

# **Problem Gambling in New Zealand**

**Analysis of the 2002/03  
New Zealand Health Survey**

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# Foreword

In New Zealand over the last decade, there has been a significant rise in the consumption of gambling products and player losses accompanying an increase in the number of people seeking help for problem gambling.

The Gambling Act 2003 gave the Ministry of Health the responsibility for the prevention and treatment of gambling related harm.

As part of this responsibility, Public Health Intelligence, the epidemiology group of the Ministry of Health, is developing a monitoring framework for gambling and gambling-related harm in New Zealand. The framework builds on existing research to provide an evidence base to inform ongoing policy and service development.

The present report, *Problem Gambling in New Zealand: Analysis of the 2002/03 New Zealand Health Survey*, provides valuable information about problem gambling in New Zealand. It presents evidence from the most recent national health survey, which included a nationally representative sample of 12,949 respondents. This report focuses on current gambling problems, in particular, presenting evidence on the extent of current gambling problems, risk factors for problem gambling, and correlates with addictive behaviours and health status.

Comments on this report are welcomed and should be sent to Public Health Intelligence, Public Health Directorate, Ministry of Health, PO Box 5013, Wellington.



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# Executive Summary

## Problem gambling

The majority of New Zealand adults have participated in gambling of some form. However, gambling can result in negative effects for the gambler and the people around them. Gambling problems can range from being mild to severe.

The negative effects that can result from problem gambling are varied, and include significant financial problems or adverse effects on the gambler's mental and physical wellbeing. Problem gambling is a public health issue, and epidemiological studies can inform the development of policy, treatment and prevention programmes.

This report describes problem gambling in New Zealand, in particular the extent of current problem gambling, the risk factors for problem gambling, and the associations between problem gambling and various health correlates.

## Data sources and methods

This research uses the results of the 2002/03 New Zealand Health Survey. The survey involved face-to-face interviews with 12,929 respondents aged 15 and over. The survey had a response rate of 72% and included increased sampling of Māori, Pacific peoples and Asian peoples.

Problem gambling was measured with a gambling screen, which is a set of questions used to determine whether respondents are experiencing problems due to their gambling behaviour. The 2002/03 New Zealand Health Survey used a newly developed gambling screen to measure the extent of current problem gambling. It should be noted that the use of a new screen means the rates calculated in this study cannot be directly compared with rates from other studies. Nevertheless, reading this study alongside other work in the area is likely to be informative.

This study reports two different measures of problem gambling. 'Problem gamblers' refers to people with problem gambling behaviour, and includes people experiencing moderate to severe gambling problems. 'At-risk gamblers' refers to people with at-risk gambling behaviours, and includes people experiencing mild gambling problems, who are at risk of becoming problem gamblers in the future. This study also investigates various health correlates of problem gambling.

## Results

### Gambling participation

Almost 70% (69.4%; 95% confidence interval: 68.2–70.6) of New Zealand adults participated in at least one of the following gambling activities in the past 12 months: Lotto, Instant Kiwi, non-casino gaming machines, track or sports betting, casino games or gaming machines, Daily Keno, housie, 0900 phone gambling and Internet gaming. Gambling participation was highest for Lotto (58.7%; 57.5–60.0), Instant Kiwi (29.2%; 27.8–30.6) and non-casino gaming machines (12.8%; 12.0–13.6).

Participation rates were significantly higher among Māori (74.1%; 71.1–77.0) and people aged 45–54 (75.6%; 73.2–78.1) compared with the overall national average. Population groups with significantly lower participation rates included Asian peoples (40.4%; 35.8–45.0), Pacific peoples (53.9%; 48.1–59.6) and people aged 15–24 (58.8%; 55.6–62.1).

## **Problem gambling prevalence**

Using the results of the 2002/03 New Zealand Health Survey gambling screen, the following prevalence rates have been found in the New Zealand population aged 15 years and over:

- the prevalence rate of current problem gambling is 1.2% (1.0–1.5) of the population, representing 32,800 (26,200–39,400) people
- the prevalence rate of current combined problem gambling and at-risk gambling is 1.9% (1.6–2.2) of the population, representing 50,300 (41,900–58,600) people.

## **Risk factors**

Some population groups are more at risk of being problem gamblers than others. The key risk factors for problem gambling, identified by regression analysis, are:

- being aged 25–34
- being of Māori or Pacific ethnicity
- being employed
- living alone
- having lower educational attainment.

The results of this survey show that Māori and Pacific peoples are disproportionately affected by problem gambling, as they make up 28.5% (19.1–37.9) and 13.3% (6.9–19.7) of problem gamblers respectively, compared with their respective population proportions of 10.9% and 4.4%. While Pacific peoples are less likely to participate in any gambling activity than people of other ethnicities, those who do gamble have a greater risk of being problem gamblers.

## **Problem gambling and associated health status**

The present research found significant associations between problem gambling and addictive behaviours, as well as worse self-rated health status. As these results are from a cross-sectional survey, these associations do not indicate causation.

Specific findings included:

- over half of problem gamblers (53.5%; 41.8–65.1) had potentially hazardous drinking behaviour compared with 16.8% (15.7–17.8) of non-problem gamblers
- when controlling for key sociodemographic variables, problem gamblers were four times (4.0; 2.2–7.3) more likely to have potentially hazardous drinking patterns than non-problem gamblers

- 58.3% (46.5–70.0) of problem gamblers were daily cigarette smokers compared with 22.5% (21.3–23.6) of non-problem gamblers
- when controlling for key sociodemographic variables, problem gamblers were three times (3.0; 1.7–5.2) more likely to be daily cigarette smokers than non-problem gamblers
- 44.4% (34.6–54.1) of gamblers who smoked reported they increased the amount they smoked when gambling
- problem gamblers have significantly worse self-rated health than the rest of the population, especially mental health, general health and vitality (measured by the short-form general health questionnaire, the SF-36 (Ware 1992, cited in Ministry of Health 2004b))
- in particular, compared with non-problem gamblers, problem gamblers were more likely to:
  - be nervous, feeling down or less likely to be happy
  - have cut down the amount of time spent on work or other activities, accomplished less than usual, or worked less carefully than usual
  - be feeling worn out or tired
  - be in poorer general health or get sick a little easier.



