM diagnoses, do not have a timeframe. This means they are probably more a lifetime measure than a measure of present problems. Consequently, the current SOGS-R cannot be expected to serve as a proxy for a lifetime clinical assessment. If problem gambling was invariably a chronic, lifelong disorder (as is implicit in the DSM conceptualisation of pathological gambling) it could be expected to

serve as such a proxy. However, the fact that about a half of SOGS-R <u>lifetime</u> probable pathological gamblers do not score within the pathological range on the <u>current</u> (6 or 12 month version), indicates that many people with gambling problems cease to experience them over time.

Longitudinal research (Abbott, Williams & Volberg, 1999) that was mentioned briefly before and will be discussed shortly, suggests that there is even greater change over time in problem gambling status than is implied by differences in SOGS-R lifetime and current performance. In contrast to the situation with the current SOGS, Abbott and Volberg conclude that Gambino's lifetime estimate is more likely to be valid, albeit that some uncertainty remains due to methodological shortcomings in their 1992 phase two study. If the lifetime prevalence estimate is valid, it is not logically possible for the current rate to exceed the lifetime rate.

To this point, it appears that the original SOGS and <u>lifetime</u> version of the SOGS-R do not produce grossly inflated prevalence estimates when used in general population surveys, at least in the United States and New Zealand. It is tentatively concluded that errors, if they occur, are in the direction of modest under- or overestimation. More uncertainty prevails with respect to the <u>current</u> SOGS. It may produce more false negatives and thus underestimate prevalence as Gambino maintains. However, until a more accurate current measure than the current SOGS-R is developed and examined in relation to the SOGS-R in community settings, this cannot be determined.

'Seven Years On'

Reference has been made to the longitudinal study that forms part of the NZGS research programme. Some of the findings from this study have important implications for interpretation of SOGS-R performance and the determination of prevalence estimates. The longitudinal study involved following up and reassessing, seven years later, the majority of 1991 national survey <u>phase</u> <u>two</u> respondents. In 1991, approximately half of these people were classified on the basis of their SOGS-R performance as lifetime problem or probable pathological gamblers. The remainder consisted of regular continuous or non-continuous gamblers who had not experienced significant gambling problems.

Until Abbott, Williams and Volberg's (1999) study, it had been assumed that the difference between lifetime and current SOGS-R rates of problem and probable pathological gambling (the 'conversion rate') provided an index of recovery from problem gambling over time. The 1999 survey described and discussed in the present report, as well as other surveys that have used the SOGS-R, have consistently found that between a third and a half of respondents who are lifetime probable pathological gamblers do not score as current probable pathological gamblers.

The longitudinal survey found that nearly three-quarters of the 1991 <u>lifetime</u> probable pathological gamblers no longer scored within this range when reassessed seven years later using the same <u>lifetime</u> measure**. In other words, most probable pathological gamblers significantly under-report their past gambling problems, especially those who no longer currently experience such problems.** This means that while the lifetime SOGS-R measure has good stability (reliability) over a short timeframe, it is highly unstable when the re-test time interval is stretched to seven years. In other words, it

cannot be regarded as a valid measure of the actual number of people who have <u>ever</u> experienced serious gambling problems during their entire lifetimes.

A number of implications of the finding of lifetime SOGS-R instability, some of which are important for the interpretation of past studies and the conduct of future gambling research, are discussed in Abbott, Williams and Volberg (1999**). In the present context it is evident that retrospective accounts do not provide a reliable measure of problem gambling that took place some years in the past.** If accurate estimates of <u>lifetime</u> problem gambling prevalence are sought, it will be necessary to conduct repeat general population surveys, ideally at two to four year intervals. By combining such surveys with longitudinal studies, it will also be possible to more fully examine reasons for apparent stability or change over time and calculate incidence as well as prevalence estimates**. Also relevant to the present discussion, it can be inferred that the NPS-1 <u>lifetime</u> prevalence estimates based on SOGS-R performance (and presumably estimates from other studies conducted to date) are highly conservative**.

The extent of under-reporting of past lifetime problem gambling that was evident when the lifetime SOGS-R was repeated seven years later makes it likely that the 1991 SOGS-R lifetime probable pathological gambling estimate is no more than half the true rate. If the true rate is double or more than double the estimated rate, it follows that the degree of problem reduction inferred from the 1999 lifetime-current prevalence difference is similarly greatly underestimated. **This means that while the experience of problem gambling may be more common than implied by past surveys, its typical duration is probably shorter than has previously been considered to be the case. This conclusion requires further examination in different populations before it can be regarded as definitive. However, Abbott, Williams and Volberg's (1999) findings further suggest that people with more severe gambling problems are less likely to overcome their problems than those with less severe problems. Additionally, when they do overcome their gambling problems, they have a high probability of either developing or continuing to experience alcohol-related problems.**

Other Information

Although the SOGS-R was used as the primary measure of problem gambling in the NPS-1 and provides the basis for estimating problem and probable pathological gambling prevalence, collateral sources of information assist in examining the likely validity of the SOGS-R based prevalence estimates. This information is also of interest in its own right. In addition to the SOGS-R aggregate measures, a number of other questions included in the NPS-1 also have direct relevance to gauging the extent of gambling-related problems in New Zealand. Specifically, participants were asked:

- If they had ever felt nervous about the amount of money they gambled
- Whether they personally considered that they had a problem with gambling (currently and/or in the past)
- If they had ever wanted help to stop gambling
- Whether they had ever tried to get help to stop gambling
- Whether they think someone else in their life has a problem with gambling.

Seven percent of adults reported that they had at some stage felt nervous about the amount of money they gambled, just over double the number that scored as a problem or

probable pathological gambler on the lifetime SOGS-R. One-point-six percent indicated that they considered that they had had a problem with gambling in the past and 0.5 percent that they had a problem currently. **The lifetime self-rated problem percentage of 1.6 percent is a little higher than the SOGS-R lifetime probable pathological gambling estimate. The percentage that indicated that they currently have a problem is identical to the SOGS-R derived current probable pathological gambling prevalence estimate**.

It would seem reasonable to expect that people who experience gambling problems are likely to feel anxious about the amount of money they gamble. However it is also probable that many, perhaps most people who worry about their gambling expenditure, do not experience or subsequently develop significant problems. Thus, the finding that around twice as many people report feeling anxious than score as lifetime problem or probable pathological gamblers is not unexpected.

Little is known about how people decide whether or not they have a gambling problem and how self assessments of this type correspond to problem gambling assessed by a clinician. Self-assessed problems probably cover a wide range of severity. However, the findings of the NPS-1 and some other studies that have examined this matter indicate that there is a moderate to high degree of overlap between performance on this self-rating item and aggregate SOGS-R scores. For example, in the NZGS longitudinal study, of 16 participants who acknowledged that they currently or in the past had a problem, nine were SOGS-R defined lifetime probable pathological gamblers and four were lifetime problem gamblers. Only one was not a SOGS-R defined problem or probable pathological gambler. **This suggests that most people who consider that they, themselves, have problems, do have significant problems when assessed psychometrically. However, given that relatively more SOGS-R defined lifetime probable pathological gamblers did <u>not</u> indicate that they considered themselves to have had a gambling problem, it appears that self-assessments of this type will yield a conservative index of problem gambling prevalence within the community.**

Wanting help to stop gambling is likely to be a more adequate marker of having serious gambling problems than feeling anxious about the amount of money gambled or self-assessment as having a problem. **It is of interest that the percentage of adults indicating that they had at some stage wanted help to stop gambling (1%) is the same as the NPS-1 SOGS-R lifetime probable pathological gambling point prevalence estimate.**
Self-reports of actually trying to get help to stop gambling may be regarded as another indicator of the presence of more serious gambling problems, albeit a highly conservative one. For example, none of the lifetime problem or probable pathological gamblers in Abbott, Williams and Volberg's (1999) longitudinal study reported having ever sought or received professional care or support from a mutual assistance organisation such as GA. **In the NPS-1, 0.4 percent of adults said that at some stage in their lives they had tried to get help to stop gambling, 40 percent of those who said they had wanted this type of assistance.** This represents approximately 9,500 people, about 1,000 more than have actually contacted specialist professional assistance from the national gambling help-line and counselling services since they commenced in the early 1990s.

Participants were also asked to assess problem gambling among family members and others in their social networks. Nearly four percent said they thought that their father may currently be experiencing, or have experienced, a gambling problem. One-point-five

percent indicated likewise for their mother. These percentages are higher than participant self-ratings of their own problems or SOGS-R determined prevalence estimates. This may mean that their parents actually experience higher problem gambling prevalence rates. While this is possible, it does not seem likely. Alternatively, people may be more able or willing to recognise and/or report other peoples' problem gambling than their own. It would be helpful to know more about the criteria members of the general population use when deciding whether they or people of their acquaintance have problems and how their assessments compare with clinical diagnoses and psychometric measures.

From the foregoing, it seems reasonable to conclude that the NPS-1 problem and probable pathological gambling estimates are unlikely to over-estimate the extent of problem gambling in the community. On the contrary, for a variety of other reasons discussed earlier in this chapter, it is concluded that they are very probably under-estimates. The degree of under-estimation is uncertain. This matter has also been considered in relation to the recent Australian national survey (Productivity Commission, 1999). The authors of that report concluded that their current (12 month) estimate could be less than half the actual rate. This could also be the case for the NPS-1 <u>current</u> prevalence estimates.

The findings of the NZGS longitudinal study suggest that the NPS-1 <u>lifetime</u> estimates may be even more conservative than the current estimates. Indeed, it could be argued that the SOGS and lifetime SOGS-R provide a better measure of current prevalence than they do of lifetime prevalence. In any event, the longitudinal findings and related discussion in the present report raise serious doubts about the validity of any estimate of lifetime prevalence that is based exclusively on retrospective participant reports. It may be advisable to cease referring to this component of the SOGS-R as a 'lifetime' measure. As mentioned earlier, if information is sought on changing prevalence rates over time, more accurate and meaningful data will be provided by repeat (replication) surveys using well validated current measures. If greater understanding of change within individuals is the focus of concern or if there is interest in estimating incidence rates, then longitudinal studies are necessary.

The Swedish National Study

Comparison of the findings of the NPS-1 and the recent Swedish national survey is of considerable interest because they used comparable methodologies, were undertaken by official governmental statistical agencies, used large national samples and attained high response rates. Both countries have a wide variety of forms of legalised gambling and similar per capita gambling expenditure.

As indicated in Chapter Four, the 1999 New Zealand and Swedish current probable pathological gambling point prevalence estimates (0.5% and 0.6% respectively) are effectively the same. However, the New Zealand lifetime probable pathological gambling point estimate of one percent is somewhat lower than the corresponding Swedish estimate of 1.5 percent. Given that the New Zealand study used a six month timeframe for the SOGS-R and the Swedish study used as 12 month frame, it is possible that the NPS-1 current prevalence estimate may have been a little higher had a 12 month frame been employed. However, the sizes of the differences between the current and 'lifetime' rates in both countries are consistent with the findings of many other studies. This suggests that little if any difference results from using 12 rather than six month frames.

The problem gambling estimates (SOGS-R scores of 3 or 4) were slightly higher in Sweden than New Zealand. Given the methodological similarities between the two studies, it is possible that Sweden might actually have slightly higher problem gambling rates than New Zealand. However, it seems more likely that the inclusion in the Swedish study of some people from groups that were excluded from the NPS-1, e.g. people who could not be contacted by telephone, accounted for this difference.

As indicated in Chapter Four, the probable pathological and problem gambling prevalence estimates from the New Zealand and Swedish national surveys are low relative to those of the most recent state and provincial surveys in North America. Shaffer, Hall and Vander Bilt (1997) found that the average current probable pathological gambling prevalence estimate for North American surveys conducted between 1987 and 1997 was 1.1 percent. The average current problem gambling estimate was 2.8. The great majority of these studies used the SOGS-R that was developed for the 1991 New Zealand national survey. These average rates are approximately double those of the recent New Zealand and Swedish surveys. While this suggests that there are lower levels of problem gambling in New Zealand and Sweden, caution is required when making comparisons across studies of widely variable quality conducted in different countries. However, the studies summarised in Figures 6 and 7 all used the SOGS-R and Shaffer, Hall and Vander Bilt's (1997) meta-analysis concluded that variation in methodological quality did not have an influence on prevalence estimates in North America.

The Australian Productivity Commission Study

Comparison with the findings of the recent Australian national survey is also of interest given the similarities and differences between the two countries in terms of gambling history and current participation and expenditure.

As mentioned in Chapter Four, the Australian survey did not include a lifetime measure but did use a current (12 month) adaptation of the SOGS. There are some other differences between the Australian survey and its New Zealand and Swedish counterparts that could compromise comparison of their respective findings. The low Australian response rate has already been noted. It is uncertain what effect this difference had. The Australian survey also differed in that not all sectors of the adult population were interviewed. As the authors of the Australian survey acknowledge, this is likely to result in conservative prevalence estimates (Productivity Commission, 1999). The Productivity Commission study also used different cut-off scores for the current SOGS measure and procedures for determining prevalence estimates. However, estimates were also calculated in the conventional way to facilitate comparison with the findings of studies undertaken in other parts of the world, including Sweden and New Zealand.

Earlier it was noted that both the New Zealand and Swedish current probable pathological gambling prevalence estimates (0.5% and 0.6%) are substantially lower than the Australian national estimate (2.1%). However, it should also be noted that there is wide variation between prevalence estimates for the various Australian states and territories. Although the sample sizes for these sub-national jurisdictions are small and the confidence intervals associated with the point estimates wide, there was a moderately strong relationship between jurisdictional adult per capita gambling expenditure and current probable pathological gambling prevalence. Similar relationships with per capita expenditure were found for both participant self-ratings of gambling problems and help seeking from specialist counselling agencies.

With respect to current probable pathological gambling, the highest point prevalence estimates were obtained in the states with the highest gambling expenditure, namely New South Wales (2.5%) and Victoria (2.1%), both of which have adult per capita gambling expenditure in excess of A$800 per annum. The lowest prevalence estimates were obtained in states with the lowest gambling expenditure, namely Western Australia (0.7%) and Tasmania (0.4%). These states have annual adult per capita gambling expenditure of less than A$400, a little higher than that of both New Zealand and Sweden. The probable pathological rates for Western Australia and Tasmania are very similar to those obtained in the New Zealand and Swedish national surveys. Thus, there appears to be some consistency in the findings of these various studies.

5.3 Sociodemographic Characteristics of Problem Gamblers and Problem Gambling Prevalence Estimates for Sub-populations

As outlined in Chapter Four, multivariate analyses established that problem and probable pathological gamblers had similar sociodemographic profiles. For this reason, and to provide a larger sample and boost statistical power, these two groups were combined in a number of analyses that compared problem and probable pathological gamblers with non-problem gamblers.

From the contingency table analyses summarised in Chapter Four, it is evident that relative to non-problem gamblers, the lifetime problem and probable pathological gambler population contains significantly more males, Mäori and Pacific Islanders, people aged 25-34 years, people living in households of five or more and Auckland residents. It contains significantly fewer women, Europeans, people aged 65 years or more, people living in households of one or two people and people living in parts of the country other than Auckland or Christchurch. People born in countries other than New Zealand, Europe, Australia and North America were also found to be somewhat over-represented in the problem group and those born in Europe, Australia and North America somewhat under-represented, although these differences were of marginal statistical significance.

Relative to non-problem gamblers, the current problem and probable pathological gambler population contains significantly more Mäori and Pacific Islanders, people with vocational or trade qualifications and people in paid employment. Auckland and Christchurch residents were also somewhat over-represented, as were people born outside New Zealand, Europe, Australia and North America. It contains significantly fewer Europeans and Asians, people with school qualifications only and people with degrees or higher qualifications, and people who are unemployed or not in the labour force. People born in Europe, Australia and North America are also somewhat underrepresented.

Comparison of the composition of lifetime and current problem and probable pathological populations is of interest. This is because while acknowledging that the lifetime measure provides a conservative index of people who have ever experienced problems, it does 'capture' many who had problems in the past but who do not report them currently. While the current measure also 'captures' some people with problems of long duration, the longitudinal survey (Abbott, Williams & Volberg, 1999) found that most people with current problems in 1991 were non-problematic seven years later. This high rate of problem remission implies that the majority of current problem gamblers will have problems of relatively recent origin. It follows from this that if there has been a change in the sociodemographic profile of problem gamblers over time, the 'lifetime' population will display greater resemblance to the population of problem gamblers in the past.

Data presented in Chapter Four indicated that 1999 <u>lifetime</u> problem and probable pathological gamblers do, in fact, evidence greater resemblance to problem and pathological gamblers in 1991 than do 1999 <u>current</u> problem and probable pathological gamblers.

Another perspective on the use of the 1999 'lifetime' - current differentiation to infer change over time is provided by the examination of 'conversion percentages' for different groups within the population. In Chapter Four, it was shown that a few groups contained large proportions of lifetime problem and probable pathological gamblers who did <u>not</u> score as problematic on the current measure. These findings were particularly striking for unemployed people. Although other possible reasons for these very high 'conversion percentages' were advanced, the most likely interpretation is that disproportionately large numbers of unemployed people who had gambling problems in the past have overcome their problems. This also appears to be the case for people within some other socially disadvantaged groups. With respect to other mental disorders and social problems, people who are marginalised and financially disadvantaged do not ordinarily have good prognoses. Perhaps, with respect to problem gambling, these people are on a forced learning curve? In the longitudinal survey, the major reason given by problem gamblers who overcame their problems was financial hardship. This is a matter that requires more detailed longitudinal study. However, it may also have relevance to subsequent discussion of the apparent reduction in problem gambling prevalence rates since the 1991 national survey.

In Chapter Four, lifetime and current problem and probable pathological gambling prevalence estimates were provided for a large number of sociodemographic groups. In many cases, these estimates have large sampling errors and thus wide confidence intervals. They have much lower reliability than the overall population estimates and should be treated with caution. Overlapping membership in different groups also complicates the interpretation of prevalence rates within specific groups and comparisons between the same groups in studies conducted at different times.

In demography and epidemiology, overlapping group membership and changes in the composition of groups over time is typically addressed by calculating standardised rates. For example, if mortality rates for a disease that largely affects old people are being compared in two populations, one of which has proportionately many more old people than the other, the comparison would be highly misleading if the differences in age structure were not adjusted for statistically. Similarly, if this comparison was being made over time and the age structure of the population changed appreciably, it would also be important to take account of this change. When one or two variables are being adjusted for, this procedure is relatively straightforward. However, it becomes highly complex when many variables are being considered in this way. Where possible, it is desirable to adjust for a small number of variables that have the strongest association with the attribute under investigation.

Meaningful standardisation requires that major risk factors are known and that their high-risk status does not change appreciably over time. With respect to problem gambling, some consideration was given in Chapter Four to the major risk factors identified in the 1991 national survey that may have influenced prevalence estimates in 1999. Gender, age, ethnicity and employment status were discussed. Had the association between these factors and problem gambling remained constant from 1991 to 1999, they could have had some impact on 1999 prevalence rates. However, assessment of their likely impact is complicated because there are strong indications from the examination of risk

factors in the 1999 survey that the association between some of these factors and problem gambling is no longer present. Young age and unemployment, in particular, fall into this category, especially with respect to current probable pathological gambling.

Although the sample sizes for some groups are small and the reliability of their prevalence estimates are low, two groups do merit some discussion. Unemployed people have been mentioned already. In 1991, unemployed people made up a large percentage of problem and probable pathological gamblers. Although, as discussed, the 1999 lifetime prevalence rates for this sub-population were moderately high, the current rates were very low. Indeed, no unemployed people were identified in the current probable pathological gambling category.

Asians are the second group of interest here. Asians, while constituting less than five percent of the total adult population, are a rapidly growing sector of the population and outnumber Pacific Islanders. Chinese constitute the largest single group within the Asian category. From the gambling participation data, it was evident that Asians have high levels of casino table games participation. Historically, New Zealand Chinese have a long association with particular forms of gambling (Grant, 1994). Although it has been maintained that Asians may have relatively high rates of problem gambling, little of a scientific nature is known about problem gambling among Chinese people living in New Zealand.

A recent survey conducted in Sydney, using a self-completion Chinese version of the SOGS, found that 60 percent said they had never gambled (Blaszczynski, Huynh & Dumlao et al, 1998). The large majority who had gambled said they had commenced after coming to Australia. However, despite the very low gambling participation rate, nearly eight percent were classified as probable pathological gamblers. In addition, nearly one in five reported that a family member had a gambling problem. Although described in the report as a current measure, the questionnaire used in the study and included in the appendix was a lifetime measure. Consequently, it is unclear whether the estimate provided refers to the past six months or lifetime. Problem gambling was most strongly associated with regular gaming machine participation and betting on horse and dog races.

The response rate for the Sydney study was low, less than 30 percent, and confidence intervals were not provided for the prevalence estimate. The Chinese version of the SOGS was not back-translated to check for accuracy. Although having some shortcomings methodologically, this study suggests that Chinese Australians and presumably New Zealand Chinese who come from similar countries, may have high rates of problem gambling.

In the national survey, although a number of Asian lifetime problem gamblers were identified, none scored within the problem or probable pathological range on the current measure. It is most unlikely that there are no Asian problem gamblers in New Zealand. Indeed, counselling and treatment centre data indicates that Chinese and other Asians do present with gambling problems (Abbott & Volberg, 1999). It appears likely, as Blaszczynski, Huynh and Dumlao et al (1998) suggest, that this population may be reluctant to report problems to an investigator. This could be especially the case with telephone or face-to-face interviews.

If information on this topic is sought from Chinese or other Asian communities, alternative approaches to that used in the national survey should be considered. One option is that employed recently by Abbott et al (1999) to study mental disorder and adjustment among Chinese migrants. This survey was preceded by lengthy consultation with Chinese

community leaders, health professionals and community organisations and coverage in the Chinese media. It also used both English and Chinese versions of the questionnaire and screening measure. The major short-coming of alternative approaches is that it is very difficult to attain a representative sample. Consequently, the ability to generalise findings to the wider population is compromised.

The failure to identify current Asian problem gamblers in the national survey is a further reason why the overall prevalence estimates are likely to be conservative, more so if Asian rates are appreciably higher than the national averages.

Differences between the regional groupings are also worthy of consideration in light of the introduction of casinos to Auckland and Christchurch and the gambling participation data reported in Chapter Four. Both of these cities have higher lifetime and current combined problem/pathological gambling rates than Wellington or the remainder of the country. While this is what would be expected if the introduction of casinos influenced problem gambling rates, Auckland also had a higher prevalence than the rest of the country in 1991. Furthermore, rates appear to have reduced in all four areas since 1991, albeit that the reductions are somewhat less in Auckland and Christchurch and may be an artefact of methodological differences between the two studies. In addition, there are various additional factors that could account for differences in gambling prevalence between these 'regions', for example the higher percentage of Pacific Islanders and Mäori residents in Auckland. Finally, as cautioned above, even though the sample used in the present study is large relative to previous surveys, the confidence intervals for these sub-national estimates are wide.

5.4 Risk Factors for Problem Gambling

Sociodemographic Factors

Considered individually, the sociodemographic factors most strongly associated with lifetime and current problem and probable pathological gambling were summarised in the preceding section of this chapter.

Multivariate analyses were conducted to identify the factors that have the strongest, independent relationship with problem gambling in 1999. The logistic regression analyses, in particular, may be regarded as a more sophisticated procedure than standardisation for taking account of the potential confounding effects of other variables. In contrast to standardisation, this form of analysis enables adjustment to be made for multiple variables, simultaneously. However, as mentioned earlier, it is a time-consuming process. There are many potential models, especially if interaction terms made up of more than one variable are incorporated into the analyses. The models included in this report may not be optimal.

With respect to lifetime problem and probable pathological gambling, most of the individual risk factors outlined above were confirmed as significant predictors in one or both of the multivariate analyses conducted (logistic regression and correspondence analysis). Both Auckland and Christchurch residence were confirmed as significant risk factors when the effects of a number of potentially confounding variables were controlled. Some additional risk factors emerged from these analyses. In both analyses, Catholics were at somewhat higher risk than people of other religions. They had approximately double the likelihood of having a significant gambling problem than people from all other religions combined. In the

logistic regression analysis, people lacking formal qualifications and people with low household incomes were also at somewhat higher risk.

With respect to <u>current</u> problem and probable pathological gambling, as is reported in Chapter Four, most of the individual risk factors were also confirmed in the multivariate analyses. Mäori and Pacific Island ethnicity were dominant risk factors, with the former having over four times the likelihood of having significant gambling problems than the remaining ethnic groups. Pacific Islanders were more than six times more likely to have problems. As with lifetime problem gambling, Catholicism emerged as an additional risk factor in both analyses, along with living in a household with an income of NZ$40,001-50,000. In the logistic regression analysis, Christchurch residence (but not Auckland residence) also emerged as a relatively strong predictor and 'other Christians' were found to be at somewhat lower risk than those of all other religions combined. Males and people with vocational or trade qualifications also appeared to be at somewhat greater risk.

The <u>lifetime</u> sociodemographic risk factors more resemble those identified in the 1991 survey than do the current risk factors. **However, considered overall, there appears to have been a substantial change over time in those factors most strongly associated with problem gambling. Mäori and Pacific Islanders have similar representation (44% of current problem and probable pathological gamblers) in both surveys. The most notable changes are found with respect to unemployed people and young people**.

As discussed above, no unemployed people were classified as <u>current</u> probable pathological gamblers in 1999 and only 0.2 percent were <u>current</u> problem gamblers. In 1991, 29 percent of current probable pathological gamblers were unemployed and 12 percent of unemployed people were current problem or probable pathological gamblers. People aged 18-24 years (in 1991 the group with the highest prevalence rate) in 1999 had the second lowest rate of the various age groupings after those aged 65 years or older.

In contrast to 1991, in the NPS-1, the male current probable pathological gambling rate no longer exceeds that of females, although the male current problem gambling rate remains higher. This 'feminisation' of problem gambling has also been noted in Australia and the United States (Abbott & Volberg, 1999; Productivity Commission, 1999) and is consistent with trends referred to in Chapter Two with respect to New Zealand clinical and counselling presentations. It has been associated with the widespread availability of gaming machines in casinos and other venues. This trend, interestingly, was not apparent in the Swedish national survey.

The reduction in problem gambling prevalence among unemployed people has already been discussed. It would appear that many people in this category who have had problems in the past have somehow overcome them. Changes in benefit entitlements and increased poverty may be significant in bringing about this change. It is also possible that fewer people in this category are developing problems in the first place. Another possibility is that these people are now less likely to have telephones and thus were not as well represented in the 1999 survey.

Apart from unemployment, age was the other risk factor evidencing the most change from 1991 to 1999. In both 1991 and 1999, very few problem or probable pathological gamblers were aged 65 years or older. As indicated and discussed briefly at various

places in this report, the major change was with respect to older adolescents and young adults. **In 1991, people aged 18-24 years had the highest lifetime and current problem/probable pathological gambling prevalence rates, followed closely by those aged 25-29 years. In 1999, people aged 18-24 years had very low rates relative to those of other age categories, apart from the 65 years and older group.** Presumably, the very low lifetime and current rates for the youngest age cohort in 1999 indicate that far fewer young people are developing problems in 1999 than was the case in 1991. However, it is possible that methodological and sample differences between the two national surveys may have had an influence on the findings. This possibility will be discussed further shortly.

In 1999, the next oldest group remains over-represented among problem/probable pathological gamblers. Approximately a third of both current and lifetime problem/probable pathological gamblers are aged 25-34 years.

Consistent with this over-representation, with respect to 'lifetime' problem/probable pathological gambling, being aged 25-34 years emerged as a significant predictor in the multivariate analyses. People in this age group are more than twice as likely as those in the other age groups combined to report experiencing gambling problems. These analyses controlled for the effects of other predictor variables that are associated with both age and problem gambling. However, in contrast to the situation with 'lifetime' problem status, age did not emerge as a significant predictor in the multivariate analyses that addressed <u>current</u> problem/probable pathological gambling.

The cohort aged 25-34 years in 1999 is predominantly composed of people who were, in 1991, in the then highest risk 18-24 year age group. Consequently, the findings outlined in the preceding paragraph are consistent with a 'pipeline' effect, with those at high risk in 1991 remaining at high risk in 1999 with respect to 'lifetime' problems. However, while at high risk relative to other groups in 1999, the prevalence rate for this group was less than a third that of the 18-24 year group in 1991. If the lifetime section of the SOGS-R is a valid measure of past gambling status, this result would not be possible unless very large numbers of problem gamblers died and/or emigrated and none or very few who did not have problems in 1991 subsequently developed them. This is unlikely. Given the longitudinal follow-up findings referred to elsewhere in this report, a more plausible explanation is that many people in this age group who had problems in the past overcame them and that these people subsequently under-reported their past gambling problems.
Age, per se, was not a significant predictor of change from problem to non-problem gambling status in the longitudinal study (Abbott, Williams & Volberg, 1999). However, lifetime problem and pathological gamblers whose preferred form of gambling was gaming machine participation were much more likely to be non-problematic seven years later than those who preferred track betting. In 1991, the former group was substantially younger than the latter group.

Earlier, financial hardship was suggested as a reason why unemployment ceased to be a significant risk factor in 1999. In the longitudinal study, this was the reason given by the majority of problem/probable pathological gamblers and regular non-problem gamblers who reported a reduction in gambling activity from 1991 to 1998. The second most frequently mentioned reason for the problem gambling groups was that they were 'older and wiser', had 'grown out of it' or 'lost interest.'

Throughout the 1990s, youth unemployment rates were substantially higher than those of older age groups in New Zealand. Mäori and Pacific Islanders are also over-represented among 18-24-year-olds and have high rates of unemployment. Consequently it is probable that, like unemployed people, older adolescents and young adults have also been affected disproportionately by changes in income distribution since 1991. Substantial increases in fees for tertiary education can also be expected to have had an impact on the discretionary expenditure capacity of this group.

In summary, it would appear that lower problem gambling prevalence among the two younger age groups may have partly come about through significant numbers overcoming their problems over time. Again, many may have been on a 'forced learning curve'. It is also possible that in 1999 (relative to 1991) fewer young adults developed gambling problems in the first instance. If this were the case, it would be helpful to know more about why this was so. Focussed in-depth and longitudinal investigation of young adults and adolescents of various ages will be necessary to address this issue.

In contrast to the situation with unemployment and age, Mäori and Pacific Islanders continued to experience high problem gambling prevalence rates relative to other ethnic groups. Mäori and Pacific Island ethnicity remained high risk factors when the effects of other variables, such as age, income level and employment status, were controlled statistically. This implies that ethnicity per se is important, rather than being an artefact of other variables that are linked both to being a Mäori or Pacific Islander and to problem gambling. Abbott and Volberg (1999) noted that Mäori and many Polynesian languages lack a word for gambling and that gambling, as it is known today, was not part of the social and cultural reality of these peoples until relatively recent times. Both groups also have histories of colonisation and associated exploitation and oppression. Volberg and Abbott (1997) have shown that there are a number of parallels between Mäori and some Native American tribes with respect to problem gambling. Further research within these groups, as well as within recent migrant groups that may also be at high risk, is required to find out more about the role that gambling plays in these communities and the development of problem gambling.

Religion was not examined in 1991. As indicated, in 1999, when other risk factors were controlled in multivariate analyses, Catholicism was found to be a significant risk factor for both lifetime and current problem/probable pathological gambling. In one of the analyses, membership of 'other Christian' denominations was also significant. This latter group is the residual population of Christians when people from major denominations (Anglicans, Catholics, Presbyterians) are excluded. It includes Methodists and a variety of Fundamentalist denominations.

Traditionally, as outlined in Abbott and Volberg (1999), the Protestant churches opposed gambling and lobbied for legislative and other restrictions on gambling throughout the mid 19th early 20th centuries. The Catholic Church, on the other hand, has long adopted a more permissive attitude towards gambling within society generally and on the part of its members. In recent times, most Protestant churches in New Zealand have also become more permissive and have come to rely on income from gambling activities to support parish and other charitable activities. While New Zealand is generally regarded as a largely secular society, it is of interest that religious affiliation remains linked to gambling participation and is a significant predictor of problem gambling. As with ethnicity, this is a

topic that has received little research attention to date yet could be expected to yield information of both theoretical and practical value.

Considering the important role of religion in the lives of some ethnic and recent migrant groups, more focussed examination of religion within specific communities may be warranted. Study of Pacific Island churches may be of particular relevance in this regard, given the very high prevalence of problem gambling among Pacific Island peoples.

As mentioned earlier in this chapter and in the body of the report, in 1991 Auckland residence was a significant risk factor for problem and probable pathological gambling. Other parts of the country had somewhat lower (and similar) problem/probable pathological prevalence rates. However, the Auckland 'effect' was considerably diminished when ethnicity and other factors were taken into account. In 1999, when a large number of other risk factors were controlled, both Auckland and Christchurch had significantly higher 'lifetime' rates than Wellington and the remainder of the country. With respect to current problem/probable pathological gambling, only Christchurch residence emerged from the multivariate analyses as a significant predictor. When other factors were controlled, people living in Christchurch were found to be approximately 2.5 times more likely than those living elsewhere in the country to have current gambling problems.

The location findings are of considerable interest. They suggest that when the effects of other sociodemographic variables are controlled statistically, there remains something about living in Christchurch and Auckland that significantly increases the probability that people residing therein will report experiencing 'lifetime' gambling problems. As indicated, this influence was confined to Christchurch when current problems are considered.

Earlier in this chapter, possible confounding factors were mentioned that could account for these regional differences. The findings from the multivariate analyses, however, provide a stronger case for the hypothesis that the introduction of casinos to these two cities would lead to an increase in problem gambling relative to those parts of the country that lack casinos. Nevertheless, caution is required in concluding that this relationship is causal. While the effects of many confounding variables have been controlled, there remains the possibility that other factors, not included in the analyses, accounted for the difference. As discussed in Abbott and Volberg (1999), establishing causation is a difficult undertaking. It is not possible for cross sectional studies of the type reported here, on their own, to demonstrate causal relationships. However, the findings of such studies can disconfirm or fail to corroborate hypothesised causal relationships (refer to Abbott & Volberg, 1999, Chapter One).

The difference between 'lifetime' and current prevalence estimates by region are also of interest. In 1999, there were estimated to be 33,904 'lifetime' problem and probable pathological gamblers resident in Auckland. However, only about a third (12,182 of these people) were current problem or probable pathological gamblers. The corresponding estimates for Christchurch (11,009 and 7,867 respectively) evidence much less variation. While the margins of error are large for these point estimates, the findings suggest that problem and probable pathological gamblers in Auckland are much more likely than their Christchurch counterparts to overcome their problems. Considered in conjunction with the results of the 1991 study, the present findings further suggest that relatively more people in Christchurch than in Auckland have recently developed gambling problems. This may at least partly explain why relatively fewer appear to have overcome their problems, i.e. they have had less time to overcome them. If these findings and interpretations are valid, they

pose additional questions with respect to underlying reasons. Further research on this topic is clearly warranted.

Gambling Participation Factors

Past six months, regular (weekly or more) participation in continuous forms of gambling and reported expenditure in excess of NZ$40 per month were found to be very strong predictors of both current and lifetime problem and probable pathological gambling. These relationships are stronger in the case of people with current problems. This was expected, given that the gambling participation measures relate to the same timeframe as the current SOGS-R measure. In contrast to current problem and probable pathological gamblers, many of the 'lifetime' problem gamblers no longer experience gambling problems and currently have much lower levels of gambling participation and expenditure.

The association between regular participation in and high expenditure on continuous forms of gambling, most of which involve a degree of actual or perceived skill, and problem gambling is a consistent finding in the literature. Further information and relevant references are provided in Chapters One and Two. More detailed discussion is provided in Abbott and Volberg (1999). The issue of causality, i.e. whether or not regular participation in continuous forms of gambling leads to problem gambling or vice versa, can be only partially addressed by cross sectional surveys of the type described in this report. However, the present findings are generally consistent with those of the 1991 national survey and a large body of international research that indicate that the former is the case. The Australian Productivity Commission Report (1999) examines this issue at some length and argues that the strongest corroboration comes from the recent rise in problem gambling among women, associated with their increased involvement with gaming machines. Some of the findings of the present study support the Productivity Commission case with respect to women.

Of the various forms of continuous gambling, problem and probable pathological gamblers indicate that they most prefer betting on horse or dog races and playing gaming machines outside of casinos. Regular participation in these two forms of gambling was also very strongly associated with problem gambling. Indeed, just over a quarter of regular gaming machine participants and approximately a fifth of regular track betters were classified as lifetime problem or probable pathological gamblers. This finding has public policy and public health implications. One implication is the importance of this group as a potential focus for prevention and early intervention programming.

Relative to track betting, which has remained relatively stagnant in recent years, gaming machine availability and expenditure has continued to expand. Unless constraints are imposed, Australian experience suggests that national expenditure on machines could double or treble within the next five to ten years. The Productivity Commission report concluded that gaming machines are by far the major contributor to problem gambling in Australia. If future gaming machine expansion in New Zealand was associated with an increase in the number of regular participants (as appears to have been the case in Australia), it could be expected that problem gambling prevalence will increase to levels that currently prevail in New South Wales and Victoria. However, some of the findings from the present survey raise questions about the inevitability of rising gaming machine expenditure leading to disproportionate increases in regular participation.

Another finding relevant to the present discussion, alluded to above, is the indication from the longitudinal survey (Abbott, Williams & Volberg, 1999) that problem gamblers whose problems are associated with gaming machines generally have problems of shorter duration than is the case for people whose problems are related to track betting. This finding may be controversial and requires further study, especially with pathological gamblers who experience particularly severe problems and who seek treatment for them.

Of the other types of continuous gambling considered in the NPS-1, regular participation in both casino table games and casino gaming machines are also associated with current and lifetime problem/probable pathological gambling. Playing card games for money and taking bets with friends and work-mates also have some association with problematic gambling. TeleBingo, a non-continuous form, is a further type of gambling that is associated with both lifetime and current gambling problems.

Given their widespread distribution nationally and the relatively large number of people who engage in them, gaming machines outside casinos and track betting are the gaming forms that are most likely to have the major impact on problem gambling prevalence in New Zealand. However, as discussed earlier in this chapter, there are indications of higher problem gambling prevalence in Christchurch and Auckland. These 'casino' cities also have much higher levels of participation in casino gambling and, in these cities, casino gambling probably also plays a significant role in the development and maintenance of problem gambling. This matter requires more focussed investigation, both in the 'established' casino cities of Auckland and Christchurch, as well as in centres to which casinos are presently being introduced.

The association between regular TeleBingo participation and problem gambling was unexpected. This is not a continuous form of gambling. It is favoured by older adults, especially women, by people of low socioeconomic status and by Mäori and Pacific Islanders. In contrast to the situation with other forms, regular TeleBingo participants are most likely to have first gambled at age 25 years or older. The link with problem gambling may come about because people who frequently take part in TeleBingo also more often participate in one or more forms of continuous gambling. However, TeleBingo participation remained a significant predictor in multiple logistic regression analyses that included continuous forms. This suggests that it has a more direct relationship. Possibly it serves as a 'gateway' for some older adults, especially women, to develop gambling problems later in life? These are hypotheses that may warrant further investigation. Currently, little is known about the role that this <u>recently</u> <u>introduced</u> type of gambling plays in peoples' lives and whether or not it is directly, or indirectly, implicated in problem gambling development.

Other Risk Factors

A variety of further factors, chosen on the basis of theory and past research findings, were examined in relation to gambling problems.

For both lifetime and current problem/probable pathological gambling, having someone else in one's life with a gambling problem was a relatively strong risk factor. In the case of current problem and probable pathological gamblers, 15 percent reported that they considered their father had experienced gambling problems and six percent indicated likewise for their mother. Although these estimates had large margins of

215

error, it is of interest that they are virtually identical to those from a recent Australian survey of clients receiving treatment for problem gambling (Productivity Commission, 1999). In the 1991 New Zealand national survey, 17 percent of problem/probable pathological gamblers reported that one or both of their parents had experienced gambling problems (Abbott & Volberg, 1991; Volberg & Abbott, 1994). The 1991 and 1999 New Zealand percentages referred to in this paragraph are all approximately four times higher than those for people without gambling problems.

In the present survey, 22 percent of current problem/probable pathological gamblers reported that another close family member (other than their father or mother) had experienced a gambling problem, slightly more than double that of non-problem gamblers. Again, this is similar to that of the Australian client survey just mentioned.

These familial associations have been found in other studies (Fisher, 1996; Lorenz, Politzer & Yaffe, 1990; Ferris et al, 1996). However, they are based on respondent assessments of family members, not independent assessments by clinicians or interviewers using standardised psychometric measures such as the SOGS-R. From previous studies, it has not been possible to rule out the possibility that problem gamblers are more aware of problem gambling and thus more likely to identify problems in other people. The present study does provide some information that has relevance to this matter. In addition to being asked about family members, participants were asked if they knew a friend or someone else who had a gambling problem. With respect to this question, the difference between the answers of problem and non-problem gamblers was minimal. This suggests that problem gamblers' assessments of family members are not inflated by their increased familiarity with problem gambling.

Although further study is required, these familial associations may be of considerable importance, particularly with reference to questions about why they occur. The most likely explanation is that they are due to social learning, with children modeling parental gambling patterns, including cognitive distortions that may predispose them to problem gambling. Another finding from the present survey is relevant here. With respect to lifetime problem/probable pathological gambling, usually gambling with other family members was an additional risk factor for experiencing problems. However, it is also possible that genetic factors may play a part in the genesis of gambling problems. Given the association between alcohol misuse and dependence and probable pathological gambling, it may be that the same or similar genetic, social, psychological and social factors underlie both disorders.

Irrespective of the reasons for familial associations, one implication is that for each person who becomes a problem gambler, there will be a multiplier effect in that it increases the probability that their children, grandchildren and perhaps their spouse will be at risk for problem development. A corollary of this is that effective prevention and early intervention programmes will also have implications beyond the individual directly involved.

The Productivity Commission (1999) suggest that it is possible that familial associations are in fact secondary to other factors such as cultural disadvantage that are passed on across generations and that these factors give rise to problem gambling among both parents and their offspring. This possibility requires examination. It is of interest, however, that in the present study having someone in one's life with a gambling problem remained a relatively strong predictor when the effects of many other variables associated with problem gambling were taken into account in logistic regression analyses. This

finding underlines the importance of this risk factor and points to the need for more extensive investigation of familial factors in the development of problem gambling.

Both current and lifetime problem/probable pathological gamblers were found to be much more likely than those without problems to report that they gambled as a hobby or habit and that they usually gambled alone. They were much less likely to say they usually gambled with co-workers and gambled for less than one hour. These findings may have relevance to prevention and treatment. Programmes with the objective of reducing heavy or problematic gambling may, for example, focus on finding alternative hobbies and interests that fulfill a similar function to that of gambling. In addition, they could encourage participants to gamble with friends or co-workers and gamble for short rather than prolonged periods of time.

In the case of lifetime problem/probable pathological gambling, it was of interest that first gambling before the age of 13 years and first gambling over the age of 25 years or older were both strong risk factors. Commencing gambling at a young age has been shown previously to increase the likelihood of experiencing gambling problems (Abbott & Volberg, 1999). The finding that people who first started gambling later in their adult life are also at high risk was not anticipated. Given that first gambling in a casino or on gaming machines were also risk factors, and considering the age restrictions for these activities, it seems probable that the older group has developed problems through their involvement with these relatively recently introduced forms of gambling. There are indications from both the present study and recent research in other countries (Abbott & Volberg, 1999; Productivity Commission, 1999) that age differences in problem gambling prevalence are diminishing. In part, this appears to be a consequence of increased numbers of older adults (other than those over 65 years) developing problems.