# Introduction

## Background

### Gambling in New Zealand

Gambling is a form of entertainment that involves staking money or possessions on some outcome of chance, such as a game or race. Gambling has been available in New Zealand for many years, although gambling opportunities have increased significantly in the past two decades. A wide variety of gambling activities are now available, including Lotto, electronic gaming machines, track betting and Internet gaming. Casinos were introduced into New Zealand in 1994, and six are located throughout the country (one in each of Auckland, Hamilton, Christchurch, Dunedin and two in Queenstown).

A new regulatory regime for gambling was introduced in New Zealand with the Gambling Act 2003, which became law in September 2003. This Act limits gambling opportunities and restricts gambling by imposing statutory age limits on the most risky gambling activities. The Act also restricts electronic gaming machines to casinos and non-casino premises at which the Department of Internal Affairs is satisfied that, among other things, the risk of problem gambling will be minimised.

Since 1 July 2004, the Ministry of Health has been formally responsible for developing and implementing an integrated problem gambling strategy focused on public health, as described in the Gambling Act 2003. In effect, the Ministry of Health and Department of Internal Affairs now share responsibility for preventing and minimising gambling-related harm. The Ministry of Health also has specific responsibilities for treatment and research, including research on the prevalence of problem gambling. For more information about the Act or the Ministry of Health's problem gambling policy, see the Ministry's website (<http://www.moh.govt.nz/problemgambling>).

### Problem gambling

A gambler's excessive gambling or loss of control over gambling can result in harm to the gambler and the people around them. Gambling problems can disrupt important personal relationships, cause significant financial problems, affect the gambler's mental and physical wellbeing, and affect the people close to them (Abbott 2001a).

Gambling behaviour lies on a continuum, which ranges from experiencing no gambling problems to very severe gambling problems. Pathological gambling is the severest form of gambling problems. It can be clinically diagnosed in individuals using the criteria defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA 1994), as presented in Table 1. A formal diagnosis of pathological gambling is made when at least five of these criteria are met, as well as the last criterion.

**Table 1: DSM-IV criteria for pathological gambling**

Diagnostic criteria for pathological gambling	Persistent and recurrent maladaptive gambling behaviour as indicated by at least five of the following
Preoccupation	Is preoccupied with gambling
Tolerance	Needs to gamble with increasing amounts of money to achieve the desired excitement
Withdrawal	Experiences restlessness or irritability when attempting to cut back or stop gambling
Escape	Gambles as a way of escaping from problems or relieving dysphoric mood
Chasing losses	After losing money gambling, often returns another day to get even
Lying	Lies to family members, therapists, or others to conceal the extent of involvement with gambling
Loss of control	Has made repeated unsuccessful efforts to control, cut back, or stop gambling
Illegal acts	Has committed illegal acts, such as forgery, fraud, theft, or embezzlement, to finance gambling
Risk significant relationship	Has jeopardized or lost a significant relationship, job, educational or career opportunity because of gambling
Bailout	Relies on others to provide money to relieve a desperate financial situation caused by gambling
AND	
	The gambling behaviour is not better accounted for by a manic episode.

Source: APA 1994.

In studies that investigate both pathological gambling and less severe gambling problems, the term ‘problem gambling’ is often used to describe the behaviour of people who are experiencing significant gambling problems, but who do not meet the criteria for pathological gambling. This term can also be used to describe *all* moderate to severe gambling problems (including pathological gambling).

### Public health issue

Problem gambling is a public health issue as it occurs within, and is influenced by, the context of the society and the environment in which the gambler lives. Additionally, gambling problems can affect the gambler, the people around them and their community (Chetwynd 1997; Korn 2001). In 1997 the Ministry of Health estimated that the effects of problem gambling resulted in a loss of 3,300–10,600 years of ‘quality of life’ in New Zealand per year, translating into \$330 million–\$1.06 billion per year (Ministry of Health 2004c).

Epidemiological studies on problem gambling help to inform the development of policy, as well as treatment and prevention programmes for problem gamblers, such as face-to-face counselling services and telephone helpline services. With the knowledge of risk factors for problem gambling, these services can be targeted towards the more susceptible subgroups of the population. Epidemiological studies are also useful for monitoring changes over time and examining the effectiveness of policies.

## Investigating prevalence rates of problem gambling

Population prevalence rates of problem and probable pathological gambling are estimated using population surveys. Most surveys use a set of questions called a ‘gambling screen’ to categorise people according to their level of gambling problems. Gambling screens estimate the lifetime or current prevalence rates of problem gambling. The current prevalence rate refers to gamblers who have experienced problems during the past 6 or 12 months, while the lifetime rate estimates the proportion of people whose gambling has caused problems during their lifetime.

There is no universally accepted gambling screen, so a variety of gambling screens are currently used. More widely used gambling screens include the South Oaks Gambling Screen (SOGS) (Lesieur and Blume 1987), the Canadian Problem Gambling Index (Ferris and Wynne 2001) and screens based on the DSM-IV criteria for pathological gambling. Prevalence rates can vary according to the screen used, and this limits the comparability between studies, unless it is known how one screen compares with another within a certain population.

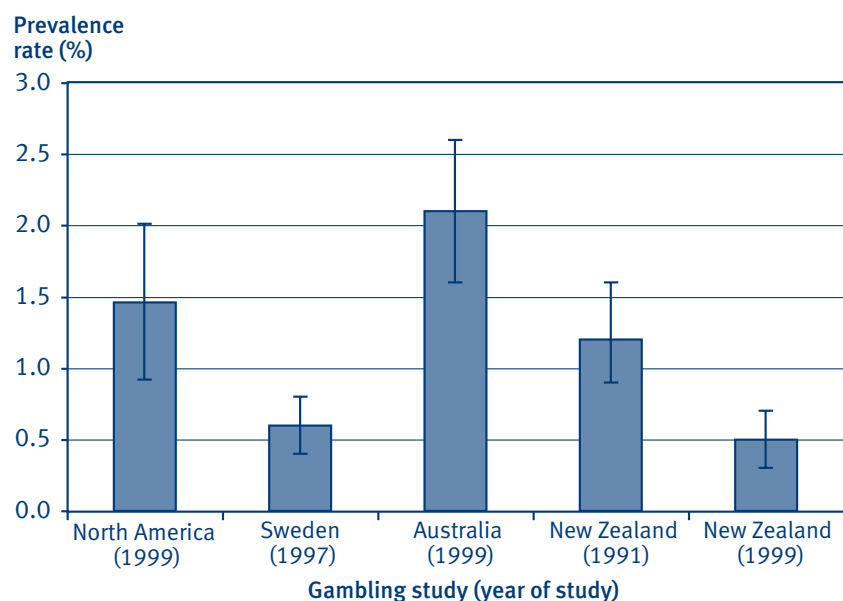
## Problem gambling research

In New Zealand, the Department of Internal Affairs conducted national problem gambling surveys in 1991 and 1999, using a revised version of the SOGS (SOGS-R). The 1991 survey found a current (past 6 month) prevalence rate of 1.2% (95% confidence interval: 0.9–1.6) for probable pathological gambling, and an additional 2.1% (1.7–2.7) for current problem gambling (Abbott and Volberg 1991). The 1999 survey found a current (past 6 month) prevalence rate of 0.5% (0.3–0.7) for probable pathological gambling, and a further 0.8% (0.6–1.1) for current problem gambling. Overall, 1.3% (0.9–1.8) of the population was currently affected in 1999 by problem or probable pathological gambling, representing 22,700–50,800 people (Abbott and Volberg 2000; Abbott 2001a). Risk factors for problem gambling in 1999 included being in paid employment, being of Māori or Pacific ethnicity and lacking formal qualifications.

Problem gambling surveys have also been conducted in other parts of the world. In Australia, the combined prevalence rate of probable pathological and problem gambling was estimated to be 4.9% (4.4–5.4) in 1999 (Productivity Commission 1999). However, the Department of Internal Affairs advises that it would expect the New Zealand problem gambling prevalence rate to be lower than the Australian rate, because Australia has more non-casino gaming machines per capita than New Zealand, more machines at each venue and higher prize limits for these machines (J Markland, personal communication, January 2006).

Current pathological gambling rates in Australia, North America and Sweden (with 95% confidence intervals) are presented in Figure 1. This graph shows that rates of more severe gambling problems, current probable pathological gambling, range from 0.5% to 2.1% in these studies. These comparisons should be interpreted with caution, as a variety of gambling screens were used, including the SOGS in Australia, the SOGS-R in New Zealand and Sweden, and a meta-analysis of 119 studies in North America.

**Figure 1: Prevalence of current probable pathological gambling in selected countries**



Sources: (from left to right): Shaffer and Hall 2001; Ronnberg et al 1999; Productivity Commission 1999; Abbott and Volberg 1991, 2000.

## Objectives

This report aims to update and extend the knowledge of problem gambling in New Zealand, using the results of the 2002/03 New Zealand Health Survey. In particular, the report's objectives are to present the extent of current problem gambling in New Zealand, identify the risk factors for problem gambling in New Zealand and investigate the association between problem gambling and various health correlates.

This report will be of interest to policy analysts and advisors in both the health sector and the wider social policy community, especially those interested in preventing and treating problem gambling in New Zealand. Further information on the Ministry of Health's strategies for problem gambling prevention and treatment are outlined in *Preventing and Minimising Gambling Harm: Strategic plan 2004–2010* (Ministry of Health 2005).

# Data sources and methods

The present research uses the results of the 2002/03 New Zealand Health Survey, which is the most recent national survey to study the health of the general adult population in New Zealand. The survey included questions about gambling participation and problems associated with gambling.

This section outlines the survey methodology and the classification system used for problem gambling. For more detailed information about the survey methodology, see *A Portrait of Health* (Ministry of Health 2004a) available from the Ministry of Health website (<http://www.moh.govt.nz>).

## Survey methodology

The 2002/03 New Zealand Health Survey used a complex multi-stage design, with stratification and clustering. The target population in the general survey was all non-institutionalised adults aged 15 and over, living in permanent private dwellings.

The main sample comprised 12,929 respondents, and included a census of people living on Chatham and Pitt Islands, from which there were 400 respondents. This research used the results of the Confidentialised Unit Record File (CURF) for this survey. This data set contains the responses from 12,529 respondents, as Chatham and Pitt Islands respondents were not included in the CURF for confidentiality reasons, although the sample was weighted to account for these respondents.

The response rates for the main sample and the Chatham and Pitt Islands census were 72% and 73% respectively. Increased sampling of some ethnic groups resulted in sample sizes of 4,120 Māori, 908 Pacific peoples and 1,172 Asian peoples in the survey (total response).

The survey was administered through face-to-face interviews conducted by trained and experienced interviewers. Pre-survey letters were sent to selected households before the interviewer visited the house, and up to 10 callbacks were made to each selected household to establish contact. The interviews for the survey were carried out between September 2002 and January 2004.

Results in this publication are weighted to represent the New Zealand adult civilian population aged 15 and over, who are non-institutionalised, live in permanent private dwellings and are usually resident in New Zealand.

## Questionnaire

The gambling section in the survey consisted of both general gambling questions and a gambling screen used to determine problem gambling prevalence rates.

## General gambling questions

The general gambling questions first asked all respondents in which gambling activities they had participated in the past 12 months. Respondents selected from a list of Lotto, Instant Kiwi, Daily Keno, casino games, non-casino gaming machines, horse and dog races, sports betting, Housie (bingo), 0900 phone gambling and Internet gaming. This study did not investigate participation in other gambling activities, such as mah-jong, raffles or non-casino card games.