Although not significantly associated with lifetime problem and probable pathological gambling, first purchasing Instant Kiwi tickets was a relatively strong predictor of current problematic gambling. Further research is required to determine the age at which purchases and regular purchases were first made. While current Instant Kiwi participation is not strongly linked to current problem/probable pathological gambling, past involvement may have served as a 'gateway' to other forms of gambling that are more strongly associated with problem development and maintenance. It is conceivable that other forms of lotteries including Lotto may also play a similar role, although regular current participation in Lotto appears to be associated with a very low likelihood of experiencing problems. Little is known about the changing role that the various forms of gambling play in problem development at different stages in individuals' lives.

5.5 Current versus Lifetime Problem Gambling

Earlier in this chapter, reference was made to the fact that current SOGS-R determined prevalence rates are generally found to be between a third and half of lifetime rates. It was also mentioned that Abbott & Volberg (1991) and subsequent investigators have assumed that this difference between lifetime and current rates provides an index of recovery from gambling problems over time. While probably retaining some validity, Abbott, Williams and Volberg (1999) found that the 'lifetime' measure is a very conservative indicator of past gambling problems and that the difference between the 'lifetime' and current prevalence rates derived from cross sectional surveys are likely to greatly underestimate problem reduction over time.

In the NPS-1, approximately 57 percent of 'lifetime' problem and probable pathological gamblers did not score within the problem or probable pathological range on the current SOGS-R measure. Earlier in this report, this was referred to as the 'conversion percentage' and it was noted that this percentage varied markedly between groups. For example, unemployed respondents and Auckland residents had very high conversion percentages relative to the average of 57 percent. The corresponding estimate from the 1991 national survey was 56 percent, effectively the same as was found in 1999 given the moderately large margins of error involved. This suggests that recovery rates have not changed since the 1991 survey. However, as discussed, the lifetime-current difference or conversion percentage is at best a highly conservative index of problem reduction, albeit one of the few proxy measures available for actual change until further prospective longitudinal studies are conducted. In this regard, it is of interest that of those who reported that they, themselves, considered that they had experienced a gambling problem at some stage in their lives, 30 percent said that they currently experienced problems. This is closer to the degree of change that was evident in the longitudinal follow-up of 1991 problem and probable pathological gamblers.

5.6 Participant Self Awareness of Gambling Problems

The number of people who said they considered that they had experienced gambling problems was approximately half the number classified as lifetime problem or probable pathological gamblers on the basis of the their SOGS-R scores. A similar percentage of people said they currently experienced problems relative to those who scored three or more on the current SOGS-R. This suggests a fairly high level of problem gambling awareness. In the 1991 national survey, only two percent of respondents reported that they had experienced problems, relative to a combined lifetime problem/probable pathological gambling prevalence of seven percent in that survey. **Although caution is required in making comparisons between these two surveys, this suggests that there may have been some increase in awareness and self-recognition of problems in recent years.**

Another index of self-awareness of problem gambling is provided by participant reports of having wanted or tried to get help to stop gambling. Information on this topic was discussed earlier in relation to the construct validation of the SOGS-R and the reliability of problem and probable pathological gambling prevalence estimates. It is of interest that over a third of current problem and probable pathological gamblers said they had wanted help at some time and that over a quarter of lifetime problem and probable pathological gamblers indicated likewise. **Approximately 40 percent of people who said they wanted help said they had subsequently tried to obtain it.** These questions were not included in phase one of the 1991 national survey. However, regular non-problem and problem and probable pathological gamblers from that survey who were re-interviewed in phase two were asked if they had sought help (Abbott & Volberg, 1992). Although over half of the 217 participants in this study were problem or probable pathological gamblers, only two individuals reported having ever sought help for themselves. In both cases help was sought from friends or family rather than from professional therapists or specialist services. None of the 217 1991 phase two respondents who were re-interviewed in 1998 had subsequently sought help for their gambling problems (Abbott, Williams, & Volberg, 1999).

The findings of the present survey suggest that there has been a substantial increase in help-seeking since 1991. However, the margin of error associated with

the help-seeking estimate (0.4%; 0.2-0.6%) is fairly wide and stronger evidence comes directly from the records of the National Gambling Helpline and specialist clinics which are summarised in Chapter Two. NPS-1 participants who sought help were not asked what type of assistance they obtained or how useful they considered it to be. However, these questions are included in the second phase of the national survey (NPS-2). The findings from this component of the NPS will be reported separately.

5.7 Changes in Gambling Participation Since 1991

As indicated previously, reported lifetime participation in one or more forms of gambling appears to be unchanged since 1991 and is comparable to estimates obtained in 1990 and 1995 DIA surveys as well as the 1996 North Health survey. Overall reported gambling expenditure increased slightly from an average of NZ$37 per month in 1991 to NZ$41 in 1999.

No change was evident from 1991 to 1999 with respect to weekly or more frequent participation in non-continuous forms of gambling. The most notable change concerned people who reported gambling this frequently on continuous forms. This change (a reduction from 18% to 10%) is of particular interest given that people in this category are at high risk for problem gambling. There was also an increase in the number of people who reported gambling less frequently than once a week.

A critically important question is whether these findings indicate a true change in gambling participation over time in New Zealand or whether they are a consequence of using somewhat different methodologies in the 1991 and 1999 national surveys. Given that the survey instruments are virtually identical, the key issue is whether or not the more satisfactory response rate in 1999 was achieved by recruiting proportionately more infrequent gamblers and less regular continuous gamblers.

Earlier in this chapter it was suggested that some aspects of the recruitment procedure used in the NPS-1 (e.g. making additional call-backs) could be expected to increase the number of heavy and problem gamblers contacted. On the other hand, encouraging reluctant participants by reassuring them that it was important that all people selected were interviewed, irrespective of their degree of involvement in gambling, could have increased the participation of infrequent gamblers. Examination of the sociodemographic profiles of the 1991 and 1999 achieved samples indicates that there are some differences between the two. However, it is unclear whether this would appreciably influence the gambling participation estimates given that the data were weighted back to expected population proportions prior to analysis.

The information most relevant to this issue comes from one of the pilot studies referred to in Chapter Three. In this pilot, 700 people were surveyed without the additional callbacks, prior notification letter and other procedures designed to boost the response rate. Consequently, the pilot response rate was similar to that of the 1991 national survey. In this pilot, the proportion of regular continuous gamblers was substantially lower than what was expected on the basis of the 1991 national survey and the proportion of infrequent gamblers was considerably higher. The proportions for these and other groups were similar to those subsequently attained in the 1999 national survey. Given that the pilot study used almost identical methodology to that employed in the 1991 study and attained a

similar response rate, it would appear that the gambling participation differences found between the two national surveys most probably reflect real changes rather than artefacts of methodology.

Some of the findings from the longitudinal survey (Abbott, Williams & Volberg, 1999) may also have relevance to this discussion. Of the participants who were non-problem frequent continuous gamblers in 1991, only 24 percent remained frequent continuous gamblers when they were re-interviewed seven years later. Nearly a half (47%) had become frequent non-continuous gamblers and a further 24 percent were infrequent or non-gamblers. In contrast, of those who were frequent non-continuous gamblers in 1991, two-thirds (66%) remained frequent non-continuous gamblers and 22 percent were infrequent or non-gamblers. Only 13 percent became frequent continuous gamblers seven years later. These findings suggest that for most adults, weekly or more frequent participation in continuous forms of gambling (especially gaming machines and Instant Kiwi) is highly transitory, with the majority 'progressing' to regular involvement in non-continuous forms or infrequent gambling on continuous and/or non-continuous forms.

Non-problem infrequent or non-gamblers from the 1991 survey were not included in the longitudinal study. Consequently, it is not known what percentage of these people would have become frequent continuous gamblers seven years later. Similarly, the study sample did not include young adults because all participants were aged 18 years or older when they were interviewed in 1991. This means that the study did not include new recruits to frequent gambling from these two groups.

The findings of other gambling participation surveys also have some relevance to the question that is being considered here. Although the DIA surveys referred to above and mentioned earlier in this report did not include the frequent continuous/non-continuous classification, they did examine participation in specific forms of gambling. The findings of these surveys are summarised earlier in this report and detailed in Abbott and Volberg (1999).

As indicated in Chapter Two, the gambling participation and expenditure findings of the 1991 national survey and the 1990 DIA surveys were generally similar, despite having used different questions and interviewing methods.

In both the 1990 and 1995 DIA surveys, 90 percent of adults reported gambling in at least some form of gambling during the past 12 months. In the 1991 national survey, 89 percent reported having gambled in the last six months and in the NPS-1, 86 percent reported gambling within this timeframe. Considering the different timeframes used and the size of the margins of error associated with these estimates, it appears that there has been no or minimal change in the overall percentage of non-gamblers and infrequent gamblers throughout the 1990s. However, there appear to have been changes within some sectors of the population. For example, in 1995 students and beneficiaries displaced retired people as the group with the highest non-participation rate. Unemployment was not considered separately in the DIA surveys.

All of the New Zealand national surveys incorporated a past week timeframe. Given the focus here on frequent gambling participation, the past week participation data are of particular interest. In the 1991 national and 1990 DIA surveys, weekly or more frequent participation rates were as follows for the more popular forms of gambling: Lotto (42% national survey; 35% DIA), Instant Kiwi (13%; 14%), raffles/lotteries (7%; 6%), track betting (4%; 3%), gaming machines (3%; 4%) and housie (1%; 2%). Apart from Lotto,

these percentages are very similar. The corresponding rates for the 1995 DIA and 1996 North Health surveys were respectively: Lotto (35%; 37%), Instant Kiwi (10%; 7%), raffles/lotteries (5%; 5%), track betting (3%; 3%), gaming machines (3%; 3%) and housie (2%; 2%). Two percent, in both surveys, said they participated weekly or more in Keno. This form of gambling was not available at the time of the earlier surveys. With the partial exception of Instant Kiwi, the results of these two mid-1990s surveys are very similar. Compared with the two previous surveys, there appears to have been a reduction in frequent Instant Kiwi participation and possibly a slight decrease in raffles/lotteries.

Weekly or more frequent participation figures from the 1999 NPS-1 were: Lotto (35%), Instant Kiwi (6%), raffles/lotteries (3%), track betting (3%), gaming machines (2%), housie (1%) and Keno (1%). Rates for recently introduced forms of gambling were TeleBingo (6%) and casino gambling (0%). Consideration of the findings from all of these surveys suggests that levels of frequent participation in Lotto and track betting have been consistent throughout the 1990s. There appears to have been a reduction in weekly or more frequent purchasing of other lottery and raffle tickets, although this has been more than offset by Keno and TeleBingo involvement, two recently introduced non-continuous gambling forms. A reduction in regular Instant Kiwi involvement is also evident. Frequent gaming machine participation may also have declined slightly although this is less certain.

From the information presented, it would appear that the reduction in the proportion of regular continuous gamblers from 1991 to 1999 may well be real rather than an artefact of different methodologies and was largely attributable to the decline in frequent Instant Kiwi participation. This has not been compensated for by increased frequent participation in new forms of continuous gambling including casino table games and Internet betting.

At the outset of this study, given the introduction of new forms of gambling and increased national gambling turnover and net expenditure, it was anticipated that frequent involvement in continuous forms of gambling would increase from 1991 to 1999. This hypothesis is not corroborated by the findings of the NPS-1. It was also expected that reported average adult per capita gambling expenditure would increase. While there was a slight increase relative to that found in the 1991 national survey and the other surveys referred to above, it is insignificant when the reduction in the purchasing power of the dollar is considered. Although consistent with the regular gambling participation changes, this finding is paradoxical given the actual increase in national expenditure during the 1990s. However, as discussed earlier in this chapter, the relationship between self reported expenditure and actual expenditure is complex. The forms of actual gambling expenditure that have increased appreciably since 1991, namely on gaming machines outside casinos and casino games (including machines) are the forms that people greatly under-report in surveys.

5.8 Changes in Problem Gambling and Problem Gambling Prevalence since 1991

At the outset of this study, on the basis of theoretical considerations and the findings of previous research, the principal investigators hypothesised that the present survey would obtain problem and probable pathological gambling prevalence rates that were significantly higher than those of the 1991 national survey. This matter has been discussed elsewhere in this report and prior research relevant to this discussion has also been summarised. More detailed consideration is given in Abbott and Volberg (1999).

In 1991, Abbott and Volberg concluded that the national survey was detecting some of the early consequences of a recent rapid expansion in gambling availability and participation. They observed that large numbers of people had relatively recently started to participate regularly in continuous forms of gambling and understood from previous research with clinical samples that it usually takes many years for serious gambling problems to develop. The 1991 survey found very high prevalence rates of problem and probable pathological gambling among youth and young adults, Mäori and Pacific Islanders. Demographic projections indicated that Mäori and Pacific Islanders would, in coming years, make up a substantially larger proportion of the adult population. Abbott and Volberg expected that this would contribute to future increases in problem and pathological gambling prevalence. They also anticipated that as the young adult cohort aged, many of the large number of SOGS-R defined problem gamblers in this group would become pathological gamblers. Further, it was assumed that the next cohort of young adults would have problem gambling rates that were at least as high as the rates of their 1991 counterparts. They also considered it likely that regular participation in continuous forms of gambling would increase within sectors of the population that had low levels of participation in 1991, for example women and older adults, and that in future years this would have an impact on problem gambling prevalence.

From these considerations, Abbott and Volberg envisaged a 'pipeline' effect. They noted that there were large numbers of people in the population who were at-risk for, or in the early phases of, problem gambling development. Over time, they expected that many of these people would join those who had already developed serious problems. They further anticipated that if new forms of gambling such as casinos were introduced and other continuous forms (especially gaming machines) became more readily available, there would be a further increase in the numbers entering the 'pipeline'. Given the strong link with unemployment, if unemployment levels increased, this would also be expected to increase the 'in-flow'. In other words, it was hypothesised that the incidence would rise and that, during the remainder of the 20th Century, the prevalence of problem and pathological gambling would increase in New Zealand.

Prevalence (the total stock of cases in the population) is, however, not only a function of incidence (the rate of inflow of new cases). Prevalence is also determined by the duration of the disorder or illness under consideration. Duration influences what can be thought of as the 'outflow' (the rate at which people cease to be cases). Outflow from a population can take place through self-recovery, successful treatment, emigration or death. With respect to community surveys, outflow from the sample frame can also occur if significant numbers of people that experience a particular problem are hospitalised, imprisoned or live in other institutional settings. In telephone surveys, lower telephone ownership in high prevalence subgroups could also play a role.

In 1991, Abbott and Volberg were of the view that problem and pathological gambling may be more transient than was generally held to be the case by most clinicians and researchers. Nevertheless, they did regard pathological gambling as a chronic or chronically relapsing condition for the majority. Research at the time supported this. For example, a United States study of GA members suggested an average duration of 18 years from the time of onset to the time when control was established (Lorenz, Politzer & Yaffee, 1990). As indicated above, Abbott & Volberg also considered it likely that most of the less serious problem gamblers in 1991 would subsequently become pathological gamblers. In New Zealand at that time, there were no specialist counselling, treatment or public education programmes for problem gambling and few mutual help groups such as GA.

In contrast to DSM conceptualisation, clinical lore and the findings of early studies such as that of Lorenz, Politzer and Yaffee (1990), the first prospective community study found that while a significant minority of problem gamblers had developed more serious problems when re-assessed seven years later, the large majority were non-problematic (Abbott, Williams & Volberg, 1999). Furthermore, the majority of probable pathological gamblers were also non-problematic seven years after their initial assessment. As discussed earlier, these findings suggest that problem gambling displays less chronicity than is generally held to be the case. However, this study also found that prognoses were worse for probable pathological gamblers with more serious problems and for those who had co-morbid alcohol-related problems.

In other words, the findings from the longitudinal survey suggested that the 'outflow' rate was much higher than Abbott and Volberg had assumed. This led them to propose an alternative hypothesis, namely that problem gambling prevalence rates do not inevitably increase with rising per capita gambling expenditure. Rather, at a certain point the relationship may weaken or even reverse.

Unfortunately, as mentioned previously, Abbott, Williams & Volberg's 1999 study did not allow the incidence of problem and probable pathological gambling to be fully examined among people who did not experience gambling problems in 1991. Consequently, it provided only partial information on the 'inflow' of new cases from the sector of the population that did not experience problems in 1991. To date, this important issue of incidence has not been adequately examined in relation to problem gambling. Until such research has been conducted, the understanding of changing prevalence rates over time and the factors that account for such change will be, at best, incomplete and speculative.

In Section 4.4 of Chapter Four, statistically significant reductions in problem and probable pathological gambling prevalence were reported. This applied both to current and lifetime estimates. These findings are at variance with those of most (but not all) state and provincial level 'replication' studies where the gap between surveys was four years or more and gambling expenditure had increased during the intervening period. The most recent North American replication, conducted in Washington State, provides an exception (Volberg & Moore, 1999b). The original survey was undertaken in 1992, the replication in 1998. Although SOGS-R defined current problem gambling rates remained much the same in the two surveys, the current probable pathological prevalence rate was 0.9 percent in 1992 and 0.5 percent in 1998. This degree of relative change is similar to that found from 1991 to 1999 in New Zealand. As in the New Zealand study reported here, the reduction in prevalence was associated with a substantial decline in weekly gambling.

Earlier, methodological factors that could have accounted for the different findings of the 1991 and 1999 national surveys were considered. In the case of gambling participation, the findings of these surveys could be compared with those of other New Zealand surveys conducted during the same period of time. These surveys, although of variable (and in some instances largely unknown) quality, do enable trends and consistencies to be observed. Unfortunately, with one exception, these surveys did not include measures of problem gambling.

The exception referred to in the preceding paragraph is the 1996 North Health survey. Although the authors of the North Health report considered that methodological deficiencies reduced the confidence that could be accorded its findings, this study is relevant in the present context. As mentioned previously, the critical question concerning

the 1999 survey is whether or not its sample included disproportionately more infrequent and non-problem gamblers than that of its 1991 counterpart. The findings of one of the 1999 survey pilot studies suggested that this was not the case with respect to gambling participation. The 1996 North Health survey provides comparable information with respect to problem gamblers.

The North Health survey used very similar methods to that of the 1991 national survey. It was conducted by the same research company and, when additional call-backs were made to boost the initial low response rate, the rate was only slightly lower than that of the 1991 study. Although the final response rate was still relatively low and the sample contained very few Pacific Islanders, this rate and the overall quality of the study was comparable to or better than most problem gambling prevalence studies. The North Health study is helpful because it allows more direct comparison with the findings of the 1991 survey, without the possible confounding effect of the slightly different methodology and much higher response rate of the 1999 NPS.

The combined SOGS-R defined lifetime combined problem and probable pathological prevalence rate for the 1996 survey was 4.1 percent; the current probable pathological gambling rate was 0.4 percent. The corresponding estimates for the 1999 survey are 2.9 percent and 0.5 percent. There is no statistically significant difference between these two sets of estimates.

Although caution is required when considering sub-groups within the 1996 North Health sample, owing to the relatively small sample size and various methodological considerations, it is of interest that the groups with the highest lifetime problem/probable pathological gambling prevalence are generally very similar to those of the 1991 national survey. As in the 1991 survey, males, Mäori, Pacific Islanders, people aged 18-24 years and people living in households of five or more all had very high prevalence rates. **Unless other factors such as the use of somewhat different methodology in the 1999 survey accounted for the different findings, this suggests that the relative reduction in male and youth/young adult prevalence rates found in the 1999 survey may be a recent development.**

The finding of comparable prevalence estimates with those of the 1996 North Health survey and recent surveys in Sweden and the two Australian states with per capita gambling expenditure most similar to that of New Zealand and Sweden, increases our confidence in the validity of the 1999 national survey estimates. The 1991 high-risk groups that displayed much lower prevalence in 1999 also reported substantially lower regular participation in continuous forms of gambling. Thus, there is also internal consistency with respect to problem gambling and the forms of gambling known to be most strongly associated with problem gambling.

Given the present focus on comparison between the findings of the 1991 and 1999 national surveys, the question that arises is how confident we can be about the validity of the 1991 survey estimates. This is an important question. If, for example, the 1991 estimate were inflated, the conclusion that there has been no increase since 1991, or a decrease, would be invalid. Unfortunately, there is no easy answer to this question. While aspects of the methodology and analysis used in 1991 have been critiqued in the present report, the procedures used, sample size and response rate achieved compare favourably with those of most other studies in this field. There are no obvious sources of bias in the methods used. In addition, the gambling

participation findings from that survey were very similar to those obtained by the 1990 DIA survey. For these reasons, it is assumed that the 1991 prevalence data are valid. However, any study that draws a sample that falls short of being a complete census of the entire population carries with it the possibility that its findings are unreliable. While the probability of error may be low, it is always present. **Furthermore, when examining change over time, caution must be exercised if only a small number of time points are being compared. It is only through repeat surveys conducted at regular intervals that the effects of possible confounding variables and statistical 'noise' can be averaged or partialled out.**

As indicated in Chapter Four, although the reductions in problem and probable pathological gambling prevalence for the New Zealand population are statistically significant, there remains the possibility that these changes and their significance levels are artefacts of differences in the design of the two studies, differential response in some high-risk groups and lack of complete design information on the 1991 survey. However, assuming that the 1991 and 1999 prevalence data sets provide reasonably accurate estimates of problem gambling in New Zealand at the time they were conducted, how could the apparent reduction in overall prevalence have come about?

Information from a variety of sources suggests that there may have been reductions in incidence ('inflow') from some groups previously at very high risk, for example young people and perhaps unemployed people and others who are outside the paid workforce and economically marginalised.