Questions on gambling expenditure were used as screening questions to decide who answered the problem gambling screen. To minimise the response burden, only respondents who had spent over \$30 on gambling during at least 5 weeks in the past 12 months were administered the problem gambling screen. In total, 613 respondents answered the gambling screen, representing 4.9% of the survey sample, or, when using weighted data, 3.7% of the population; this difference is accounted for by the increased sampling in some ethnic groups.

## Gambling screen

The gambling screen and scoring system were developed for the 2002/03 New Zealand Health Survey by the Ministry of Health and a contracted technical specialist, as it was thought no existing gambling screen met the criteria required for the screen. These criteria included having a small number of gambling questions, which minimised response burden but also measured a wide range of negative effects from gambling. This screen has not been used in any previous studies and it has not been validated against psychological assessments or other screens. However, each individual question has been validated as part of other gambling screens in other studies. Thus, it is unclear how this gambling screen compares with clinical diagnoses of pathological gambling, or to any previous prevalence rates of current problem gambling calculated from the SOGS or DSM-IV screens. *It is important to note that problem gambling rates found with this screen are not directly comparable to those found in previous studies.* Nevertheless, reading this study alongside other work in the area is likely to be informative.

In this report, the term ‘problem gambling’ is used to describe all people experiencing moderate to severe gambling-related problems, as defined by the gambling screen used in the 2002/03 New Zealand Health Survey. This report does not examine probable pathological gambling, as the gambling screen used in the survey was not based on the formal DSM-IV criteria for pathological gambling, so does not allow for investigation into this subgroup of more severe gambling problems.

Table 2 presents the gambling screen used in the 2002/03 New Zealand Health Survey to assess the extent of current problem gambling in New Zealand. The gambling screen consisted of 10 questions about certain negative effects due to the respondent’s gambling. These included feeling guilty or depressed after gambling, feeling the need to bet more and more, and feeling that the respondent had a problem with gambling. A previously used screen, the Lie/Bet Screen (Johnson et al 1997) was also incorporated into the gambling screen (Table 2, questions 9 and 10).

**Table 2: 2002/03 New Zealand Health Survey gambling screen questions**

1	In the last 12 months, have you ever felt worried or depressed after playing any of those games? <i>(referring to previously listed gambling activities)</i>
2	In the last 12 months, has anyone been worried or concerned enough to ask you about your gambling?
3	In the last 12 months, have you ever gone into debt or borrowed money or had your credit card owing, from money spent on gambling?
4	Do you feel that you have <u>ever</u> had a problem with gambling?
5	<i>(If answered 'yes' to question 4) And in the last 12 months?</i>
6	In the last 12 months, have you said you were winning from gambling when in fact you lost?
7	In the last 12 months, have you felt you would like to stop gambling but didn't think that you could?
8	In the last 12 months, have you felt guilty or bad for doing wrong because of your gambling?
9	In the last 12 months, have you felt at any time, the need to bet more and more money?
10	In the last 12 months, have you had to lie to people important to you about how much you gambled?

Essentially, the severity of gambling problems lies on a continuum from no problems to severe problems. For the purposes of describing respondents of this gambling screen, this continuum has been split into four levels:

- level 3: problem gambling
- level 2: at-risk gambling
- level 1: not at-risk gambling
- level 0: non-gambling.

Table 3 presents the criteria used to score the different levels of problem gambling. Respondents were classified at one of these levels depending on which gambling-related problems they had experienced in the past 12 months.

In this report, level 3 'problem gamblers' refers to people with problem gambling behaviour, that is, people experiencing moderate to severe problems from their gambling. Level 2 'at-risk gamblers' refers to people with at-risk gambling behaviour, that is, people who are experiencing mild gambling-related problems and are at risk of experiencing worse problems. Level 1 'gamblers not at risk' refer to people who gamble but who have not experienced any gambling-related problems; only some of these respondents answered the gambling screen. Level 0 'non-gamblers' refers to people who had not gambled in the past 12 months, and who thus did not answer the gambling screen.

**Table 3: Problem gambling criteria for 2002/03 New Zealand Health Survey gambling screen**

Problem gambling category	Criteria*
Level 3: Problem gambling	Answers 'yes' to one or both of questions 9 or 10 OR Answers 'yes' to any five of questions 2, 3, 5–8 OR Answers 'yes' to question 5 OR Answers 'yes' to either three or four of questions 1–3, 6–8
Level 2: At-risk gambling	Answers 'yes' to any one or two of questions 1–3 or 6–8 OR Answers 'yes' to question 4 and 'no' to question 5
Level 1: Not at-risk gambling	Has not spent more than \$30 on gambling during five or more weeks in the past 12 months OR Answers 'no' to questions 1–10
Level 0: Non-gambling	Has not participated in any of the gaming activities mentioned in the 2002/03 New Zealand Health Survey in the past 12 months

\* These criteria refer to the 2002/03 New Zealand Health Survey gambling screen questions in Table 2.

In addition, gambling screen respondents were also asked about their normal weekly gambling expenditure and whether their use of alcohol or tobacco increased or decreased when they gambled.

## Other variables

The demographics covered in the survey were based on the 2001 Census of Population and Dwellings questions, and included gender, age, ethnicity, country of birth, education level, income, employment status, household characteristics, income support and socioeconomic deprivation. Some health variables were used in the analysis of problem gambling presented in this report, including alcohol use, tobacco use and self-rated health status.

Ethnicity refers to prioritised ethnicity, where each respondent is allocated to a single ethnic group using a priority system, in the following order: Māori, Pacific, Asian, Other.

Socioeconomic deprivation was measured with the New Zealand Index of Deprivation (NZDep2001) (Salmond and Crampton 2002). This measure is based on small area units (meshblocks), and refers to areas rather than individuals. It is derived from eight dimensions of deprivation, calculated from nine variables from the 2001 Census. These include having an income-tested benefit, lacking qualifications and having no access to a car. For this study, the NZDep2001 deciles were transformed into quintiles, from 1 (least deprived) to 5 (most deprived).

Potentially hazardous drinking behaviour was measured with the AUDIT (Alcohol Use Disorders Identification Test) screen (Babor et al 1992; Saunders et al 1993, cited in Ministry of Health 2004b). Potentially hazardous drinking is defined as a pattern of alcohol use that has a high risk of having adverse effects or causing harm but has not yet done so. The test consists of 10 questions. A score of 8 or more out of the maximum score of 40 indicates potentially hazardous drinking behaviour.

Self-rated mental and physical health was measured using the SF-36 (Ware 1992, cited in Ministry of Health 2004b). The SF-36 consists of 36 questions, which give scores from 0 to 100 for the eight scales of physical functioning, role physical, bodily pain, social functioning, role emotional, general health, vitality and mental health. For all of these scales, higher scores represent better self-perceived health.

## Point estimates

In calculating point estimates, weighted data were used to represent the New Zealand population. All survey weights and jackknife replicate weights were calculated by the Ministry of Health, and were included with the data set used for this research. For more information on how the weights were calculated, see *A Portrait of Health* (Ministry of Health 2004a) available from the Ministry of Health website (<http://www.moh.govt.nz>).

In this report, point estimates are given with 95% confidence intervals. The 95% confidence interval of a survey point estimate provides an indication of the sampling error for that estimate; that is, we are 95% certain that the true estimate lies within this range. Confidence intervals that do not overlap indicate a statistically significant difference between rates. However, note that overlapping confidence intervals do not necessarily indicate the absence of a statistically significant difference.

The sampling errors, variances, 95% confidence intervals and relative sampling errors of point estimates were calculated using the delete-a-group jackknife method, with 100 groups. This is a replication method that involves dropping out groups of units from the sample (see Kott (1998) for more details of this method).

Results were suppressed when an unweighted individual cell contained a value less than 10, to maintain the confidentiality of survey participants and because of the unreliability of estimates from small counts. Values with a relative sampling error between 0.3 and 0.5 should be interpreted cautiously, and those with a relative sampling error greater than 0.5 should be considered very unreliable. The relative sampling error was defined as the standard error divided by the estimate.

Unit non-response was adjusted for by generalised regression weighting, while item non-response was assumed to be missing completely at random. Rates were not age standardised.

## Logistic regression

Logistic regression was used for modelling the risk factors for problem gambling (level 3), as well as the associations between problem gambling and various health correlates, in particular addictive behaviours and worse self-rated health. The computer program SAS v8.2 was used to perform the regression analysis, although the variances of regression coefficients were calculated using the delete-a-group jackknife method, repeating the regression on each jackknife replicate. The stepwise method was used for the regression analysis.

Significant risk factors for problem gambling were determined using the Pearson chi squared test for model comparison, and the Wald test for the values of parameters associated with individual explanatory variables. The Wald test used the weighted regression estimate and jackknifed standard error to calculate a test statistic value, assuming a standard normal distribution, from which a p-value was obtained. A p-value below the selected cutoff point of .05 indicated a significant association with that variable.

In the analysis of the eight health domains of the self-rated health (SF-36 scale), scores were transformed into dichotomous outcomes (0 or 1), which were based on whether the score was below a cutoff value, which indicated worse self-rated health. These cutoff values were selected separately for each domain, due to the skewed distributions of the raw SF-36 scores in the 2002/03 New Zealand Health Survey.

## Comparisons with previous studies

Problem gambling has been investigated in New Zealand with several surveys. In 1991 and 1999 the Department of Internal Affairs carried out national surveys to investigate the prevalence of problem gambling in New Zealand (Abbott and Volberg 1991, 2000). The 1991 National Survey was a two-phase study, while the later two-phase 1999 National Prevalence Survey was part of the New Zealand Gaming Survey. The Department of Internal Affairs also carried out surveys investigating gambling participation in New Zealand in 1985, 1990, 1995 and 2000 (Wither 1997; Christoffel 1992; Reid and Searle 1996; Amey 2001). The Department of Internal Affairs carried out a further survey of gambling participation in 2005, the results of which are yet to be reported.

The gambling section of the 2002/03 New Zealand Health Survey adds to the knowledge base for problem gambling in New Zealand. However, the survey has measured gambling participation and problem gambling in different ways to all previous studies. This report makes brief comparisons with findings in previous problem gambling prevalence studies, but these comparisons must be interpreted with caution, because of the different definitions of problem gambling used in these studies.

# Results

## Gambling participation in past 12 months

The 2002/03 New Zealand Health Survey found that 69.4% (68.2–70.6) of New Zealand adults had participated in gambling activities in the past 12 months. These gambling activities included Lotto, Instant Kiwi, non-casino gaming machines, track and sports betting, casino games and gaming machines, Daily Keno, housie, 0900 gaming and Internet gaming.

Studies show that gambling participation in New Zealand has been relatively stable from 1985 to 2000, with about 85%–90% of the adult population participating in any type of gambling at least once during the past 6 or 12 months (see Table 4). In comparison, the participation rate appears to be significantly lower in 2002/03, although this rate is based on a shorter list of gambling activities than in the previous studies.