The 1999 longitudinal survey and some findings from the present study also suggest that the duration of problems for a significant number problem gamblers is relatively short. Again, this may be especially so for particular groups including youth and unemployed people. Relatively high rates of self-recovery were evident in the longitudinal survey. Although none of the participants in that study reported seeking specialist help for themselves, a number reported assisting other people with problems to obtain this form of care. Quite a large proportion who reported 'lifetime' problems in the 1999 NPS-1 indicated that they had sought help and it is known from agency records that very large numbers of New Zealanders have accessed specialist counselling, mutual help and treatment services in recent years. Increased public awareness of problem gambling and the substantial growth in specialist services may have enhanced already high self-recovery rates (and thus 'outflow'). However, the failure to find a change in the overall 'conversion percentage' from 1991 to 1999 raises the possibility that this effect is minimal when the total population of problem and probable pathological gamblers is considered. This issue could be more directly examined by studies of treatment efficacy. Little is known about the effectiveness of New Zealand's problem gambling counselling and treatment services and the degree to which they facilitate problem reduction over and above 'natural' or self-recovery rates.

Many of the issues raised with respect to the finding of lower prevalence rates in 1999 (and 1996) relative to 1991, including reasons for differences in the survey findings, can only be addressed by further research. Repeat national replication prevalence surveys, large-scale longitudinal surveys to determine incidence rates, case control studies and in-depth investigation of high risk sectors of the population including Māori, Pacific Islanders and Asians would be particularly helpful to address questions and hypotheses generated by the NPS-1. Some aspects of the NPS-2 will yield relevant information. **However,**

until further research has been undertaken, many of the findings discussed in this section and their interpretation should be regarded as tentative and treated with caution.

5.9 Other issues

Treatment and Other Services

One reason for conducting prevalence studies is to determine the degree to which specialist services are reaching people who are considered to be in need of them. **Comparison of the 1999 NPS prevalence findings with National Helpline and clinic first presentation records indicates that a substantial proportion of people with more serious problems (SOGS-R scores of 5 or more) are accessing problem gambling services.** Over time, although still somewhat outnumbered by men, women have made up an increasing proportion of clients. This is in keeping with the finding that whereas in 1991 male probable pathological gamblers greatly outnumbered females, in the 1999 survey there was no gender difference with respect to current probable pathological gambling.

During the 1990s, Mäori have accessed services in significantly greater numbers. In 1998, just over 20 percent of first-time Helpline callers were Mäori. From the NPS, it was estimated that approximately 31 percent of current problem and probable pathological gamblers were Mäori. While still under-represented, these findings suggest much greater access on the part of Mäori than was previously the case. However, Pacific Islanders remain under-represented. The NPS current problem/probable pathological gambling estimate for Pacific Islanders was 14 percent. In 1998, less than four percent of Helpline callers were Pacific Islanders, little changed from the first year of the service's full year of operation in 1993. Face-to-face therapy presentations were somewhat higher in 1998, namely five percent.

First-time Helpline callers in 1998 had a similar age profile to that of current problem and probable pathological gamblers in the NPS. Thus, assuming that the NPS youth/young adult sample is representative, it appears that services are now reaching people of all ages in proportion to their numbers in the population.

Asians made up two percent of Helpline first-time callers in 1998 and three percent of first presentations for therapy. These findings are of interest in light of the failure to identify any Asian current probable pathological gamblers in the NPS. Earlier, this was given as one reason why the overall NPS prevalence estimates are likely to be conservative. This finding also points to the need for research specifically focussed on Asian and recent migrant populations.

It is also of interest that the forms of gambling that callers and clients indicate are most strongly linked with their problems closely parallel the types of gambling associated with problem and probable pathological gambling in the NPS and earlier 1991 national survey. Gaming machines and track betting remain major high risk activities, the latter being matched recently by casino gaming. It would be helpful to know more about the outcomes for these different subgroups of problem gamblers. Survey findings suggest that machine problem gamblers may have a better prognosis and that track problem gamblers might require more intensive treatment with prolonged follow-up to reduce the probability of relapse.

226

Although most problem gamblers (people with scores of 3 or 4 on the SOGS-R) appear to overcome their problems without specialist help, a substantial minority progress to probable pathological gambling. Given that very few of these people currently present for counselling or therapy, it would be timely to consider ways to reach this high risk group with a view to preventing more serious problems from developing. Many of these people are Mäori or Pacific Islanders. Consequently, such services will need to address this fact if they are likely to be effective.

Gambling Expenditure by Gambling Mode and Problem Gamblers

The high percentage of total gambling expenditure accounted for by weekly or more frequent continuous gamblers and problem and probable pathological gamblers and the high percentages of problem and probable pathological gamblers who are regular gaming machine and track betters raise a number of social policy issues. Not the least is that if so-called 'harm minimisation' interventions were effective with high-risk gambling participation groups and problem gamblers, a substantial portion of revenue would no longer be forthcoming. This would appear to create a dilemma for sectors of the gaming industry with respect to public education and prevention initiatives.

NPS-2

One purpose of the NPS-1 was to identify sub-groups of gamblers and problem gamblers and recruit people from these groups for participation in the second phase of the NPS involving more extensive face-to-face interviews. As with the second phase of the 1991 national survey, this part of the NPS was designed to provide more detailed information about gambling participation and problem gambling than that obtained from the national telephone survey. A total of 302 participants gave written consent for NPS-2 participation, 70 percent of those approached. While this overall response rate is acceptable, it was somewhat lower for problem and probable pathological gamblers (65%). It was of interest that response rates for the remaining groups, namely regular continuous gamblers, regular non-continuous gamblers and infrequent gamblers were similar, suggesting that these groups do not differ with respect to their willingness to participate in the study. It will be recalled that this is an important consideration in interpreting the results of the NPS and making comparisons with the findings of other studies including the 1991 national survey.

Because NPS-2 sampling was based on expected proportions of the different groups within the population (derived from the findings of the 1991 national survey), the number of regular continuous gamblers and problem/probable pathological gamblers recruited was much lower than anticipated. Similarly, the number of infrequent gamblers and, to lesser extent, frequent non-continuous gamblers were inflated relative to expectations. These changes in proportions will, to some extent, compromise the number of comparisons and analyses that can be conducted in the NPS-2.

REFERENCES

Abbott, M.W. (1984). Unemployment: Health and social costs. In *Economic Summit Conference Proceedings and Papers Vol. 2.* Wellington: Parliament House.

Abbott, M.W. (1994). Mental health. In A. Trlin, J. Spicer, & J.A. Walton (Eds.), *Social science perspectives on health in New Zealand* (pp. 119-140). Palmerston North: Dunmore Press.

Abbott, M.W. (1997). Refugees and immigrants. In P.M. Ellis & S.C.D. Collings (Eds.), *Mental health in New Zealand from a public health perspective* (pp. 250-264). Wellington: Ministry of Health.

Abbott, M.W., Rönnberg, S., & Volberg, R.A. (1997*). Some major conclusions from the pilot study of gambling and problem gambling in Sweden.* Report to the Sweden Ministry of Health and Social Affairs.

Abbott, M.W., Sullivan, S., & McAvoy, B. (1994). *The Compulsive Gambling Society of New Zealand Telephone Hotline and Clinics: Report on their first year of operation.* Auckland: Compulsive Gambling Society of New Zealand.

Abbott, M.W., Sullivan, S., McAvoy, B., & Arroll, B. (1994). Pathological gamblers - will they use a new telephone hotline? *New Zealand Medical Journal*, 107, 313-315.

Abbott, M.W., & Volberg, R.A. (1991). *Gambling and problem gambling in New Zealand. Research Series No. 12.* Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R. (1992). *Frequent gamblers and problem gamblers in New Zealand. Research Series No 14.* Wellington: Department of Internal Affairs

Abbott, M.W., & Volberg, R.A. (1996). The New Zealand National Survey of Problem and Pathological Gambling. *Journal of Gambling Studies,* 12, 143-160*.*

Abbott, M.W., & Volberg, R.A. (1997*). Tender document for the National Survey on Problem and Pathological Gambling.* Auckland: Author.

Abbott, M.W., & Volberg, R. (1999). *Gambling and problem gambling in the community: An international overview and critique. Report No. 1 of the New Zealand Gaming Survey.* Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R. (in press). A reply to Gambino's 'An epidemiological note on verification bias: Implications for estimation of rates'. *Journal of Gambling Studies.*

Abbott, M.W., Williams, M., & Volberg, R. (1999). *Seven years on: A follow-up study of frequent and problem gamblers living in the community. Report No. 2 of the New Zealand Gaming Survey.* Wellington: Department of Internal Affairs.

Abbott, M.W., Wong, S., Williams, M., Au, M., & Young, S. (1999). Chinese migrants' mental health and adjustment to life in New Zealand. *Australian and New Zealand Journal of Psychiatry,* 33, 13-21.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders, third edition.* Washington DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders, fourth edition.* Washington DC: Author

Australian Institute for Gambling Research. (1998). *Study of the social and economic impacts of New Zealand casinos. Final report.* Campbelltown, Australia: Author.

Austrin, T. (1998). Retailing leisure: Local and global developments in gambling. In C.C. Perkins & G. Cushman (Eds.), *Time out? Leisure, recreation and tourism in New Zealand and Australia* (pp. 167-181). Auckland: Longman

Blaszczynski, A., Dumlao, V., & Lange, M. (1997). How much do you spend gambling? Ambiguities in survey questionnaire items. *Journal of Gambling Studies, 13,* 237-252.

Blaszczynski, A., Huynh, S., Dumlao, V.J., & Farrell, E. (1998). Problem gambling within a Chinese speaking community. *Journal of Gambling Studies, 14*, 359-380

Christoffel, P. (1992). *People's participation in and attitudes towards gambling.* Wellington: Department of Internal Affairs.

Committee of Inquiry into Casinos. (1989). *The report of the Committee of Inquiry into the Establishment of Casinos in New Zealand.* Wellington: Author.

Cottler, L.B. (1998). *The 11-Year incidence of gambling problems among drug users recruited from the St. Louis ECA Study.* Paper presented at the National Research Council, Committee on the Social and Economic Impact of Pathological Gambling. Workshop on Pathological Gambling: Definitions, Prevalence, Comorbidity, and Etiology. Irvine, CA.

Cox, S., Lesieur, H.R., Rosenthal, R.J., & Volberg, R.A. (1997). *Problem and pathological gambling in America: The national picture.* Report prepared by the Research and Public Policy Committees of the National Council on Problem Gambling. Columbia, MD: National Council on Problem Gambling.

Department of Internal Affairs. (1990). *Review of gambling in New Zealand.* Wellington; Author.

Department of Internal Affairs. (1995a). *Overview of gaming and gambling issues present and future.* Wellington: Author.

Department of Internal Affairs. (1995b). *Review of Gaming – a discussion document.* Wellington: Author.

Deville, J.C., Sarndall, C.E., & Sautory, O. (1993). Generalised raking procedures in survey sampling. *Journal of the American Statistical Association,* 88, 1013-1020*.*

Dickerson, M. G. (1993). A preliminary exploration of a two-stage methodology in the assessment of the extent and degree of gambling related problems in the Australian population. In W.R. Eadington & J.A. Cornelius (Eds.), *Gambling behavior and problem gambling* (pp. 347-363). Reno, Nevada: Institute for the Study of Gambling and Commercial Gaming, University of Nevada, Reno.

Dickerson, M.G., Baron, E., Hong, S.M., & Cottrell, D. (1996). Estimating the extent and degree of gambling related problems in the Australian population: A national survey. *Journal of Gambling Studies, 12,* 161-178.

Ferris, J., Stirpe, T., & Lalomiteanu, A. (1996). *Gambling in Ontario: A report from a general population survey on gambling-related problems and opinions. ARF research document series no. 130.* Toronto: Addiction Research Foundation.

Fisher, S. (1996*). Gambling and problem gambling among casino patrons.* Report to the British Casino Industry Consortium.

Gambino, B. (1997). The correction for bias in prevalence estimation with screening tests. *Journal of Gambling Studies*, 13, 343-351.

Gambino, B. (in press). An epidemiological note on verification bias: Implications for estimation of rates*. Journal of Gambling Studies.*

Gerstein, D., Volberg, R.A., Murphy, S., & Toce, M. et. al. (1999*). Gambling impact and behavior study. Report to the National Gambling Impact Study Commission.* Chicago: National Opinion Research Center at the University of Chicago.

Grant, D. (1994). *On a roll: A history of gambling and lotteries in New Zealand.* Wellington: Victoria University Press.

Greenacre, M., & Hastie, T. (1987). The geometric interpretation of correspondence analysis. *Journal of the American Statistical Association, 82*, 437-447.

Griffiths, M.D. (1998a). *Gambling into the millennium: Issues of concern and potential concern.* Paper presented at the National GamCare Conference, Adelaide, 6 May, 1998.

Griffiths, M.D. (1998b). *The way ahead: Internet, technology and problems – what can we expect?* Paper presented at the National GamCare Conference, Adelaide, 6 May, 1998.

Jacques, C., Ladouceur, R., Ferland, F., & Giroux, I. (1997). *Prevalence of problem gambling in Quebec seven years after the first prevalence study.* Paper presented at the 10th International Conference on Gambling and Risk Taking. Montreal, Canada, (31 May 4 June, 1997).

Korn, E.L. & Graubard, B.I., (1998). Confidence intervals for proportions with small expected numbers of positive counts estimated from survey data. *Survey Methodology*, *24*, 193-201.

Lesieur, H.R. (1994). Epidemiological surveys of pathological gambling: Critique and suggestions for modification. *Journal of Gambling Studies, 10,* 385-398.

Lesieur, H.R., & Blume, S.B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144*, 1184-1188.

Lorenz, V., Politzer, R., & Yaffee, R. (1990). *Final report on gambling addiction in Maryland.* Baltimore: Department of Health and Mental Hygiene.

Manly, B.F.J., & Gonzalez, L. (1993). *A confidence interval for the number of pathological gamblers in New Zealand.* Dunedin: Centre for Applications of Statistics and Mathematics, University of Otago.

Ministry of Health. (1996). *Guidelines for the assessment of and treatment of pathological gambling,* Wellington: Author.

National Health Committee. (1998). *The social, cultural and economic determinants of health in New Zealand. Action to improve health.* Wellington: Author.

North Health. (1996). *Interim report on problem gambling management prepared for Committee on Problem Gambling Management.* Auckland: Author.

Oldendick, Bishop, Sorenson, & Tuchfarber, (1998). A comparison of the Kish and last birthday method of respondent selection in telephone surveys. *Journal of Official Statistics,* 4(4), 307-318.

O'Sullivan, J., & Christoffel, P. (1992). In C. Scott (Ed.), *Lotteries, gaming and public policy* (pp. 61-69). Wellington: Institute of Policy Studies.

Phillips, J. (1987). *A man's country? The image of the Pakeha male: A history.* Auckland: Penguin Books.

Polzin, P.E., Baldridge, J., Doyle, D., Sylvester, J.T., Volberg, R.A. & Moore, W.L. (1998). From convenience stores to casinos: Gambling – Montana style. *Montana Business Quarterly, 36* (4), 2-14.

Problem Gambling Committee. (1999). Problem gambling counselling in New Zealand 1998, National Statistics.

Productivity Commission. (1999). *Australia's gambling industries, Report No. 10.* Canberra: AusInfo.

Reid, K., & Searle, W. (1996). *People's participation in and attitudes towards gambling: Final results of the 1995 survey. Research Series No* 22. Wellington: Department of Internal Affairs*.*

Rönnberg, S., Volberg, R.A., & Abbott, M.W., Moore, W.L., Andren, A., Munck, I., Jonsson, J., & Svensson, O. (1999). *Gambling and problem gambling in Sweden. Report No. 2 of the National Institute of Public Health Series on Gambling.* Stockholm: National Institute of Public Health.

Rosecrance, J. (1988). *Gambling without guilt: The legitimation of an American pastime.* Belmont, CA: Wadsworth.

Schwarz, N. (1999). Self-reports. How the questions shape the answers. *American Psychologist,* 2, 93-105.

Shaffer, H.J., Hall, M.N., & Vander Bilt, J. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis*. Boston, MA: Harvard Medical School Division of Addictions.

Sullivan, S., McCormack, R., & Selman, D. (1997). Increased requests for help by problem gamblers. Data from a gambling crises hot line. *New Zealand Medical Journal, 110,* 380-383*.*

Thompson, W.N. (1997*). Legalized gambling: A reference handbook.* Santa Barbara, CA: ABC-CLIO.

Volberg, R.A. (1995). *Gambling and problem gambling in Iowa: A replication survey.* Report to the Iowa Department of Human Services.

Volberg, R.A. (1996).   Prevalence studies of problem gambling in the United States*. Journal of Gambling Studies, 12,* 111-128*.*

Volberg, R..A., & Abbott, M.W. (1994). Lifetime prevalence estimates of pathological gambling in New Zealand. *International Journal of Epidemiology, 23,* 976-983.

Volberg, R.A., & Abbott, M.W. (1997). Gambling and problem gambling among indigenous peoples*. Journal of Substance Use and Misuse, 32*, 1525-1538

Volberg, R..A., & Banks, S.M. (1994). *A new approach to understanding gambling and problem gambling in the general population.* Paper presented at the Ninth International Conference on Gambling and Risk Taking. Las Vegas, NV.

Volberg, R.A., & Dickerson, M.G. (1996). Special issue on prevalence studies and pathological gambling. *Journal of Gambling Studies, 12 (2).*

Volberg, R.A., Dickerson, M.G., Ladouceur,R., & Abbott, M.W. (1996). Prevalence studies and the development of services for problem gamblers and their families. *Journal of Gambling Studies, 12,* 215-231.

Volberg, R.A., & Moore, L. (1999a) Appendix D: Gambling and problem gambling in Louisiana: A replication study, 1995 to 1998. In T.P. Ryan & J.F. Speyrer, *Gambling in Louisiana: A benefit/cost analysis.* Report to the Louisiana Gaming Control Board.

Volberg, R.A., & Moore, L. (1999b). *Gambling and problem gambling in Washington State: A replication study, 1992-1998.* Report to the Washington State Lottery.

Volberg, R.A., Reitzes, D.C., & Boles, J. (1997). Exploring the links between gambling, problem gambling and self-esteem. *Deviant Behavior,* 18, 321-342*.*

Volberg, R.A. & Silver, E. (1993)*. Gambling and problem gambling in North Dakota.* Report to the North Dakota Department of Human Services, Division of Mental Health.

Volberg, R.A., & Steadman, H.J. (1988). Refining prevalence estimates of pathological gambling*. American Journal of Psychiatry*, *145*, 502-505.

Volberg, R.A., Toce, M.T., & Gerstein, D.R. (1999). From backroom to living room: changing attitudes toward gambling. *Public Perspective,* 10(5), 8-13.

Walker, M.B. (1992). *The psychology of gambling.* New York, NY: Permagon.

Walker, M.B., & Dickerson, M.G. (1996).). On defining problem gambling. *The National Association of Gambling Studies Journal, 10* (1), 5-6.

Wells, J.E., Bushnell, J.A., Hornblow, A.R., Joyce, P.R., & Oakley-Browne, M.A. (1989). Christchurch psychiatric epidemiology study Part 1 Methodology and lifetime prevalence for specific disorders. *Australian and New Zealand Journal of Psychiatry, 23,* 215-226.

Wells, J.E., Bushnell, J.A., Joyce, P.R., Oakley-Brown, M.A., & Hornblow, A.R. (1992). Problems with alcohol, drugs and gambling in Christchurch, New Zealand. In M. Abbott & K. Evans (Eds.), *Alcohol and drug dependence and disorders of impulse control.* Auckland: Mental Health Foundation of New Zealand.

Westphal, J., Johnson, L.J. & Stevens, L. (1999). Appendix E: Estimating the social costs of gambling disorders in Louisiana for 1998. In T.P. Ryan & JF. Speyrer, *Gambling in Louisiana: A benefit/cost analysis.* Report to the Louisiana Gaming Control Board.

Wildman, R.W. (1998). *Gambling: An attempt at an integration.* Edmonton: Wynne Resources.

Wither, A. (1987). *Taking a gamble: A survey of public attitudes towards gambling in New Zealand.* Wellington: Department of Internal Affairs.

Wynne, H.J. , Smith, G.J. & Volberg, R.A. (1994). *Gambling and problem gambling in Alberta.* Report to the Alberta Lotteries and Gaming Commission.

APPENDICES

Appendix One

**New Zealand Gaming Survey 1999
Questionnaire**

New Zealand Gaming Survey 1999

Statistics NEW ZEALAND Te Tari Tatau

Household form	Phase 1 Introduction & selection	Phase 2 Consent

Interviewer number ☐☐☐

Participation code ☐☐

Person number ☐☐

Interview mode ☐

Not selected for phase 2 ◯ 1

Consented for phase 2 ◯ 2

Refused for phase 2 ◯ 3

Consented for phase 2

Consent form included ◯ 1

Refused to sign consent form ◯ 2

Non-contact ◯ 3

Instructions to do the selection

- Put a tick in "Eligible" column for each person where:
  1. they are 18 yrs or older
  2. they usually live here.

- In the "Eligible No." column, rank the eligible residents. Put 1 beside the oldest eligible person, 2 beside the next oldest etc.

- Use the selection grid to pick the selected person.

- Circle the eligible number of the selected person.

Answers to common questions

- The survey is voluntary but we would really like you to take part.

- The survey is to do with betting activities or games such as Lotto, TAB or Telebingo.

- We're still interested in you. We need to talk to people who don't do any of these things.

- We are interviewing about 9,500 people.

- The interview will take about 15 minutes.

- We are doing the survey on behalf of the Department of Internal Affairs who license gaming activities in NZ.

Call backs / best time to call

	1	2	3	4	5	6	7	8
H								
R								

---

1 Hello, I'm ..... from Statistics NZ. We're the government department which collects statistics, for example we do the Census. We're doing a survey. A letter was sent to your address introducing it. What I need to do is select one person at random from your household and ask them to take part. Would it be OK to do this now? It only takes half a minute to do the selection.

Yes .... 1 ◯

No .... 2 ◯ → When would be a good time to call back? _____

2 To help me do this selection, can you tell me the first names and ages of all the people, 18 years or older, who usually live here, starting with the oldest?

	Q2 First name	Q2 Age	Eligible	Eligible No.
11				
12				
13				
14				
15				
16				
17				
18				
19				

3 Do the selection. Is there a selected person for the household?

Yes .... 1 ◯

No .... 2 ◯ → As a result of the selection process, no one in your household has been selected. Thank you for taking part in the survey. **END INTERVIEW.**

4 Before I begin, I'd like to make sure I've dialled the right number. Is this ..... (read number)?

Yes .... 1 ◯

No .... 2 ◯ → As a result of the selection process, no one in your household has been selected. Thank you for taking part in the survey. **END INTERVIEW.**

5 As a result of the selection process I need to interview ..... Is (he/she) available now?

Yes .... 1 ◯ → Go to questionnaire

No .... 2 ◯ → When would be a good time for me to call back to talk to (him/her)? **END INTERVIEW.** _____

■ **Consent required**

You have been selected to go through to the second interview. The second interview is to be carried out by the National Research Bureau (NRB). To continue we need to give NRB your contact details. Do you mind if we do this?

I need you to sign a form to say you will allow us to pass your contact details over to NRB. I will bring it to you to sign. When would be a good time?

_____

Can I have your full name and address?

_____

_____

_____

_____

_____

Thank you very much and I will see you on .....

■ **Not required for phase 2**

You have not been selected to go through to the second interview. I'd like to take this opportunity to thank you, on behalf of the survey team, for taking part in this survey.

Details passed over to NRB

- Name, address, telephone number.

- Coded information about gambling activities.

Statistics
NEW ZEALAND
Te Tari Tatau

Reference number G ☐☐☐☐☐☐☐

Participation code ☐☐

Person number ☐☐

New Zealand Gaming Survey 1999
Personal Questionnaire

1   (Hello, I'm ….. from Statistics New Zealand. We're the government department which collects statistics, for example we do the Census.
We're doing a survey, and you have been chosen at random from your household to take part.)

Do you have 15 minutes available now to do the interview, or would you prefer me to call back?

Now . . . . ◯
Call back . . . . ◯ ➔   When would be a good time to call back? E N D

_____

2   The survey has to do with betting activities or games in which there is an element of luck or chance for example Lotto, TAB or Telebingo. All your answers are absolutely confidential.

People bet or spend money on many different things, such as raffles, Lotto, housie, sports events, card games, and others. I am going to read out a list of these activities.

Can you first tell me, for each one, whether you have ever spent money on that activity:

INTERVIEWER: Read out list on opposite page

3   INTERVIEWER: Is 'Yes' ticked for any of (a) to (p) in Q2?

Yes . . . . 1 ◯ ➔ 4
No . . . . 2 ◯ ➔ 48

4   I am going to run through the list again.
Can you tell me which of the activities you have bet or spent money on in the last six months?

INTERVIEWER: Read out (a) to (p) for those which have ticked 'Yes' in Q2

5   Can you give me an idea of the amount of money that you spend on the activity in a typical month?
I am only looking for an approximate amount, rounded to the nearest $5 or so.

INTERVIEWER: Read out (a) to (p) for those which have ticked 'Yes' in Q4

6   And can you tell me which of these activities you usually take part in once a week or more often?

INTERVIEWER: Read out (a) to (p) for those which have ticked 'Yes' in Q4

	2 Ever bet on this			**4** In past six months			**5** Amount per month	**6** Once a week		
				ask if "yes" in Q2			ask if "yes" in Q4	ask if "yes" in Q4		
	Yes	No	DK	Yes	No	DK		Yes	No	DK
(a) Lotto?	1	2	3	1	2	3	$	1	2	3
(b) Instant Kiwi?	1	2	3	1	2	3	$	1	2	3
(c) Daily Keno?	1	2	3	1	2	3	$	1	2	3
(d) Telebingo?	1	2	3	1	2	3	$	1	2	3
(e) other lotteries or raffles of any kind?	1	2	3	1	2	3	$	1	2	3
(f) 0900 telephone competitions?	1	2	3	1	2	3	$	1	2	3
(g) gambling on the internet for money? **If "yes" ask (i) to (v)**	1	2	3							
(i) was that betting on horse or dog races?	1	2	3	1	2	3	$	1	2	3
(ii) other sports betting?	1	2	3	1	2	3	$	1	2	3
(iii) lottery tickets?	1	2	3	1	2	3	$	1	2	3
(iv) casino games, including all gaming machines on the internet?	1	2	3	1	2	3	$	1	2	3
(v) any other types of gambling activity? SPECIFY...	1	2	3	1	2	3	$	1	2	3
(h) gambling at a Casino? **If "yes" ask (i) and (ii)**	1	2	3							
(i) was that gaming machines?	1	2	3	1	2	3	$	1	2	3
(ii) or other games at a casino?	1	2	3	1	2	3	$	1	2	3
(i) gaming machines that aren't in casinos?	1	2	3	1	2	3	$	1	2	3
(j) betting on horse or dog races?	1	2	3	1	2	3	$	1	2	3
(k) other sports betting?	1	2	3	1	2	3	$	1	2	3
(l) dice games such as Crown and Anchor, played for money?	1	2	3	1	2	3	$	1	2	3
(m) card games played for money?	1	2	3	1	2	3	$	1	2	3
(n) housie played for money?	1	2	3	1	2	3	$	1	2	3
(o) money bets with friends or workmates on the outcome of some event?	1	2	3	1	2	3	$	1	2	3
(p) any other gambling activity, for example battens up or mah-jong? SPECIFY...	1	2	3	1	2	3	$	1	2	3

SCORING:

Tick the first category the respondent meets. Select one only.

Are any shaded Q6 'yes' squares ticked?	☐ Continuous ➔**7**
Are any non-shaded Q6 'yes' squares ticked?	☐ Non-continuous ➔**7**
Are any Q2 'yes' squares ticked?	☐ Infrequent ➔**7**
otherwise	☐ Non-gambler ➔**48**

7 *Thinking about the sorts of activities which I have mentioned, please tell me which is the gambling activity that you most enjoy?*

Lotto ··············· 1 ◯

Instant Kiwi ········ 2 ◯

Daily Keno ·········· 3 ◯

Telebingo ·········· 4 ◯

Other lotteries or
raffles of any kind.. 5 ◯

0900 telephone
competitions......... 6 ◯

Internet
-horse or dog races ... 7 ◯

Internet
-other sports betting 8 ◯

Internet
-lottery tickets ...... 9 ◯

Internet-casino games . 10 ◯

Internet-other games . 11 ◯
- specify

_____

Casino-gaming machines 12 ◯

Casino-other games ... 13 ◯

Gaming machines
not in a casino ...... 14 ◯

Betting on
horse or dog races ... 15 ◯

Other sports betting . 16 ◯

Dice games for money . 17 ◯

Card games for money . 18 ◯

Housie for money ..... 19 ◯

Money bets with
friends or workmates . 20 ◯

Other gaming activity . 21 ◯
- specify

_____

No favourite......... 22 ◯ ➔ 9

DK.................... ◯ ➔ 9

Refused .... ◯ ➔ 9

8 Are there any others that you particularly enjoy?

PROBE: Any others?

Tick all that apply

Lotto ··············· 1 ◯

Instant Kiwi ········ 2 ◯

Daily Keno ·········· 3 ◯

Telebingo ·········· 4 ◯

Other lotteries or
raffles of any kind.. 5 ◯

0900 telephone
competitions......... 6 ◯

Internet
-horse or dog races ... 7 ◯

Internet
-other sports betting 8 ◯

Internet
-lottery tickets ...... 9 ◯

Internet-casino games . 10 ◯

Internet-other games . 11 ◯
- specify

_____

Casino-gaming machines 12 ◯

Casino-other games ... 13 ◯

Gaming machines
not in a casino ...... 14 ◯

Betting on
horse or dog races ... 15 ◯

Other sports betting . 16 ◯

Dice games for money . 17 ◯

Card games for money . 18 ◯

Housie for money ..... 19 ◯

Money bets with
friends or workmates . 20 ◯

Other gaming activity . 21 ◯
- specify

_____

No other favourite ... 22 ◯

DK.................... ◯

Refused .... ◯

9 And can you tell me the reasons why you participate in these types of activities?

PROBE: Any other reasons?

Tick all that apply

Socialising......... 1 ◯

Excitement/challenge. 2 ◯

To win money........ 3 ◯

To support worthy causes.............. 4 ◯

For entertainment/fun 5 ◯

As a hobby / habit... 6 ◯

Curiosity........... 7 ◯

Other............... 8 ◯
- specify

_____

DK.................... ◯

Refused·············· ◯

10 Some of the next questions might not apply to you, but I need to ask them anyway. There are no right or wrong answers – just say what's true for you.

When you participate in the gambling activities we have discussed, how often do you go back another day to win back money you lost. Is it:

never? .... 1 ◯ ➜12

some of the time? .... 2 ◯

most of the time? .... 3 ●

every time? .... 4 ●

DK.................... ◯ ➜12

Refused.............. ◯ ➜12

11 And how often have you done this in the last 6 months. Is it:

never? .... 1 ◯

some of the time? .... 2 ◯

most of the time? .... 3 ◯

every time? .... 4 ◯

DK.................... ◯

Refused.............. ◯

12 Have you ever claimed to be winning money from these activities when in fact you lost. Is it:

never? .... 1 ◯ ➜14

half the time? .... 2 ●

most of the time? .... 3 ●

DK.................... ◯ ➜14

Refused.............. ◯ ➜14

13 And how often have you done this in the last 6 months. Is it:

never? .... 1 ◯

half the time? .... 2 ◯

most of the time? .... 3 ◯

DK.................... ◯

Refused.............. ◯

Score:

9 – 13

14 Do you ever spend either more time or more money gambling than you intend?

Yes . . . . 1 ●

No . . . . 2 ○ ➔16

DK . . . . ○ ➔16

Refused . . . . ○ ➔16

15 And have you done so in the last 6 months?

Yes . . . . 1 ○

No . . . . 2 ○

DK . . . . ○

Refused . . . . ○

16 Have people ever criticised your gambling?

Yes . . . . 1 ●

No . . . . 2 ○ ➔18

DK . . . . ○ ➔18

Refused . . . . ○ ➔18

17 And have people criticised your gambling in the last 6 months?

Yes . . . . 1 ○

No . . . . 2 ○

DK . . . . ○

Refused . . . . ○

18 Have you ever felt guilty about the way you gamble, or about what happens when you gamble?

Yes . . . . 1 ●

No . . . . 2 ○ ➔20

DK . . . . ○ ➔20

Refused . . . . ○ ➔20

19 Have you felt this way in the last 6 months?

Yes . . . . 1 ○

No . . . . 2 ○

DK . . . . ○

Refused . . . . ○

20 Have you ever felt that you would like to stop gambling, but didn't think that you could?

Yes . . . . 1 ●

No . . . . 2 ○ ➔22

DK . . . . ○ ➔22

Refused . . . . ○ ➔22

21 Have you felt this way in the last 6 months?

Yes . . . . 1 ○

No . . . . 2 ○

DK . . . . ○

Refused . . . . ○

22 Have you ever hidden betting slips, lottery tickets, gambling money or other signs of gambling from your spouse or partner, children or other important people in your life?

Yes . . . . 1 ●

No . . . . 2 ◯ ➔24

DK . . . . ◯ ➔24

Refused . . . . ◯ ➔24

23 And have you done this in the last 6 months?

Yes . . . . 1 ◯

No . . . . 2 ◯

DK . . . . ◯

Refused . . . . ◯

24 Have you ever argued with people you live with over how you handle money?

Yes . . . . 1 ◯

No . . . . 2 ◯ ➔27

DK . . . . ◯ ➔27

Refused . . . . ◯ ➔27

25 Have these arguments ever centred on your gambling?

Yes . . . . 1 ●

No . . . . 2 ◯ ➔27

DK . . . . ◯ ➔27

Refused . . . . ◯ ➔27

26 Have you had any of those arguments about your gambling in the last 6 months?

Yes . . . . 1 ◯

No . . . . 2 ◯

DK . . . . ◯

Refused . . . . ◯

27 Have you ever missed time from work, school or study due to gambling?

Yes . . . . 1 ●

No . . . . 2 ◯ ➔29

DK . . . . ◯ ➔29

Refused . . . . ◯ ➔29

28 And have you missed time from work, school or study due to gambling in the last 6 months?

Yes . . . . 1 ◯

No . . . . 2 ◯

DK . . . . ◯

Refused . . . . ◯

29 Have you ever borrowed from someone and not paid them back as a result of your gambling?

Yes . . . . 1 ●

No . . . . 2 ◯ ➔31

DK . . . . ◯ ➔31

Refused . . . . ◯ ➔31

30 And have you done so in the last 6 months?

Yes . . . . 1 ◯

No . . . . 2 ◯

DK . . . . ◯

Refused . . . . ◯

Score:

31 I am going to read out a list of ways in which some people get money for gambling.
Can you tell me which of these, if any, you have used to get money for gambling
or to pay gambling debts?

INTERVIEWER: Read out list of ways from table below

		31 Ever borrowed		33 In past 6 months	
		YES	NO	YES	NO
a)	borrowed household money	1 ●	2 ○	1 ○	2 ○
b)	borrowed from your spouse or partner	1 ●	2 ○	1 ○	2 ○
c)	borrowed from other relatives or in-laws	1 ●	2 ○	1 ○	2 ○
d)	loans from banks, loan companies or other finance companies	1 ●	2 ○	1 ○	2 ○
e)	cash withdrawals on credit cards INTERVIEWER: does not include EFTPOS and other instant cash cards to access bank account	1 ●	2 ○	1 ○	2 ○
f)	loans from loan sharks	1 ●	2 ○	1 ○	2 ○
g)	cashed in shares, insurance policies or other securities	1 ●	2 ○	1 ○	2 ○
h)	sold personal or family property	1 ●	2 ○	1 ○	2 ○
i)	borrowed from your cheque account by writing cheques that bounced	1 ●	2 ○	1 ○	2 ○

32 INTERVIEWER: Is 'Yes' ticked for any of (a) to (i) in Q31?

Yes .... 1 ○
No .... 2 ○ ➔ 34

33 And which of these sources of money have you used in the past 6 months for this purpose?

INTERVIEWER: Read out (a) to (i) for those which have ticked 'Yes' in Q31

34 Do you feel that you have ever had a problem with gambling?

Yes .... 1 ●
No .... 2 ○ ➔ 36
DK .... ○ ➔ 36
Refused .... ○ ➔ 36

35 Do you feel that you have had a problem with gambling in the last 6 months?

Yes .... 1 ○
No .... 2 ○
DK .... ○
Refused .... ○

Total
Score:

(Pathological = 3 or more)

36 When you participate in the gaming activities that you most enjoy, do you usually do so:

Tick all that apply

alone? .... 1 ◯

with your spouse
or partner? .... 2 ◯

with other family members? .. 3 ◯

with friends or co-workers? .... 4 ◯

with some other individual
or group? .... 5 ◯
-specify

_____

DK..................... ◯

Refused............... ◯

37 When you participate in the gaming activities that you most enjoy, do you usually do so for:

less than 1 hour? .... 1 ◯

1 to 2 hours? .... 2 ◯

3 to 5 hours? .... 3 ◯

6 to 12 hours? .... 4 ◯

more than 12 hours? .... 5 ◯

DK..................... ◯

Refused............... ◯

38 What is the largest amount of money you have ever lost in one day of gambling:

Less than $1? .... 1 ◯

$1 to $9? .... 2 ◯

$10 to $99 .... 3 ◯

$100 to $999? .... 4 ◯

$1,000 to $9,999? .... 5 ◯

$10,000 or more? .... 5 ◯

DK..................... ◯

Refused............... ◯

39 People bet on many different things and some start quite young. How old were you the first time you gambled?

☐☐

DK..................... ◯ ➜41

Refused............... ◯ ➜41

40 What type of gambling was that?

Lotto ·············· 1 ◯

Instant Kiwi .... 2 ◯

Daily Keno .... 3 ◯

Telebingo .... 4 ◯

Other lotteries or
raffles of any kind.. 5 ◯

0900 telephone
competitions......... 6 ◯

Internet
-horse or dog races ... 7 ◯

Internet
-other sports betting 8 ◯

Internet
-lottery tickets...... 9 ◯

Internet-casino games . 10 ◯

Internet-other games. 11 ◯
- specify

_____

Casino-gaming machines 12 ◯

Casino-other games ... 13 ◯

Gaming machines
not in a casino...... 14 ◯

Betting on
horse or dog races... 15 ◯

Other sports betting . 16 ◯

Dice games for money . 17 ◯

Card games for money . 18 ◯

Housie for money ..... 19 ◯

Money bets with
friends or workmates . 20 ◯

Other gaming activity . 21 ◯
- specify

_____

DK..................... ◯

Refused............... ◯

41 W as there any time when the amount you were gambling made you nervous?

Yes . . . . 1 ◯

No . . . . 2 ◯ ➔ 44

DK . . . . ◯ ➔ 44

Refused . . . . ◯ ➔ 44

42 What types of gambling were you doing when that happened?

PROBE: Any others?

Tick all that apply

Lotto · · · · · · · · · · · · · · · 1 ◯

Instant Kiwi . . . . 2 ◯

Daily Keno . . . . 3 ◯

Telebingo . . . . 4 ◯

Other lotteries or
raffles of any kind.. 5 ◯

0900 telephone
competitions. . . . . 6 ◯

Internet
-horse or dog races ... 7 ◯

Internet
-other sports betting 8 ◯

Internet
-lottery tickets . . . . . . 9 ◯

Internet-casino games . 10 ◯

Internet-other games . 11 ◯
- specify

_____

Casino-gaming machines 12 ◯

Casino-other games ... 13 ◯

Gaming machines
not in a casino . . . . . . 14 ◯

Betting on
horse or dog races ... 15 ◯

Other sports betting . 16 ◯

Dice games for money . 17 ◯

Card games for money . 18 ◯

Housie for money . . . . . 19 ◯

Money bets with
friends or workmates . 20 ◯

Other gaming activity . 21 ◯
- specify

_____

DK . . . . ◯

Refused . . . . ◯

43 How old were you the first time that happened?

[|]

DK .... ◯
Refused .... ◯

44 Have you ever been in trouble with the law because of activities related to your gambling?

Yes .... 1 ◯
No .... 2 ◯
DK .... ◯
Refused .... ◯

45 Have you ever wanted to get help to stop gambling?

Yes .... 1 ◯
No .... 2 ◯ ➔48
DK .... ◯ ➔48
Refused .... ◯ ➔48

46 Have you ever tried to get help to stop gambling?

Yes .... 1 ◯
No .... 2 ◯ ➔48
DK .... ◯ ➔48
Refused .... ◯ ➔48

47 Where did you go for help?

PROBE: Anyone else?

Tick all that apply

Nowhere .... 1 ◯
Family .... 2 ◯
Friends .... 3 ◯
Gambling hotline ..... 4 ◯
Gamblers anonymous (GA) or GAMANON .... 5 ◯
Psychologist, counsellor or psychiatrist ...... 6 ◯
General Practitioner . 7 ◯
Nurse .... 8 ◯
Minister, priest, pastor or monk .... 9 ◯
Alcohol or drug treatment centre ..... 10 ◯
Other .... 11 ◯
- specify

_____

DK .... ◯
Refused .... ◯

48 Which, if any, of the following people do you think may have or may have had a problem with gambling:

Tick all that apply

your father? .... 1 ◯

your mother? .... 2 ◯

another close family member? 3 ◯

a friend or
someone else in your life? ..... 4 ◯

None of these .... 5 ◯

DK .... ◯

Refused .... ◯

49 Thinking about your life generally, how happy have you been during the last 6 months? Would you say:

very happy? .... 1 ◯

somewhat happy? .... 2 ◯

somewhat unhappy? .... 3 ◯

very unhappy? .... 4 ◯

DK .... ◯

Refused .... ◯

50 Finally, I need to ask you some general questions about yourself and your household.
Were you born in New Zealand?

Yes .... 1 ◯ ➔53

No .... 2 ◯

51 What country were you born in?

_____

52 When did you first arrive to live in NZ?

month   year

53 Last week did you do any work for pay or profit in a job, business or farm?

Yes .... 1 ◯ ➔56

No .... 2 ◯

54 Last week did you have a job, business or farm that you were away from because of sickness, holidays or any other reason?

Yes .... 1 ◯ ➔56

No .... 2 ◯

55 Last week did you work without pay in a family business or farm?

Yes .... 1 ◯

No .... 2 ◯ ➔58

56 In your (main) job last week, what was your occupation?

_____

57 In your (main) job last week, what were the main tasks or duties?

_____

➔Go to 62

58 At any time in the last four weeks have you been looking for paid work?

Yes . . . . 1 ◯ ➔ 60

No . . . . 2 ◯

59 Last week was your main activity:

studying? . . . . 1 ◯

retired? . . . . 2 ◯

at home looking after children? 3 ◯

at home
not looking after children? . . . . . . 4 ◯

doing something else? . . . . 5 ◯
- specify

_____

➔ Go to 62

60 In the last four weeks have you done any of the following to find work:

Tick all that apply

looked at job advertisements
in newspapers? . . . . 1 ◯

wrote, phoned or applied in
person to an employer? . . . . 2 ◯

contacted the
NZ Employment Service? . . . . . . 3 ◯

contacted friends or
relatives about a job? . . . . 4 ◯

contacted career advisers or
vocational guidance officers? 5 ◯

anything else? . . . . 6 ◯
- specify

_____

None of the above . . . . 7 ◯

61 If a job had been available, could you have started last week?

Yes . . . . 1 ◯

No . . . . 2 ◯

62 Do you have any school qualification?

Yes . . . . 1 ◯

No . . . . 2 ◯

63 Have you gained any qualifications since leaving school?

Yes . . . . 1 ◯

Still at school . . . . . . 2 ◯ ➔ 65

No . . . . 3 ◯ ➔ 65

64 What qualifications have you obtained since leaving school?

Tick all that apply

Vocational or trade . . 1 ◯
(includes: Trade Cert,
Advanced Trade Cert,
NZ Cert or Diploma,
Technicians Cert,
Polytech Cert or Diploma,
Teachers Cert or Diploma,
University Cert or Diploma
below Bachelor level,
Other qualification)

Degree . . . . 2 ◯
(includes: Bachelors Degree,
Post Graduate Degree, Cert
or Diploma)

65 What is your date of birth?

     day   month   year

66 Can you tell me which of these ethnic groups you belong to:

Tick all that apply

NZ European / Pakeha? .... 1 ◯

other European? .... 2 ◯

NZ Maori? .... 3 ◯

Pacific Island? .... 4 ◯

Asian? .... 5 ◯

or another ethnic group? .... 6 ◯

DK .... ◯

Refused .... ◯

67 Are you currently:

married ? .... 1 ◯

living with a partner? .... 2 ◯

separated? .... 3 ◯

divorced? .... 4 ◯

widowed? .... 5 ◯

or never married? .... 6 ◯

DK .... ◯

Refused .... ◯

68 Is R:

Male? .... 1 ◯

Female? .... 2 ◯

69 What is your religion?

Christian (unspecified) 1 ◯

Anglican .... 2 ◯

Presbyterian .... 3 ◯

Catholic .... 4 ◯

Methodist .... 5 ◯

Baptist .... 6 ◯

Latter Day Saints .... 7 ◯

Pentecostal .... 8 ◯

other Christian ...... 9 ◯
- specify

_____

other religion ...... 10 ◯
- specify

_____

no religion .... 11 ◯

DK .... ◯

Refused .... ◯

70 I am going to read out a list of income groups and I'd like you to tell me which of these groups covers your total household income from all sources. This is before tax, and is for the 12 months ending today.