**Table 4: Gambling participation in past 12 months in New Zealand, 1985–2003**

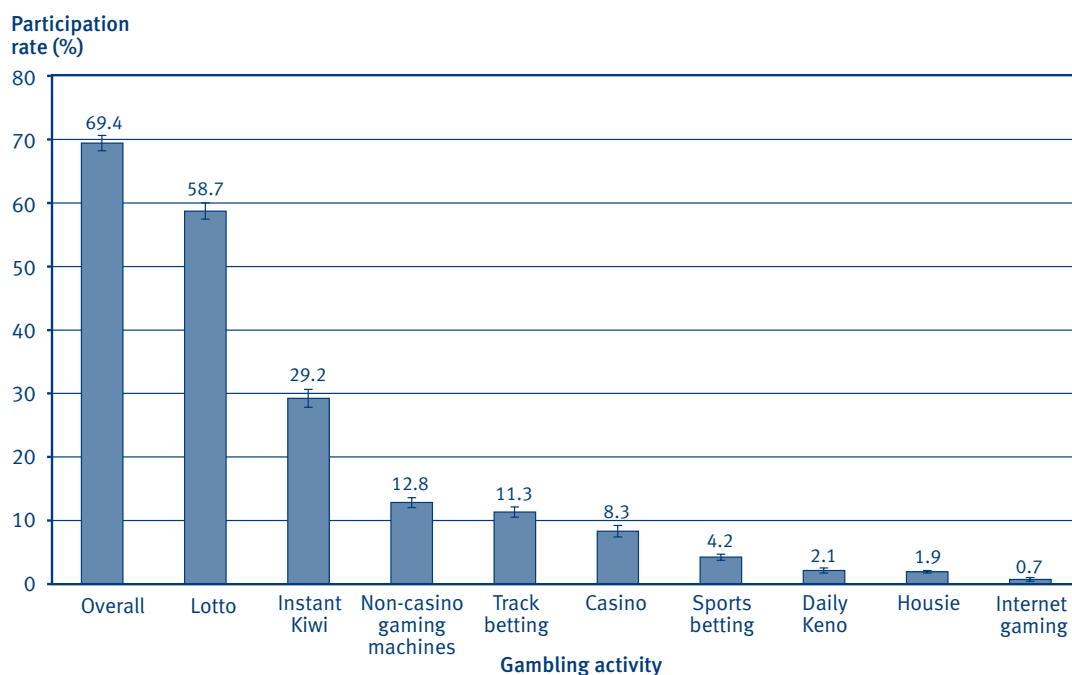
Year	Participation rate %	Gambling survey	Survey conducted by
1985	85	<i>Taking a Gamble: A Survey of Public Attitudes Towards Gambling in New Zealand</i> (Wither 1987)	Department of Internal Affairs
1990	90	<i>People's Participation in and Attitudes Towards Gambling</i> (Christoffel 1992)	Department of Internal Affairs
1991 <sup>a</sup>	90	<i>1991 National Survey</i> (Abbott and Volberg 1992) on problem gambling	Department of Internal Affairs
1995	90	<i>People's Participation in and Attitudes Towards Gambling: Final results of the 1995 Survey</i> (Reid and Searle 1996)	Department of Internal Affairs
1999 <sup>a</sup>	86	<i>1999 National Prevalence Survey</i> (Abbott and Volberg 2000) on problem gambling	Department of Internal Affairs
2000	87	<i>People's Participation in and Attitudes Towards Gambling: Final results of the 2000 Survey</i> (Amey 2001)	Department of Internal Affairs
2002/03 <sup>b</sup>	69	2002/03 New Zealand Health Survey	Ministry of Health

a This is based on past 6-month participation

b This is based on a shorter list of gambling activities than in the other studies.

Figure 2 presents the participation rates for individual gambling activities from the 2002/03 New Zealand Health Survey. These participation rates refer to people who have participated in the listed activities at least once in the 12 months before being surveyed. Lotto and Instant Kiwi were the gambling activities most widely participated in, with 3 in 5 adults having bought a Lotto ticket in the past 12 months (58.7%; 57.5–60.0). Almost 1 in 3 people played Instant Kiwi (29.2%; 27.8–30.6). The third most popular form of gambling was gaming machines not found in casinos (12.8%; 12.0–13.6). Furthermore, 8.3% (7.5–9.2) of New Zealand adults had gambled at a casino in the past 12 months.

**Figure 2: Gambling participation rates for past 12 months by activity, 2002/03**



Participation rates varied by demographic group. Table 5 presents the participation rates by gender, age, ethnicity and socioeconomic deprivation quintile, and for the selected gambling activities of non-casino gaming machines and track betting (horse and dog races), which have been cited as the main causes of gambling problems among problem gamblers (Paton-Simpson et al 2003; Abbott and Volberg 2000).

Māori had higher gambling participation rates (74.1%; 71.1–77.0) than the national average (69.4%; 68.2–70.6), as did people aged 45–54 (75.6%; 73.2–78.1). By contrast, only 40.4% (35.8–45.0) of Asian peoples had gambled in the past 12 months. There were also lower participation rates among Pacific peoples (53.9%; 48.1–59.6) and people aged 15–24 (58.8%; 55.6–62.1).

Table 5 suggests there is no significant difference in gambling participation rates between males and females. However, males were significantly more likely to participate in track betting and to play non-casino gaming machines compared to females.

People aged 45–54 were more likely than other age groups to have gambled in the past 12 months, and also to have participated in track betting. However, participation rates for non-casino gaming machines were highest among people aged 15–24, with participation decreasing with increasing age.

Māori had a high participation rate in playing non-casino gaming machines compared with people of other ethnicities, with 21.7% (19.1–24.4) of Māori adults having played a non-casino gaming machine in the past 12 months, compared with 12.8% (12.0–13.6) of the total population. Furthermore, Māori and people of European/Other ethnicity were much more likely to have participated in track betting in the past 12 months compared with Pacific and Asian peoples.

Overall, there was no trend with gambling participation and neighbourhood socioeconomic deprivation. Although participation rates in more deprived areas were somewhat higher for non-casino gaming machines and somewhat lower for track betting compared with rates in less deprived areas, these differences were not statistically significant.