$20,000 or less? .... 1 ◯

$20,001 to $30,000? .... 2 ◯

$30,001 to $40,000? .... 3 ◯

$40,001 to $50,000? .... 4 ◯

$50,001 to $70,000? .... 5 ◯

$70,001 or more? .... 6 ◯

DK .... ◯

Refused .... ◯

71 Are there any other phone numbers for this residence?
Don't include cell phones or fax numbers.

Yes .... 1 ◯

No .... 2 ◯ ➜ 75

72 How many different numbers are there?

1 .... 1 ◯

2 .... 2 ◯

3 .... 3 ◯

4 .... 4 ◯

other - specify...... 5 ◯

_____

DK .... ◯

Refused .... ◯

73 Are any of these numbers for business only?

Yes .... 1 ◯

No .... 2 ◯ ➜ 75

74 Of the .... numbers mentioned, how many are for business only?

1 .... 1 ◯

2 .... 2 ◯

3 .... 3 ◯

4 .... 4 ◯

other - specify...... 5 ◯

_____

DK .... ◯

Refused .... ◯

75 Can you tell me how many people, including children, live in this household?

1 .... 1 ◯

2 .... 2 ◯

3 .... 3 ◯

4 .... 4 ◯

5 .... 5 ◯

6+ .... 6 ◯

DK .... ◯

Refused .... ◯

76 That's all the questions. Some of the people who have answered this questionnaire are selected to go through to a second part of the survey. I am now putting your responses through the random selection criteria.

Interviewer: do phase 2 selection using the scoring box's after question 6 and 35, and the phase 2 selection grid on the household form.

➜ Go to household form.

Appendix Two

Definitions

Definitions

Continuous gaming activity
Continuous gambling is characterised by the opportunity for a continuous repeated cycle of placing a stake, playing, determination and ability to collect and reinvest winnings, such as occurs with gaming machines, casino betting and horse betting.

Current problem gambler
A current problem gambler is a person who has met the South Oaks Revised Gambling Screen criteria for problem gambling in the past six months.

Current probable pathological gambler
A current probable pathological gambler is a person who has met the South Oaks Revised Gambling Screen criteria for probable pathological gambling in the past six months.

Employed
The employed are all persons in the working-age population who during the last week:
a) worked for one hour or more for pay, profit, or payment in kind in a job, business, farm or professional practice, or,
b) worked without pay for one hour or more in work which contributed directly to the operation of a farm, business or professional practice operated by a relative, or,
c) had a job or business they were temporarily absent from.

Ethnicity
Ethnicity is the ethnic group or groups reported by respondents in the ethnic group question.

Ethnic group
A social group whose members have the following four characteristics:

a) share a sense of common origins
b) claim a common and distinctive history and destiny
c) possess one or more dimensions of collective cultural individuality
d) feel a sense of unique collective solidarity.

Gamblers Anonymous (GA)
A mutual help organisation for problem gambling modelled on Alcoholics Anonymous and its '12 step' programme.

Infrequent gambler
A person who has gambled in their lifetime, but who gambles less than once a week.

Lifetime problem gambler
A lifetime problem gambler is a person who has at some time in their lives met the South Oaks Revised Gambling Screen criteria for problem gambling.

Lifetime probable pathological gambler
A lifetime probable pathological gambler is a person who has at some time met the South Oaks Revised Gambling Screen criteria for probable pathological gambling.

Never gambled
A person who has not gambled in their life.

Non-continuous gaming activity
A non-continuous gaming activity is an activity where there may be many hours or days between placing a stake or buying a ticket and the determination of the win or loss. Gambling on lotteries is an example of a non-continuous activity.

Non-gambler
A non-gambler is someone who has not gambled in the past six months.

Not in the labour force
Persons in the working-age population who are neither employed nor unemployed are "not in the labour force".

Occupation
An occupation is a set of jobs, which involve the performance of a common set of tasks.

Past six month gambler
A past six-month gambler is someone who has gambled in the past six months.

Prioritised ethnic group
Respondents were asked to specify which ethnic group(s) they belong to, and were given the option of specifying as many as they wished. The priority system allocates people to one group only, on the following basis:

- "European" includes those who specified a European group as their sole ethnic group
- "NZ Mäori" includes all those who specified NZ Mäori either alone or in combination with other groups
- "Pacific Island" includes all people who specified a Pacific Island ethnic group except those who also specified NZ Mäori
- "Asian" includes all those who specified an Asian ethnic group except those who also specified NZ Mäori or a Pacific Island ethnic group. The two largest Asian groups in New Zealand are Chinese and Indian.
- "Other" includes all those who specified another ethnic group except those who also specified NZ Mäori or a Pacific Islands or Asian ethnic group.

Probable pathological gambling
Probable pathological gambling is defined as those who have scored 5 or more on the South Oaks Revised Gambling Screen.

Problem gambling
Problem gambling is defined as those people who have scored 3 or 4 on the South Oaks Revised Gambling Screen.

Regular continuous gambler
A regular continuous gambler is a person who participates in a continuous gaming activity, once a week or more.

Regular non-continuous gambler

A regular non-continuous gambler is a person who participates in a non-continuous activity once a week or more and who is not a regular continuous gambler.

South Oaks Revised Gambling Screen

The South Oaks Revised Gambling Screen (SOGS-R) was the instrument used to measure the extent of problem gambling in the survey population.

SOGS-R is an international psychometric measure of whether someone is defined as a problem or probable pathological gambler.

Unemployed

The unemployed are all persons in the working-age population who are, or during the reference week were, without work, available for work and have actively sought work in the past four weeks.

Appendix Three

Detailed Description of the Derivations

Detailed Description of the Derivations

Lifetime no problem – none of the following responses:
- most of the time or every time to question 10
- half of the time or most of the time to question 12
- yes to 14, 16, 18, 20, 22, 25, 27, 29, 31a, 31b, 31c, 31d, 31e, 31f, 31g, 31h, 31i, 34

Lifetime problem gambler 1 – 1 or 2 of the following responses:
- most of the time or every time to question 10
- half of the time or most of the time to question 12
- yes to 14, 16, 18, 20, 22, 25, 27, 29, 31a, 31b, 31c, 31d, 31e, 31f, 31g, 31h, 31i, 34

Lifetime problem gambler 2 – 3 or 4 of the following responses:
- most of the time or every time to question 10
- half of the time or most of the time to question 12
- yes to 14, 16, 18, 20, 22, 25, 27, 29, 31a, 31b, 31c, 31d, 31e, 31f, 31g, 31h, 31i, 34

Probable pathological gambler (lifetime) – 5 or more of the following responses:
- most of the time or every time to question 10
- half of the time or most of the time to question 12
- yes to 14, 16, 18, 20, 22, 25, 27, 29, 31a, 31b, 31c, 31d, 31e, 31f, 31g, 31h, 31i, 34

Current no problem – none of the following responses:
- most of the time or every time to question 11
- half of the time or most of the time to question 13
- yes to 15, 17, 19, 21, 23, 26, 28, 30, 33a, 33b, 33c, 33d, 33e, 33f, 33g, 33h, 33i, 35

Current problem gambler 1 – 1 or 2 of the following responses:
- most of the time or every time to question 11
- half of the time or most of the time to question 13
- yes to 15, 17, 19, 21, 23, 26, 28, 30, 33a, 33b, 33c, 33d, 33e, 33f, 33g, 33h, 33i, 35

Current problem gambler 2 – 3 or 4 of the following responses:
- most of the time or every time to question 11
- half of the time or most of the time to question 13
- yes to 15, 17, 19, 21, 23, 26, 28, 30, 33a, 33b, 33c, 33d, 33e, 33f, 33g, 33h, 33i, 35

Current probable pathological gambler – 5 or more of the following responses:
- most of the time or every time to question 11
- half of the time or most of the time to question 13
- yes to 15, 17, 19, 21, 23, 26, 28, 30, 33a, 33b, 33c, 33d, 33e, 33f, 33g, 33h, 33i, 35

Never gambled
No to all activities in question 2 "ever bet on this"

Infrequent gambler
Yes to at least one activity in question 2 "ever bet", but answered no to all activities in question 6 "once a week or more often".

Regular continuous gambler

Yes to any of the following activities in question 6 "once a week or more often" :
(b) Instant Kiwi, (g i) horse and dog races on Internet, (g ii) other sports betting on Internet, (g iv) casino games including all gaming on Internet, (h) gambling at casino, (i) gaming machines not at casinos, (j) betting on horse or dog races, (k) other sports betting, (l) dice games such as crown and anchor played for money, (m) card games for money, (n) housie played for money, or (p) other gaming activity (this may be dependent on which activity they specify).

Regular non-continuous gambler
Yes to any of the following activities in question 6 "once a week or more often" :
(a) Lotto, (c) Daily Keno, (d) TeleBingo, (e) other lotteries or raffles of any kind, (f) 0900 telephone competitions, (g iii) lottery tickets on the Internet, (g v) other types of Internet gambling, (o) money bets with friends or work mates on the outcome of an event and they are not a regular continuous gambler.

Gambled but not in the past six months
Yes to one or more activities in question 2 and answered no to all activities in question 4.

Gambled in the past 6 months but not once a week
Yes to one or more activities in question 4 and answered no to all activities in question 6.

Prioritised ethnic group
If any Mäori response then prioritised ethnic group is Mäori.
If a Pacific Island response and no Mäori response then Pacific Island ethnic group
If an Asian response and not a Mäori or Pacific Island response then Asian ethnic group
If a response in other ethnic group and not Mäori or Pacific Island or Asian then Other ethnic group
Otherwise European ethnic group.

Labour force status
Employed – answered yes to question 53 or yes to question 54, or answered yes to question 55
Unemployed – answered no to question 53 and no to question 54 and no to question 55 and answered yes in question 58 and yes to 2, 3, 4, 5 or 6 in question 60 and yes to question 61
Not in the labour force – answered no to question 53 and answered no to question 54 and answered no to question 55 and answered no to question 58 or
answered no to question 53 and answered no to question 54 and answered no to question 55 and answered yes to question 58 and answered 1 or 7 in question 60 or
answered no to question 53 and answered no to question 54 and answered no to question 55 and answered yes to question 58 and answered yes to 2, 3, 4, 5, 6 in question 60 and answered no to question 61
Otherwise – labour force status unidentifiable

Region
Auckland – Auckland directory
Wellington – Wellington directory
Christchurch – Christchurch directory
Rest of New Zealand – All other Telecom directories.

Highest educational qualification

No school qualification – answered no (2) to question 62 and answered no (3) to question 63.

School qualification – answered yes (1) to question 62 and no (3) to question 63.

Vocational or trade qualification – answered 1 to question 64 and did not answer 2 to question 64.

Degree – answered 2 to question 64.

Appendix Four

Contingency Table and Logistic Regression Analyses of Past Six Months Participation in Major Forms of Gambling

In this appendix, the statistical significance and relative strength of associations between socio-demographic variables and participation in nine different types of gambling are reported. Chi-square analysis of two-way tables (tests of independence) and logistic regression analysis are employed. The findings of these analyses underline the importance of regarding gambling as a grouping of somewhat heterogenous activities.

As indicated in Tables 8 and 17a, 72.6 percent of adults reported participating in Lotto during the past six months. Table A examines differences between respondents who reported participating in Lotto during the past six months and those who did not. The statistical significance of these differences was tested by adjusted Chi-square and the significance levels are indicated on the table. The Table A findings are discussed here to illustrate how the results of Chi square and logistic regression analyses are interpreted.

The assumption underlying Chi-square analysis is that all sub-populations under consideration have the same distribution of a given gambling behaviour. In practice the sub-populations correspond to columns in the contingency table. The test takes account of the variability of the sample estimates and estimates the probability that sub-population estimates would be the result if there were actually no difference between sub-populations. This probability (or p-value) is provided with each contingency table considered in the analysis. A p-value of less than 0.05 indicates that there is less than (or equal to) one chance in 20 that there is no significant difference in gambling participation between sub-populations in the contingency table. Adjustment has been made for the complex survey design.

From Table A it is evident that Lotto participants do not differ significantly from non-participants with respect to either gender or location. However, highly significant differences (p less than .001) are evident for all of the other factors considered.

Because many of the variables listed in Table A are inter-related and because there is interest in knowing which of the factors have the strongest, independent predictive relationship with Lotto participation, a stepwise logistic regression analysis was conducted. This provides a more definitive analysis than the two-way contingency tables which ignore the effects of other collected variables.

The stepwise logistic regression process begins by adding the first listed variable to the model. If the modelled coefficient is significantly different from zero (at the 5% significance level) then the variable will remain in the model. If not, it is removed. This process iterates through each potential explanatory variable in the list. Each time a variable is added, the status of all the other variables in the model is reassessed. If a variable no longer has a coefficient significantly different from zero then it will be removed. The process continues until all potential explanatory variables have been considered for inclusion and all variables not significant to the model have been removed. When the final set of possible explanatory variables was identified through weight-adjusted stepwise logistic regression in SAS, they were then exported to WesVar. This enabled direct user specified regression modelling taking full account of the complex design.

Two measures of logistic regression model fit are provided, namely the rate of concordance and the R^2 statistic.

<u>Rate of Concordance</u>. A pair of individuals with different responses, that is one with Y = 1, the other with Y = 0, is considered concordant (discordant) if the modelled probability p for the individual with Y = 1 is higher (lower) than the modelled probability p of the individual with Y = 0. If the modelled probabilities are the same for both individuals then the pair is considered tied. The concordance rate is the proportion of all pairs that are concordant. Rates of discordance and ties are calculated in a similar manner. The higher the rate of concordance the better the model.

R^2 <u>Statistic</u>. This statistic measures the proportion of the overall variability of the outcome variable Y explained by the logistic model. The higher the R^2 value the better the fitted model.

With respect to Table A, the overall model is highly satisfactory. The logistic regression analysis identified the most powerful predictors of Lotto participation. All of the binary sociodemographic variables were considered for inclusion in this and subsequent models. Each of the statistically significant predictor variables is expressed as an odds ratio estimate (OR). The results of the first analysis are reported in Table B.

The highest odds ratio is 2.03 (Employed). This means that relative to the other groups within the broader employment status category (i.e. unemployed and not in labour force), employed participants are 108 percent more likely (i.e. slightly more than twice as likely) to participate in Lotto. The confidence interval for this odds ratio is 1.7 to 2.4, meaning that the true estimate has a 95 percent probability of falling within this range. Other high odds ratios are evident for people with school qualifications only or vocational or trade qualifications. The lowest odds ratios apply to Christians who do not belong to one of the major denominations, people of religions other than Christian, recent migrants and people aged 18-24 years. People in these groups are much less likely than those in other groups within their respective sociodemographic categories to participate in Lotto.

Table A: Participation in Lotto in last 6 Months by Selected Characteristics

Characteristic		Participated in Lotto in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	47.6%	48.8%	0.4593
	Female	52.4%	51.2%	
Ethnicity	European	74.7%	79.1%	
	Mäori	11.6%	11.8%	
	Pacific Island	4.8%	3.8%	<0.0001
	Asian	7.4%	3.2%	
	Other ethnic group	1.6%	2.0%	
Marital status	Married/Living with a partner	57.9%	70.2%	
	Separated/Divorced/Widowed	14.1%	12.8%	<0.0001
	Never married	27.7%	16.4%	
	Not elsewhere included	0.4%	0.7%	
Age group	18-24	20.2%	11.0%	
	25-34	18.4%	21.3%	
	35-44	19.4%	22.4%	<0.0001
	45-54	14.5%	18.5%	
	55-64	10.7%	12.0%	
	65 plus	16.9%	14.8%	

Country of birth	New Zealand	74.9%	81.0%	
	Europe/Australia/North America	5.5%	5.0%	0.0002
	Other countries	19.5%	13.9%	
	Not elsewhere included	0.0%	0.1%	
Years since arrival in NZ	Less than 4 years	6.7%	2.4%	
	4 years or more	18.4%	16.4%	<0.0001
	Not elsewhere included	0.0%	0.2%	
	Not in subject population	74.9%	81.0%	
Highest qualification	No formal qualification	23.6%	22.1%	
	School qualification	20.3%	21.4%	<0.0001
	Vocational or trade qualification	38.1%	44.0%	
	Degree or higher qualification	18.0%	12.4%	
Labour force status	Employed	55.6%	70.1%	
	Unemployed	6.0%	2.9%	<0.0001
	Not in the labour force	38.0%	26.9%	
	Labour force status unidentifiable	0.4%	0.2%	
Religion	No religion	27.8%	30.8%	
	Anglican	11.6%	20.0%	
	Presbyterian	10.3%	13.9%	
	Catholic	10.6%	14.1%	<0.0001
	Other Christian	31.7%	16.1%	
	Other religion	7.1%	3.9%	
	Not elsewhere included	1.0%	1.2%	
Household size (includes children)	1	12.3%	10.6%	
	2	28.4%	34.7%	
	3	18.7%	19.8%	0.0004
	4	20.9%	18.9%	
	5 or more	19.4%	15.7%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	23.7%	17.4%	
	$20,001 to $30,000	14.0%	15.5%	
	$30,001 to $40,000	12.0%	14.8%	
	$40,001 to $50,000	8.5%	12.5%	<0.0001
	$50,001 to $70,000	12.7%	13.8%	
	$70,001 or more	14.4%	18.2%	
	Not elsewhere included	14.7%	7.7%	
Location	Auckland	31.5%	29.3%	
	Wellington	10.7%	10.9%	0.5374
	Christchurch	12.0%	12.5%	
	Rest of New Zealand	45.8%	47.3%	

Adjusted Chi-square P Values Used

Table B: Sociodemographic Predictors of Lotto Participation: Results of Logistic Regression Analysis

Characteristic	Odds Ratio		Confidence interval	
European	0.75		(0.6 , 0.9)	
Asian	0.59		(0.4 , 0.9)	
Never Married	0.64		(0.5 , 0.8)	
Aged 18-24	0.56		(0.4 , 0.8)	
Anglican	1.30		(1.1 , 1.6)	
Other Christian	0.41		(0.3 , 0.5)	
Other religion	0.49		(0.3 , 0.7)	
Employed	2.03		(1.7 , 2.4)	
Household size of 2	1.32		(1.1 , 1.5)	
Household size of 3	1.28		(1.1 , 1.6)	
No formal qualifications	1.36		(1.1 , 1.8)	
Highest qualification - school qualification	1.86		(1.5 , 2.3)	
Highest qualification - Vocational or trade qualification	1.65		(1.3 , 2.1)	
Less Than 4 Years in NZ	0.50		(0.3 , 0.7)	

Concordant = 66.8%, R^2 = 0.080
Discordant: = 31.7%,
Tied = 1.5%.

A cautionary note must be added at this juncture. Logistic regression models generally predict a dependent variable from a collection of independent variables. There are a number of important provisos on such models:

- They are predictors, and even statistically significant independent variables do not necessarily indicate causes; i.e. models which are good predictors may not provide casual explanations.

- The independent (i.e. explanatory, or predictor) variables are not necessarily independent of each other, and explanatory variables that are strongly related can lead to confounding or multicollinearity problems that make interpretation even of important predictor variables difficult.

- Models which contain some or all main effects only (i.e. no interaction terms) can be fitted, but these may not incorporate the more subtle relationships between the independent variables, especially where there is confounding or multicollinearity. Extensive model testing is the only way to firmly establish that a main effects model is an adequate or a best predictor.

- Models can be fitted that include interactions between independent variables, and these models require considerable time consuming statistical model checking to determine the best model.

Given the wide range of socio-demographic, gaming participation, preference and expenditure, and other risk factors, as explanatory variables, an extremely large number of possible candidate models exist. Time and budget constraints limited the extent of model fitting for the gaming data. The models reported on in this section have generally

ignored confounding effects and possible variable interactions. In view of the points made above they should be considered as exploratory only, and not a definitive statement on explanatory variables of most or least impact on the various outcome variables.

For this reason care should be exercised in drawing too definitive a conclusion from the results of logistic regression modelling. For instance, the omission of any one predictor variable from a fitted logistic regression model does not necessarily imply that it is of no significance to the outcome variable. It may in fact be significant through effects which were not considered in these models, such as through interactions with other variables. Caution should also be exercised with reported odds ratios and their confidence intervals. These are provided here as an indicator of each variable's predictive power within the fitted model only. It should not be assumed that they are unaffected by the addition or removal of other variables from the model. Finally, these models are provided as predictors of gaming outcomes and should not be considered as a direct means of identifying and explaining the causes of these outcomes. As confounding effects and possible variable interactions have been ignored, models of similar or greater predictive power may be producible using alternative variables or more complex variable combinations as predictors.