**Table 5: Gambling participation rates in past 12 months, overall and for selected activities, 2002/03**

	Overall		Non-casino gaming machines		Track betting	
	%	95% CI	%	95% CI	%	95% CI
Total	69.4	68.2–70.6	12.8	12.0–13.6	11.3	10.5–12.1
<b>Gender</b>						
Male	70.7	69.0–72.5	14.3	12.8–15.7	14.7	13.3–16.0
Female	68.1	66.4–69.9	11.4	10.4–12.5	8.2	7.2–9.2
<b>Age group (years)</b>						
15–24	58.8	55.6–62.1	19.3	16.0–22.5	8.2	6.2–10.1
25–34	72.0	69.2–74.8	15.7	13.3–18.1	12.6	10.7–14.5
35–44	72.6	70.4–74.8	11.9	10.1–13.6	12.0	10.1–13.9
45–54	75.6	73.2–78.1	12.3	10.2–14.5	14.5	12.1–16.8
55–64	72.1	69.2–75.0	9.7	7.7–11.6	11.5	9.4–13.5
65+	64.4	61.8–67.0	5.8	4.5–7.2	8.5	7.1–10.0
<b>Ethnicity</b>						
European/Other	71.8	70.5–73.1	12.3	11.3–13.3	12.1	11.2–13.1
Māori	74.1	71.1–77.0	21.7	19.1–24.4	11.5	9.6–13.3
Pacific	53.9	48.1–59.6	10.7	7.5–13.8	7.4	4.4–10.3
Asian	40.4	35.8–45.0	4.0	2.1–6.0	3.1*	1.0–5.3
<b>NZDep01 quintile</b>						
1 (least deprived)	68.7	65.7–71.6	11.8	9.4–14.3	12.3	10.4–14.3
2	71.0	68.1–74.0	11.8	10.0–13.6	12.6	10.8–14.5
3	71.9	69.3–74.5	11.7	9.5–13.9	12.0	9.9–14.2
4	68.5	65.2–71.9	14.5	12.4–16.6	10.2	8.4–11.9
5 (most deprived)	66.8	62.9–70.7	13.8	11.1–16.6	9.6	7.8–11.3

\* This value has a relative sampling error between 0.3 and 0.5, so interpret it cautiously.

Gambling participation among population subgroups shows similar trends in 2002/03 compared with 1999 (Abbott and Volberg 2000), with Māori, Europeans and people aged 25–44 having higher gambling participation rates than others. Lower participation rates were found among Asian and Pacific peoples in both 1999 and 2002/03.

Participation in individual gambling activities also has similar trends in 2002/03 as in 1999, when the most popular gambling activities were Lotto, Instant Kiwi and track betting. However, gambling participation has decreased in almost all gambling activities since previous surveys were carried out. Participation rates for the most popular form of gambling, Lotto, dropped from 73% to 59% from 1999 to 2002, while participation in Instant Kiwi scratch tickets fell from 51% to 29% from 1991 to 2002 (Abbott and Volberg 1991, 2000).

While concern has been raised recently about the development of 0900 phone gambling and Internet gambling, the results from this survey suggest low participation rates (less than 1.0% of the population) among these forms.

## Prevalence of problem gambling

For a proportion of the population, gambling can have a negative impact on their lives and the lives of others. Gambling problems can vary in severity, ranging from mild to severe.

In this survey, respondents were classified as ‘problem gamblers’ (people experiencing moderate to severe gambling-related problems), ‘at-risk gamblers’ (people experiencing mild gambling-related problems), ‘gamblers not at risk’ (people not experiencing any gambling-related problems) or ‘non-gamblers’ (people who have not gambled in the past 12 months), according to the criteria given in the methods section. All results refer to the current prevalence rate; that is, the percentage of people aged 15 years and over who have experienced gambling problems in the past 12 months.

### Overall problem gambling prevalence rates

Table 6 presents the estimated prevalence rates of problem gambling in New Zealand. These results suggest:

- the current prevalence rate of problem gambling is 1.2% (1.0–1.5) of New Zealand adults, representing 32,800 (26,200–39,400) people
- the current prevalence rate of combined problem gambling and at-risk gambling is 1.9% (1.6–2.2) of New Zealand adults, representing 50,300 (41,900–58,600) people.

**Table 6: Problem gambling prevalence rates in New Zealand, 2002/03**

Description of problem gambling level	Problem gambling level	Prevalence rate % (95% CI)	Number of people (95% CI)
Problem gambling	3	1.2 (1.0–1.5)	32,800 (26,200–39,400)
At-risk gambling	2	0.7 (0.4–0.9)	17,500 (11,800–23,100)
At-risk and problem gambling	2–3	1.9 (1.6–2.2)	50,300 (41,900–58,600)

It is not known how the results from this gambling screen compare with previous studies, and any comparisons must be interpreted with extreme caution. However, previous surveys in New Zealand found that the rate of past 6-month probable pathological and problem gambling had dropped from 3.3% in 1991 to 1.3% in 1999 (Abbott and Volberg 2000). The prevalence rate found in the 2002/03 New Zealand Health Survey of 1.2% (1.0–1.5) seems to be relatively consistent with these previous findings.

## Problem gambling prevalence rates among population subgroups

Problem gambling rates are not uniform across the population, but instead vary between groups with different demographic characteristics. The following section gives descriptive results for problem gambling rates by demographic variable. Full results are in the Appendix (Table A3).

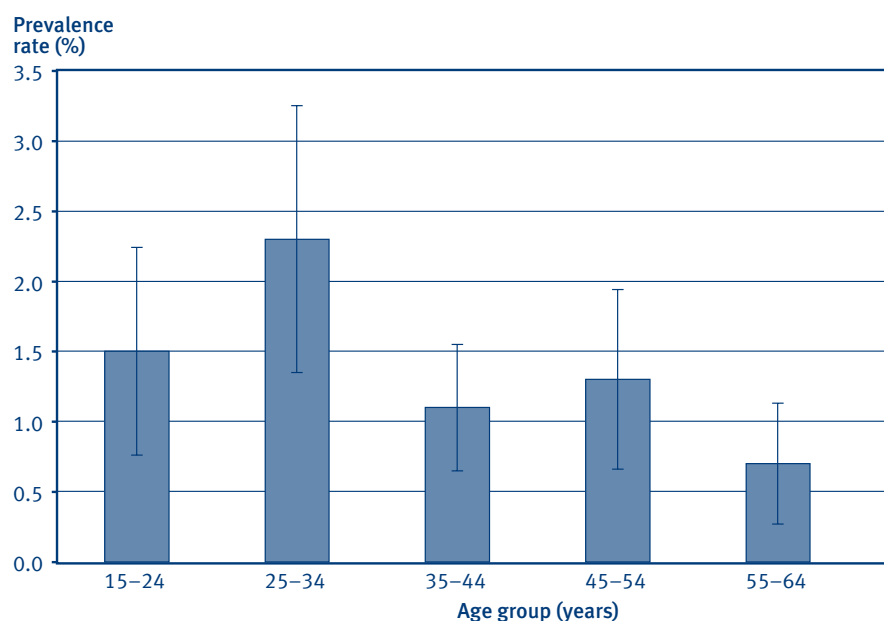
### Gender

Males have higher rates of gambling problems than females, with 1.6% (1.1–2.0) of males classified as problem gamblers (level 3) compared with 0.9% (0.7–1.2) of females.