Tables C to R present comparable information to that provided in Tables A and B for the following gambling activities. The past six months participation rate for each form of gambling is shown in brackets:

- Other lotteries or raffles (48.1%)
- Instant Kiwi (36.4%)
- Horse or dog races (18.4%)
- Money bets with friends or work-mates (17.0%)
- TeleBingo (16.7%)
- Gaming machines not at casinos (14%)
- Gaming machines at casinos (10.6%)
- Other games at casinos (4.5%).

From the contingency tables (Tables C, E, G, I, K, M, O and Q) it is evident that, as with Lotto participation, participation in most forms of gambling varies across many of the sociodemographic groups considered. Reference to the accompanying summary tables from logistic regression analyses D, F, H, J, L, N, P and R indicates that, in most cases, the great majority of significant odds ratios range between 0.5 and 2.00. In other words, many different factors each appear to contribute modestly to the prediction of participation in the different types of gambling. There are, however, a few exceptions that will be mentioned.

For each form of gambling considered, the strongest independent predictors of past six months participation are listed. These lists are based on the odds ratios in the tables referred to above. Only categories with odds ratios higher than 2.0 or lower than 0.5 are shown.

Lotto

- Low participation
    Christian other than major denomination

265

Other Religion

- High participation
  Employed

Other lotteries and Raffles

- Low participation
  Wellington residents

Instant Kiwi

- Low participation
  Pacific Island ethnicity
  Resident less than four years in New Zealand

- High participation
  Aged 18-24 years

Gambling on Horse or Dog Races

- Low participation
  Asian
  Religion other than Christian

- High participation
  Wellington residents

Money Bets with Friends or Work-mates

- High participation
  Aged 18-24 years
  Employed
  Household income of NZ$70,001 or more

TeleBingo

- Low participation
  Religion other the Christian
  Resident less than four years in New Zealand

- High participation
  No formal qualifications
  School qualification only

Gaming Machines not at a Casino

- Low participation
  Other religion

- High participation
    - Mäori
    - No formal qualifications
    - Vocational or trade qualification

Gaming Machines at a Casino

- High participation
    - Christchurch resident
    - Auckland resident
    - Pacific Islanders

Other Casino Games

- Low participation
    - Household income NZ$20,001-NZ$30,000

- High participation
    - Christchurch resident
    - Auckland resident
    - Employed

Odds ratios higher than 3.0 were found for Christchurch residents' casino gaming machine and other casino games participation. In other words, people in this group have very high levels of participation in these two forms of gambling relative to others within the general population.

Although the odds ratios from these analyses should be considered approximations rather than definitive, the relative weightings or levels of participation for the various groups examined are generally consistent with the participation findings summarised in Table 17a. It should be noted that a wider range of sociodemographic variables is considered here than in Table 17a.

Table C: Participation in Other Lotteries or Raffles in the last 6 months by Selected Characteristics

Characteristic		Participated in Other Lotteries or Raffles in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	50.8%	45.9%	0.0005
	Female	49.2%	54.1%	
Ethnicity	European	74.3%	81.9%	
	NZ Mäori	10.9%	12.3%	
	Pacific Island	5.5%	2.7%	<0.0001
	Asian	7.0%	1.6%	
	Other ethnic group	2.3%	1.4%	
Marital status	Married/Living with a partner	62.6%	71.6%	
	Separated/Divorced/Widowed	14.1%	12.1%	<0.0001
	Never married	22.7%	15.8%	
	Not elsewhere included	0.6%	0.6%	

Age group	18-24	16.2%	10.4%	
	25-34	19.9%	21.3%	
	35-44	18.4%	25.1%	<0.0001
	45-54	16.3%	18.5%	
	55-64	12.1%	11.2%	
	65 plus	17.1%	13.5%	
Country of birth	New Zealand	74.9%	84.0%	
	Europe/Australia/North America	6.2%	4.0%	<0.0001
	Other countries	18.9%	11.9%	
	Not elsewhere included	0.0%	0.1%	
Years since arrival in NZ	Less than 4 years	5.4%	1.6%	
	4 years or more	19.5%	14.2%	<0.0001
	Not elsewhere included	0.2%	0.1%	
	Not in subject population	74.9%	84.0%	
Highest qualification	No formal qualification	24.7%	20.1%	
	School qualification	20.4%	21.9%	0.0044
	Vocational or trade qualification	41.0%	44.0%	
	Degree or higher qualification	13.9%	14.1%	
Labour force status	Employed	61.2%	71.5%	
	Unemployed	4.9%	2.6%	<0.0001
	Not in the labour force	33.6%	25.9%	
	Labour force status unidentifiable	0.3%	0.1%	
Religion	No religion	30.3%	29.6%	
	Anglican	15.1%	20.6%	
	Presbyterian	11.2%	14.5%	
	Catholic	12.1%	14.4%	<0.0001
	Other Christian	23.3%	17.2%	
	Other religion	6.6%	2.9%	
	Not elsewhere included	1.4%	0.8%	
Household size (includes children)	1	12.1%	10.0%	
	2	33.1%	33.0%	
	3	20.0%	18.9%	0.0059
	4	17.6%	21.6%	
	5 or more	16.9%	16.4%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	23.1%	15.0%	
	$20,001 to $30,000	15.9%	14.3%	
	$30,001 to $40,000	12.7%	15.2%	
	$40,001 to $50,000	9.7%	13.2%	<0.0001
	$50,001 to $70,000	11.7%	15.6%	
	$70,001 or more	14.8%	19.9%	
	Not elsewhere included	12.1%	6.8%	
Location	Auckland	32.6%	27.2%	
	Wellington	13.9%	7.6%	<0.0001
	Christchurch	11.8%	13.1%	
	Rest of New Zealand	41.7%	52.1%	

Adjusted Chi-square P Values Used

Table D: Sociodemographic Predictors of Other Lotteries or Raffles Participation: Results of Logistic Regression Analysis

Characteristic	Odds Ratio	Confidence Interval
Male	0.76	(0.7 , 0.8)
Asian	0.62	(0.4 , 1.1)
Aged 18-24	0.67	(0.5 , 0.9)
Aged 35-44	1.25	(1.1 , 1.5)
No religion	0.81	(0.7 , 0.9)
Other Christian	0.62	(0.5 , 0.7)
Other religion	0.54	(0.4 , 0.8)
Employed	1.26	(1.1 , 1.5)
Auckland	0.74	(0.6 , 0.9)
Wellington	0.41	(0.3 , 0.5)
Christchurch	0.84	(0.7 , 1.0)
Household size of 4	1.22	(1.0 , 1.5)
Household income $20001-$30000	1.35	(1.1 , 1.6)
Household income $30001-$40000	1.58	(1.3 , 1.9)
Household income $40001-$50000	1.75	(1.4 , 2.2)
Household income $50001-$70000	1.80	(1.5 , 2.2)
Household income $70001 or over	1.90	(1.6 , 2.3)
No formal qualifications	0.78	(0.7 , 0.9)
Less than 4 years in NZ	0.50	(0.3 , 0.7)
Not born in NZ/Europe/Australia/North America	0.52	(0.3 , 0.8)

Concordant = 65.4%, R^2 = 0.068
Discordant = 33.9%,
Tied = 0.7%.

Table E: Participation in Instant Kiwi in the last 6 months by Selected Characteristics

Characteristic		Participated in Instant Kiwi in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	51.2%	43.6%	<0.0001
	Female	48.8%	56.4%	
Ethnicity	European	77.0%	79.7%	
	NZ Mäori	10.8%	13.3%	
	Pacific Island	5.0%	2.3%	<0.0001
	Asian	5.1%	3.2%	
	Other ethnic group	2.1%	1.5%	
Marital status	Married/Living with a partner	67.6%	65.5%	
	Separated/Divorced/Widowed	14.3%	11.1%	<0.0001
	Never married	17.6%	22.6%	
	Not elsewhere included	0.5%	0.8%	
Age group	18-24	10.3%	18.7%	
	25-34	19.7%	22.0%	
	35-44	21.7%	21.4%	<0.0001
	45-54	18.2%	16.1%	
	55-64	12.5%	10.2%	
	65 plus	17.7%	11.5%	
Country of birth	New Zealand	76.6%	84.4%	
	Europe/Australia/North America	5.7%	4.0%	<0.0001

	Other countries	17.8%	11.5%	
	Not elsewhere included	0.0%	0.1%	
Years since arrival in NZ	Less than 4 years	4.6%	1.6%	
	4 years or more	18.6%	13.8%	<0.0001
	Not elsewhere included	0.2%	0.2%	
	Not in subject population	76.6%	84.4%	
Highest qualification	No formal qualification	23.0%	21.7%	
	School qualification	20.2%	22.8%	0.0006
	Vocational or trade qualification	41.4%	44.1%	
	Degree or higher qualification	15.4%	11.3%	
Labour force status	Employed	63.2%	71.0%	
	Unemployed	3.9%	3.5%	<0.0001
	Not in the labour force	32.6%	25.4%	
	Labour force status unidentifiable	0.3%	0.1%	
Religion	No religion	28.4%	32.7%	
	Anglican	17.0%	18.9%	
	Presbyterian	12.5%	13.3%	
	Catholic	12.5%	14.4%	<0.0001
	Other Christian	22.9%	15.8%	
	Other religion	5.5%	3.6%	
	Not elsewhere included	1.0%	1.3%	
Household size (includes children)	1	12.6%	8.4%	
	2	33.8%	31.7%	
	3	18.6%	21.0%	<0.0001
	4	18.4%	21.3%	
	5 or more	16.3%	17.4%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	20.5%	16.9%	
	$20,001 to $30,000	14.8%	15.5%	
	$30,001 to $40,000	13.3%	15.0%	
	$40,001 to $50,000	11.2%	11.8%	0.0866
	$50,001 to $70,000	13.4%	13.7%	
	$70,001 or more	17.0%	17.6%	
	Not elsewhere included	9.8%	9.5%	
Location	Auckland	32.2%	25.8%	
	Wellington	10.0%	12.3%	<0.0001
	Christchurch	12.0%	13.1%	
	Rest of New Zealand	45.9%	48.7%	

Adjusted Chi-square P Values Used

Table F: Sociodemographic Predictors of Instant Kiwi Participation: Results of Logistic Regression Analysis

	Characteristic	Odds Ratio		Confidence interval
	Male	0.69		(0.6 , 0.8)
	Pacific Island	0.41		(0.2 , 0.8)
	Aged 18-24	2.44		(2.0 , 3 .0)
	Aged 25-34	1.40		(1.2 , 1.7)
	Aged 35-44	1.23		(1.0 , 1.5)
	No religion	0.84		(0.7 , 1.0)
	Other Christian	0.58		(0.5 , 0.7)
	Other religion	0.66		(0.4 , 1 .0)
	Employed	1.34		(1.2 , 1.5)
	Auckland	0.86		(0.7 , 1 .0)
	Wellington	1.22		(1 .0, 1.5)
	Household size of 1	0.73		(0.6 , 0.8)
	Household income $20001-$30000	1.17		(1.0 , 1.4)
	Less Than 4 Years in New Zealand	0.37		(0.2 , 0.6)

Concordant = 62.5%, R^2 = 0.043
Discordant = 36.1%,
Tied = 1.4%.

Table G: Participation in Gambling on Horse or Dog races in last 6 months by Selected Characteristics

Characteristic		Participated in Gambling on Horse or Dog Races in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	46.9%	55.8%	<0.0001
	Female	53.1%	44.2%	
Ethnicity	European	77.5%	79.7%	
	Māori	11.3%	13.6%	
	Pacific Island	4.2%	3.5%	0.0043
	Asian	5.0%	1.9%	
	Other ethnic group	2.0%	1.4%	
Marital status	Married/Living with a partner	66.4%	68.7%	
	Separated/Divorced/Widowed	13.6%	11.1%	0.2338
	Never married	19.5%	19.4%	
	Not elsewhere included	0.6%	0.7%	
Age group	18-24	14.2%	10.7%	
	25-34	19.5%	24.9%	
	35-44	21.4%	22.0%	0.0004
	45-54	17.3%	17.8%	
	55-64	11.4%	12.7%	
	65 plus	16.2%	12.0%	

Country of birth	New Zealand	78.6%	82.7%	
	Europe/Australia/North America	5.1%	5.1%	0.0034
	Other countries	16.2%	12.1%	
	Not elsewhere included	0.1%	0.0%	
Years since arrival in NZ	Less than 4 years	3.9%	2.0%	
	4 years or more	17.3%	15.2%	0.0009
	Not elsewhere included	0.2%	0.0%	
	Not in subject population	78.6%	82.7%	
Highest qualification	No formal qualification	22.0%	24.7%	
	School qualification	21.2%	20.4%	0.435
	Vocational or trade qualification	42.6%	41.7%	
	Degree or higher qualification	14.1%	13.2%	
Labour force status	Employed	63.8%	76.0%	
	Unemployed	4.1%	2.1%	<0.0001
	Not in the labour force	31.8%	21.8%	
	Labour force status unidentifiable	0.3%	0.1%	
Religion	No religion	29.8%	30.6%	
	Anglican	17.2%	20.2%	
	Presbyterian	12.8%	13.4%	
	Catholic	12.0%	18.5%	<0.0001
	Other Christian	21.6%	14.7%	
	Other religion	5.4%	2.0%	
	Not elsewhere included	1.2%	0.6%	
Household size (includes children)	1	11.5%	9.2%	
	2	32.4%	35.9%	
	3	19.2%	20.6%	0.1231
	4	19.6%	18.9%	
	5 or more	17.0%	15.2%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	20.2%	14.5%	
	$20,001 to $30,000	15.0%	15.5%	
	$30,001 to $40,000	13.7%	15.3%	
	$40,001 to $50,000	11.6%	10.4%	<0.0001
	$50,001 to $70,000	13.2%	14.8%	
	$70,001 or more	15.9%	22.8%	
	Not elsewhere included	10.3%	6.7%	
Location	Auckland	30.2%	28.9%	
	Wellington	9.7%	16.2%	<0.0001
	Christchurch	11.9%	14.3%	
	Rest of New Zealand	48.2%	40.7%	

Adjusted Chi-square P Values Used

Table H: Sociodemographic Predictors of Gambling on Horse or Dog Races: Results of Logistic Regression Analysis

	Description	Odds Ratio		Confidence interval
	Male	1.38		(1.2 , 1.6)
	Maori	1.38		(1.0 , 1.9)
	Asian	0.46		(0.3 , 0.9)
	Aged 18-24	0.74		(0.5 , 1.0)
	Aged 25-34	1.27		(1.0 , 1.5)
	Anglican	1.21		(1.0 , 1.5)
	Catholic	1.57		(1.2 , 2.0)
	Other Christian	0.69		(0.5 , 0.9)
	Other religion	0.39		(0.2 , 0.7)
	Employed	1.77		(1.4 , 2.2)
	Auckland	1.26		(1.0 , 1.5)
	Wellington	2.10		(1.6 , 2.7)
	Christchurch	1.42		(1.0 , 2.0)
	Household size of 2	1.20		(1.1 , 1.4)
	Household income $40001-$50000	0.77		(0.6 , 1.0)
	Household income $70001 or more	1.19		(1.0 , 1.5)
	No formal qualifications	1.46		(1.2 , 1.8)
	Highest qualification - school qualification	1.21		(1.0 , 1.5)

Concordant = 63.7%, R^2 = 0.050
Discordant = 35.5%,
Tied   = 0.8% .

Table I: Participation in Money Bets with friends or co-workers in last 6 months by Selected Characteristics

Characteristic		Participated in Money Bets with Friends or Co-Workers in last 6 months		Significance (p value)
		No	Yes	
Sex	Male	46.4%	58.8%	<0.0001
	Female	53.6%	41.2%	
Ethnicity	European	78.0%	77.4%	
	Mäori	10.9%	16.0%	
	Pacific Island	4.1%	3.9%	0.0002
	Asian	4.9%	1.8%	
	Other ethnic group	2.1%	0.9%	
Marital status	Married/Living with a partner	68.0%	60.6%	
	Separated/Divorced/Widowed	14.0%	8.7%	<0.0001
	Never married	17.3%	30.1%	
	Not elsewhere included	0.6%	0.5%	
Age group	18-24	11.7%	22.2%	
	25-34	19.1%	27.4%	
	35-44	20.9%	24.7%	<0.0001

273

	45-54	17.8%	15.3%	
	55-64	12.6%	7.0%	
	65 plus	17.8%	3.4%	
Country of birth	New Zealand	77.8%	86.8%	
	Europe/Australia/North America	5.2%	4.6%	0.0002
	Other countries	16.9%	8.5%	
	Not elsewhere included	0.0%	0.1%	
Years since arrival in NZ	Less than 4 years	4.0%	1.4%	
	4 years or more	18.0%	11.5%	<0.0001
	Not elsewhere included	0.2%	0.2%	
	Not in subject population	77.8%	86.8%	
Highest qualification	No formal qualification	24.3%	13.8%	
	School qualification	21.4%	19.9%	<0.0001
	Vocational or trade qualification	41.3%	47.4%	
	Degree or higher qualification	13.0%	18.9%	
Labour force status	Employed	61.8%	87.1%	
	Unemployed	4.0%	2.7%	<0.0001
	Not in the labour force	34.0%	10.2%	
	Labour force status unidentifiable	0.3%	0.0%	
Religion	No religion	28.3%	38.2%	
	Anglican	18.1%	15.7%	
	Presbyterian	13.5%	10.0%	
	Catholic	12.7%	15.4%	<0.0001
	Other Christian	21.1%	16.3%	
	Other religion	5.1%	3.3%	
	Not elsewhere included	1.1%	1.0%	
Household size (includes children)	1	12.0%	6.7%	
	2	33.7%	29.3%	
	3	18.4%	25.1%	<0.0001
	4	18.8%	22.6%	
	5 or more	16.8%	16.1%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	21.6%	7.4%	
	$20,001 to $30,000	16.0%	10.8%	
	$30,001 to $40,000	14.2%	13.2%	
	$40,001 to $50,000	11.0%	13.6%	<0.0001
	$50,001 to $70,000	12.6%	17.4%	
	$70,001 or more	14.7%	29.4%	
	Not elsewhere included	10.0%	8.1%	
Location	Auckland	28.7%	35.3%	
	Wellington	10.6%	11.9%	0.001
	Christchurch	12.5%	11.9%	
	Rest of New Zealand	48.2%	40.9%	

Adjusted Chi-square P Values Used

Table J: Sociodemographic Predictors of Making Money Bets with Friends or Workmates: Results of Logistic Regression Analysis

Characteristic	Odds Ratio	Confidence interval
Male	1.42	(1.2 , 1.7)
Mäori	1.57	(1.1 , 2.2)
Asian	0.52	(0.2 , 1.1)
Separated/Divorced/Widowed	1.54	(1.2 , 2.0.)
Never Married	1.46	(1.1 , 1.9)
Aged 18-24	2.56	(1.7 , 3.8)
Aged 25-34	1.90	(1.5 , 2.4)
Aged 35-44	1.58	(1.3 , 1.9)
Catholic	1.23	(1.0 , 1.6)
Other Christian	0.78	(0.6 , 1.0)
Employed	2.34	(1.7 , 3.1)
Auckland	1.36	(1.1 , 1.7)
Household size of 5 or more	0.75	(0.5 , 1.0)
Household income $20000 or less	0.64	(0.4 , 0.9)
Household income $40001-$50000	1.36	(1.0 , 1.8)
Household income $50001-$70000	1.57	(1.2 , 2.1)
Household income $70001 or more	2.05	(1.5 , 2.7)
No formal qualifications	0.75	(0.6 , 1.0)
Highest qualification - school qualification	0.82	(0.7 , 1.0)
Less Than 4 Years in New Zealand	0.50	(0.2 , 1.1)
Born in New Zealand	1.32	(1.0 , 1.8)

Concordant = 74.5%, R^2 = 0.115
Discordant = 25.0%,
Tied   = 0.5% .

Table K: Participation in TeleBingo in last 6 months by Selected Characteristics

Characteristic		Participated in TeleBingo in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	50.3%	39.3%	<0.0001
	Female	49.7%	60.7%	
Ethnicity	European	78.3%	75.5%	
	Mäori	10.8%	16.4%	
	Pacific Island	4.1%	4.2%	0.0042
	Asian	4.8%	2.2%	
	Other ethnic group	1.9%	1.8%	
Marital status	Married/Living with a partner	65.3%	74.4%	
	Separated/Divorced/Widowed	13.2%	12.8%	<0.0001
	Never married	20.9%	12.0%	
	Not elsewhere included	0.6%	0.8%	

Category	Subcategory			P value
Age group	18-24	14.6%	7.7%	
	25-34	21.2%	16.9%	
	35-44	21.9%	19.9%	<0.0001
	45-54	17.2%	18.2%	
	55-64	10.9%	15.4%	
	65 plus	14.1%	21.9%	
Country of birth	New Zealand	78.8%	82.4%	
	Europe/Australia/North America	5.2%	4.7%	0.1312
	Other countries	16.0%	12.9%	
	Not elsewhere included	0.1%	0.0%	
Years since arrival in NZ	Less than 4 years	4.0%	1.2%	
	4 years or more	17.1%	15.9%	0.1337
	Not elsewhere included	0.1%	0.5%	
	Not in subject population	78.8%	82.4%	
Highest qualification	No formal qualification	20.6%	31.7%	
	School qualification	21.0%	21.8%	<0.0001
	Vocational or trade qualification	42.8%	40.4%	
	Degree or higher qualification	15.6%	6.0%	
Labour force status	Employed	67.7%	58.4%	
	Unemployed	3.8%	3.5%	<0.0001
	Not in the labour force	28.3%	37.9%	
	Labour force status unidentifiable	0.2%	0.1%	
Religion	No religion	30.9%	25.0%	
	Anglican	16.6%	23.2%	
	Presbyterian	11.9%	18.0%	
	Catholic	12.8%	15.2%	<0.0001
	Other Christian	21.6%	14.1%	
	Other religion	5.2%	2.8%	
	Not elsewhere included	1.0%	1.7%	
Household size (includes children)	1	11.1%	10.8%	
	2	31.4%	41.1%	
	3	20.0%	17.1%	0.001
	4	20.0%	16.8%	
	5 or more	17.3%	13.8%	
	Not elsewhere included	0.2%	0.4%	
Household income	$20,000 or less	18.2%	23.5%	
	$20,001 to $30,000	14.0%	20.7%	
	$30,001 to $40,000	13.9%	14.3%	
	$40,001 to $50,000	11.2%	12.3%	<0.0001
	$50,001 to $70,000	14.2%	10.1%	
	$70,001 or more	18.5%	10.5%	
	Not elsewhere included	9.9%	8.6%	
Location	Auckland	31.2%	23.4%	
	Wellington	11.1%	9.5%	<0.0001
	Christchurch	12.8%	10.2%	
	Rest of New Zealand	44.8%	57.0%	

Adjusted Chi-square P Values Used

Table L: Sociodemographic Predictors of TeleBingo Participation: Results of Logistic Regression Analysis

	Characteristic	Odds Ratio		Confidence interval
	Maori	1.72		(1.3 , 2.3)
	Pacific Island	1.48		(0.8 , 2.9)
	Aged 18-24	0.57		(0.4 , 0.8)
	Aged 25-34	0.78		(0.6 , 1.0)
	No religion	0.79		(0.7 , 0.9)
	Other Christian	0.51		(0.4 , 0.6)
	Other religion	0.45		(0.3 , 0.8)
	Auckland	0.78		(0.6 , 1.0)
	Christchurch	0.70		(0.5 , 0.9)
	Household size of 2	1.26		(1.1 , 1.5)
	Household income $20001-$30000	1.27		(1.0 , 1.5)
	Household income $50001-$70000	0.67		(0.5 , 0.9)
	Household income $70001 or more	0.62		(0.5 , 0.8)
	No formal qualifications	2.48		(1.8 , 3.5)
	Highest qualification - school qualification	2.14		(1.6 , 2.9)
	Highest qualification - Vocational or trade qualification	1.93		(1.4 , 2.6)
	Less Than 4 Years in New Zealand	0.45		(0.2 , 0.9)
	Married/Living as Married	1.51		(1.2 , 1.8)
	Male	0.65		(0.5 , 0.8)

Concordant = 66.6%, R^2= 0.070
Discordant = 32.5%,
Tied   = 0.9%.

Table M: Participation in Gambling on Gaming Machines not at a Casino in last 6 months by Selected Characteristics

Characteristic		Participated in Gaming Machine Gambling not at a Casino in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	46.6%	59.9%	<0.0001
	Female	53.4%	40.1%	
Ethnicity	European	78.7%	72.8%	
	Mäori	10.3%	21.0%	
	Pacific Island	4.1%	3.8%	<0.0001
	Asian	4.8%	1.9%	
	Other ethnic group	2.1%	0.5%	
Marital status	Married/Living with a partner	68.2%	58.5%	
	Separated/Divorced/Widowed	13.9%	8.4%	<0.0001
	Never married	17.3%	32.4%	
	Not elsewhere included	0.6%	0.7%	
Age group	18-24	12.0%	23.0%	
	25-34	19.5%	26.8%	
	35-44	22.1%	18.2%	<0.0001

277

	45-54	17.5%	16.6%	
	55-64	12.3%	7.8%	
	65 plus	16.6%	7.7%	
Country of birth	New Zealand	78.5%	84.7%	
	Europe/Australia/North America	5.0%	5.7%	0.0065
	Other countries	16.4%	9.7%	
	Not elsewhere included	0.1%	0.0%	
Years since arrival in NZ	Less than 4 years	3.9%	1.5%	
	4 years or more	17.4%	13.9%	0.0002
	Not elsewhere included	0.2%	0.0%	
	Not in subject population	78.5%	84.7%	
Highest qualification	No formal qualification	22.5%	22.6%	
	School qualification	21.1%	21.5%	0.0009
	Vocational or trade qualification	41.5%	47.5%	
	Degree or higher qualification	14.9%	8.4%	
Labour force status	Employed	64.4%	76.2%	
	Unemployed	3.6%	4.5%	<0.0001
	Not in the labour force	31.7%	19.1%	
	Labour force status unidentifiable	0.2%	0.1%	
Religion	No religion	28.4%	39.9%	
	Anglican	18.1%	15.4%	
	Presbyterian	13.0%	12.1%	
	Catholic	13.0%	14.2%	<0.0001
	Other Christian	21.3%	14.6%	
	Other religion	5.1%	2.9%	
	Not elsewhere included	1.1%	1.0%	
Household size (includes children)	1	11.9%	6.1%	
	2	33.4%	30.5%	
	3	19.0%	22.4%	0.0023
	4	18.9%	22.9%	
	5 or more	16.6%	17.8%	
	Not elsewhere included	0.2%	0.4%	
Household income	$20,000 or less	19.6%	16.6%	
	$20,001 to $30,000	15.6%	12.3%	
	$30,001 to $40,000	13.6%	16.2%	
	$40,001 to $50,000	11.3%	12.3%	0.0063
	$50,001 to $70,000	14.0%	10.6%	
	$70,001 or more	16.8%	19.2%	
	Not elsewhere included	9.2%	12.7%	
Location	Auckland	30.9%	23.7%	
	Wellington	10.7%	12.0%	0.0044
	Christchurch	12.0%	15.1%	
	Rest of New Zealand	46.5%	49.2%	

Adjusted Chi-square P Values Used

Table N: Sociodemographic Predictors of Gaming Machine Participation not in a Casino: Results of Logistic Regression Analysis

Characteristic	Odds Ratio	Confidence interval
Male	1.62	(1.3 , 2.0)
Mäori	2.08	(1.5 , 2.8)
Never Married	1.68	(1.3 , 2.2)
Aged 18-24	1.67	(1.2 , 2.3)
Aged 25-34	1.68	(1.3 , 2.2)
Aged 45-54	1.31	(1.0 , 1.7)
Other Christian	0.59	(0.4 , 0.8)
Other religion	0.49	(0.3 , 1.0)
Employed	1.54	(1.2 , 2.0)
Auckland	0.73	(0.6 , 0.9)
Household size of 1	0.59	(0.5 , 0.8)
Household income $20001-$30000	0.71	(0.6 , 0.9)
Household income $50001-$70000	0.65	(0.5 , 0.9)
No formal qualifications	2.14	(1.4 , 3.2)
Highest qualification - school qualification	1.80	(1.2 , 2.7)
Highest qualification - Vocational or trade qualification	2.01	(1.4 , 3.0)

Concordant = 67.9% $R^2 = 0.077$
Discordant = 31.0%
Tied   = 1.1%

Table O: Participation in Gambling on Gaming Machines at a Casino in last 6 months by Selected Characteristics

Selected characteristics		Participated in Gaming Machine Gambling at a Casino in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	48.2%	51.2%	0.2506
	Female	51.8%	48.8%	
Ethnicity	European	78.2%	74.9%	
	Mäori	12.0%	9.8%	
	Pacific Island	3.7%	7.8%	0.0274
	Asian	4.2%	5.8%	
	Other ethnic group	1.9%	1.7%	
Marital status	Married/Living with a partner	66.7%	67.8%	
	Separated/Divorced/Widowed	13.5%	9.8%	0.0649
	Never married	19.2%	21.3%	
	Not elsewhere included	0.5%	1.2%	
Age group	18-24	13.4%	13.8%	
	25-34	19.8%	26.3%	
	35-44	21.6%	21.2%	<0.0001
	45-54	17.2%	19.0%	
	55-64	11.6%	12.0%	

	65 plus	16.3%	7.7%	
Country of birth	New Zealand	79.8%	75.3%	
	Europe/Australia/North America	4.5%	10.7%	0.0151
	Other countries	15.7%	13.8%	
	Not elsewhere included	0.0%	0.2%	
Years since arrival in NZ	Less than 4 years	3.5%	3.8%	
	4 years or more	16.6%	19.9%	0.2952
	Not elsewhere included	0.1%	1.0%	
	Not in subject population	79.8%	75.3%	
Highest qualification	No formal qualification	22.9%	18.6%	
	School qualification	21.0%	22.3%	0.1111
	Vocational or trade qualification	42.1%	45.1%	
	Degree or higher qualification	14.0%	14.1%	
Labour force status	Employed	64.7%	78.0%	
	Unemployed	3.7%	3.8%	<0.0001
	Not in the labour force	31.4%	17.9%	
	Labour force status unidentifiable	0.2%	0.3%	
Religion	No religion	29.7%	31.7%	
	Anglican	17.7%	18.1%	
	Presbyterian	12.9%	13.2%	
	Catholic	12.6%	17.7%	0.0007
	Other Christian	21.4%	12.2%	
	Other religion	4.6%	6.1%	
	Not elsewhere included	1.1%	1.1%	
Household size (includes children)	1	11.6%	6.4%	
	2	33.0%	33.4%	
	3	19.1%	22.6%	0.0042
	4	19.1%	22.0%	
	5 or more	16.9%	15.3%	
	Not elsewhere included	0.3%	0.2%	
Household income	$20,000 or less	20.3%	9.2%	
	$20,001 to $30,000	15.7%	10.4%	
	$30,001 to $40,000	13.9%	15.0%	
	$40,001 to $50,000	11.2%	12.6%	<0.0001
	$50,001 to $70,000	13.4%	14.8%	
	$70,001 or more	16.0%	27.3%	
	Not elsewhere included	9.5%	10.8%	
Location	Auckland	27.9%	46.2%	
	Wellington	11.3%	7.2%	<0.0001
	Christchurch	11.1%	23.2%	
	Rest of New Zealand	49.7%	23.4%	

Adjusted Chi-square P Values Used

Table P: Sociodemographic Predictors of Gambling on Gaming Machines at Casinos: Results of Logistic Regression Analysis

Characteristic	Odds Ratio	Confidence interval
Pacific Island	2.18	(1.1 , 4.5)
Aged 25-34	1.27	(1.0 , 1.6)
Catholic	1.26	(0.9 , 1.7)
Other Christian	0.51	(0.4 , 0.7)
Not in the Labour Force	0.66	(0.5 , 0.9)
Auckland	2.80	(2.2 , 3.6)
Christchurch	4.10	(3.3 , 5.1)
Household size of 5 or more	0.73	(0.5 , 1.0)
Household income $20000 or less	0.53	(0.4 , 0.8)
Household income $20001-$30000	0.68	(0.5 , 1.0)
Household income $70001 or more	1.40	(1.1 , 1.8)
Born in Europe/Australia/North America	1.35	(1.0 , 1.9)

Concordant = 72.1% $R^2 = 0.092$
Discordant = 25.5%
Tied   = 2.5%

Table Q: Participation in Other Gambling Games at a Casino in last 6 months by Selected Characteristics

Characteristic		Participated in Other Games at a Casino in the last 6 months		Significance (p value)
		No	Yes	
Sex	Male	47.8%	61.8%	0.0015
	Female	52.2%	38.2%	
Ethnicity	European	78.0%	75.2%	
	Mäori	12.0%	7.4%	
	Pacific Island	4.0%	7.0%	0.0643
	Asian	4.1%	9.4%	
	Other ethnic group	1.9%	1.1%	
Marital status	Married/Living with a partner	66.7%	68.8%	
	Separated/Divorced/Widowed	13.5%	6.6%	0.0241
	Never married	19.3%	23.9%	
	Not elsewhere included	0.6%	0.7%	
Age group	18-24	13.5%	13.4%	
	25-34	19.9%	33.6%	
	35-44	21.4%	24.8%	<0.0001
	45-54	17.4%	16.8%	
	55-64	11.8%	7.4%	
	65 plus	16.0%	4.1%	
Country of birth	New Zealand	79.6%	73.6%	
	Europe/Australia/North America	4.8%	12.4%	0.0084
	Other countries	15.5%	14.0%	
	Not elsewhere included	0.0%	0.0%	
Years since arrival in NZ	Less than 4 years	3.5%	5.0%	

	4 years or more	16.7%	21.4%	0.2862
	Not elsewhere included	0.2%	0.0%	
	Not in subject population	79.6%	73.6%	
Highest qualification	No formal qualification	22.9%	15.0%	
	School qualification	21.4%	14.4%	0.0003
	Vocational or trade qualification	42.2%	48.5%	
	Degree or higher qualification	13.6%	22.1%	
Labour force status	Employed	65.1%	86.1%	
	Unemployed	3.8%	1.6%	<0.0001
	Not in the labour force	30.9%	12.3%	
	Labour force status unidentifiable	0.2%	0.0%	
Religion	No religion	29.6%	36.6%	
	Anglican	17.8%	15.3%	
	Presbyterian	12.9%	11.4%	
	Catholic	12.9%	19.5%	0.0103
	Other Christian	20.8%	11.6%	
	Other religion	4.8%	5.0%	
	Not elsewhere included	1.1%	0.6%	
Household size (includes children)	1	11.3%	5.3%	
	2	32.8%	35.9%	
	3	19.4%	22.4%	0.0453
	4	19.3%	21.6%	
	5 or more	16.9%	14.9%	
	Not elsewhere included	0.3%	0.0%	
Household income	$20,000 or less	19.7%	7.7%	
	$20,001 to $30,000	15.5%	6.4%	
	$30,001 to $40,000	14.0%	13.7%	
	$40,001 to $50,000	11.3%	13.5%	<0.0001
	$50,001 to $70,000	13.4%	16.5%	
	$70,001 or more	16.6%	29.6%	
	Not elsewhere included	9.6%	12.6%	
Location	Auckland	29.2%	45.9%	
	Wellington	10.8%	10.3%	<0.0001
	Christchurch	12.0%	22.4%	
	Rest of New Zealand	48.1%	21.3%	

Adjusted Chi-square P Values Used

Table R: Sociodemographic Predictors of Participation in Other Gambling Games at a Casino: Results of Logistic Regression Analysis

Description	Odds Ratio	Confidence interval
Male	1.57	(1.1 , 2.2)
Aged 25-34	1.72	(1.2 , 2.4)
Catholic	1.40	(0.9 , 2.2)
Other Christian	0.53	(0.3 , 0.9)
Employed	2.23	(1.5 , 3.3)
Auckland	2.94	(2.1 , 4.1)
Wellington	1.73	(1.0 , 3.0)
Christchurch	3.97	(2.7 , 5.9)
Household size of 2	1.35	(1.0 , 1.8)

Household income $20000 or less	0.58	(0.4 , 0.9)
Household income $20001-$30000	0.40	(0.2 , 0.8)
Highest qualification - school qualification	0.68	(0.5 , 0.8)
Born in Europe/Australia/North America	1.97	(1.1 , 3.7)

Concordant = 73.2% R^2 = 0.103
Discordant = 24.9%
Tied   = 1.8%

Appendix Five

1999 Percent Confidence Intervals using the Korn and Graubard Method for Lifetime and Current Gambling Problem Status by Selected Characteristics

Selected Characteristics	Lifetime				Current			
	Problem		Pathological		Problem		Pathological	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Sex								
Male	2.0	3.9	0.8	1.9	0.7	1.9	0.2	0.8
Female	0.7	1.6	0.5	1.4	0.2	0.7	0.2	1.0
Age Group								
18-24	1.1	3.8	0.1	1.8	0.1	1.8	0.1	1.6
25-34	1.9	5.0	1.0	2.9	0.4	2.0	0.3	1.9
35-44	1.5	3.8	0.2	1.2	0.4	1.5	0.1	0.9
45-54	0.6	2.0	0.8	2.6	0.5	2.0	0.2	1.5
55-64	0.5	3.3	0.3	4.7	0.1	3.4	0	1.3
65+	0.2	1.2	0	0.8	0.1	0.8	NA[1]	NA
Ethnicity [2]								
European	1.0	1.7	0.4	0.9	0.4	0.9	0.1	0.5
Mäori	1.8	6.4	1.6	6.6	0.8	4.4	0.3	3.4
Pacific Island	2.0	19.5	0.7	8.6	0.4	6.1	0.3	7.3
Asian	0.7	7.4	NA	NA	NA	NA	NA	NA
Other	0	4.7	0	6.8	NA	NA	0	6.8
European	1.0	1.7	0.4	0.9	0.4	0.9	0.1	0.5
NZ Mäori	1.8	6.4	1.6	6.6	0.8	4.4	0.3	3.4
Other Ethnic Group	1.6	9.7	0.4	3.7	0.2	2.4	0.2	3.1
Country of Birth								
New Zealand	1.4	2.4	0.7	1.6	0.6	1.3	0.2	0.7
Europe/Australia/North America	0.4	2.1	0	0.7	0.1	1.3	NA	NA
Other Countries	0.9	10.0	0.5	4.4	0.2	3.0	0.3	3.7
Not elsewhere included	NA	NA	NA	NA	NA	NA	NA	NA
Number of years since arrival in NZ								
Less than 4 years	0	5.2	0	3.7	NA	NA	0	3.7
4 years or more	0.7	5.8	0.2	2.2	0.3	1.8	0.1	1.8
Not in subject population	1.4	2.4	0.7	1.6	0.6	1.3	0.2	0.7
Highest qualification								
No formal qualification	1.4	4.2	0.7	3.1	0.3	2.1	0.2	1.4
School qualification	0.7	5.6	0.1	0.9	0.2	1.3	0	0.7
Vocational or trade qualification	1.1	2.3	0.9	1.9	0.6	1.4	0.4	1.2
Degree or higher qualification	0.5	2.2	0	1.1	0.1	1.3	0	0.1
Labour force status								
Employed	1.4	2.8	0.7	1.5	0.6	1.2	0.4	1.1
Unemployed	0.5	13.7	0.4	5.1	0	1.3	NA	NA
NILF	0.8	2.3	0.4	2.1	0.3	1.6	0	0.5
LFS unidentifiable	0.1	38.4	NA	NA	NA	NA	NA	NA
Occupation								
Legislators administrators & managers	0.7	3.9	0.1	1.3	0.3	2.0	0	0.2
Professionals	0.5	2.5	0	1.5	0.2	1.9	NA	NA
Technicians & associate professionals	0.2	2.7	0.2	2.1	0.1	2.3	0	1.9
Clerks	0.5	2.8	0.2	3.6	0.1	1.4	0	3.3
Service and sales workers	0.9	3.9	0.2	2.8	0.6	3.4	0.1	2.7
Agriculture and fishery workers	0.6	3.8	0.1	2.9	0	1.5	0.1	2.9
Trade workers	0	1.4	0.9	4.5	0	1.3	0.6	4.1
Plant & machine operators & assemblers	1.5	12.4	0.4	4.6	0.4	4.4	0.1	2.9
Elementary occupations	2.8	10.2	0.2	6.6	0.5	3.6	0.2	7.0
Not in subject population	1.0	2.7	0.4	2.2	0.2	1.5	0	0.4
Main activity for those not in the Labour force								
Studying	0.3	9.8	0.2	8.3	0.3	8.5	0.3	8.5
Retired	0.4	1.6	0.1	2.4	0.1	2.4	0.1	2.4

At home looking after the children	0.1	2.1	0.2	4.5	0	1.5	0	1.5
Other	0.3	8.7	0.2	5.0	NA	NA	NA	NA
Not elsewhere included	NA	NA	NA	NA	NA	NA	NA	NA
Not in subject population	1.5	3.0	0.7	1.5	0.6	1.2	0.6	1.2
Marital Status								
Married/living with a partner	1.2	2.6	0.8	1.7	0.5	1.3	0.3	0.9
Separated/divorced/widowed	0.7	2.9	0.5	1.7	0.4	1.6	0	1.0
Never married	1.3	4.3	0.2	1.5	0.3	1.5	0.1	1.3
Not elsewhere included	0.3	13.7	NA	NA	0.1	14.0	NA	NA
Religion								
No religion	1.1	2.9	0.4	1.4	0.4	1.4	0.1	0.8
Anglican	0.6	2.7	0.2	1.8	0.5	2.1	0.1	1.2
Presbyterian	0.5	2.5	0.3	3.7	0.1	1.5	0.1	2.0
Catholic	1.3	4.6	1.2	4.5	0.5	3.5	0.3	2.6
Other Christian	0.9	3.7	0.3	1.5	0.1	1.0	0	1.0
Other Religion	0.9	8.9	0	2.7	0	2.7	0	2.7
Not elsewhere included	0.2	9.2	NA	NA	NA	NA	NA	NA
Household size (includes children)								
1	0.6	2.1	0.4	1.4	0.6	2.1	0	0.2
2	1.2	2.4	0.3	1.1	0.3	1.1	0.1	0.7
3	0.5	2.0	0.6	2.3	0.1	0.7	0.3	1.7
4	1.1	3.8	0.7	2.6	0.5	2.1	0.3	1.9
5 or more	1.8	6.3	0.5	3.2	0.4	2.9	0	1.5
Not elsewhere included	NA	NA	NA	NA	NA	NA	NA	NA
Household income								
$20,000 or less	1.0	3.4	0.3	2.2	0.2	1.1	0.1	2.1
$20,001 - $30,000	1.0	5.2	0.5	3.2	0.1	2.8	0	1.0
$30,001 - $40,000	0.6	2.3	0	0.6	0.2	1.1	NA	NA
$40,001 - $50,000	0.8	3.0	0.7	3.5	0.7	2.9	0.2	2.5
$50,001 - $70,000	1.0	3.8	0.4	2.4	0.4	2.0	0.2	1.9
$70,000 or more	0.9	2.6	0.2	1.5	0.3	1.8	0	0.7
Not elsewhere included	0.9	6.0	0.3	4.7	0.1	2.0	0.1	2.1
Location								
Auckland	1.6	4.7	0.6	2.4	0.2	1.6	0.4	1.7
Wellington	0.9	2.7	0.1	1.0	0.3	1.8	NA	NA
Christchurch	1.1	3.5	0.5	2.7	1.1	3.2	0.1	1.0
Rest of New Zealand	0.8	2.1	0.6	1.5	0.4	1.0	0.1	0.7

[1] NA means that the confidence interval cannot be calculated because no one in the sample was observed with the characteristic

[2] A finer ethnic breakdown than given in Table 19A is presented as well as the Table 4 ethnic breakdown