### Age group

Results from the survey show that people aged 25–34 experienced higher rates of problem gambling (2.3%; 1.4–3.3) than people of other ages (Figure 3). People aged 55 and over had lower rates for problem gambling than others. The prevalence rate for people aged 65 and over has been suppressed due to low cell counts.

**Figure 3: Problem gambling prevalence rates by age group, 2002/03**



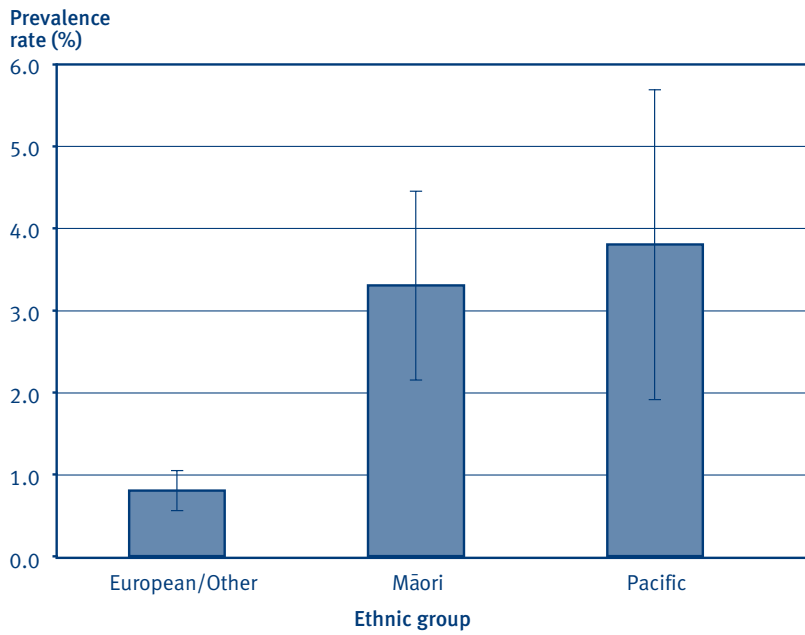
Note: The relative sampling error for the age group 55–64 is between 0.3 and 0.5, so interpret this result cautiously. The rate for people 65 and over has been suppressed due to low cell counts.

### Ethnicity

Prevalence rates of problem gambling were significantly higher among Māori (3.3%; 2.1–4.4) and Pacific peoples (3.8%; 1.9–5.7) compared with Europeans/Others (0.8%; 0.6–1.1) (Figure 4). Problem gambling prevalence rates for Asian peoples have been suppressed because of low cell counts. However, results suggested the problem gambling rates of Asian peoples are similar to those of Europeans/Others.

Risk ratios show that Māori are 3.9 times (2.1–5.7) more likely to be problem gamblers (level 3) and Pacific peoples are 4.5 times (1.9–7.0) more likely to be problem gamblers than Europeans/Others.

**Figure 4: Problem gambling prevalence rates by ethnicity, 2002/03**

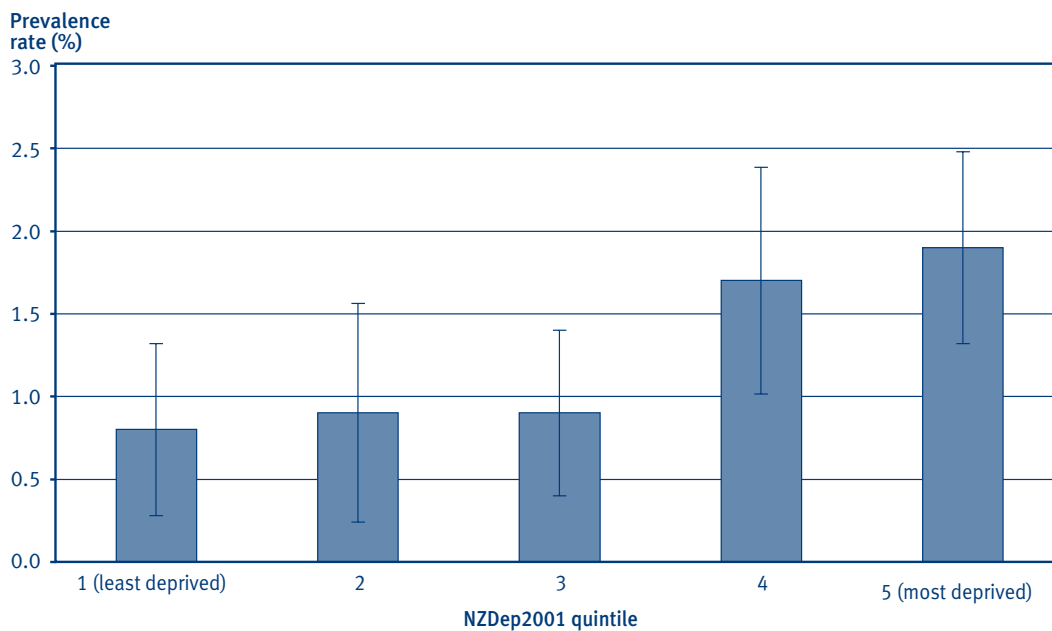


Note: The rate for Asian peoples has been suppressed due to low cell counts.

**Socioeconomic deprivation**

Figure 5 shows that problem gambling rates are higher in the 20% of most deprived areas (NZDep2001 quintile 5) (1.9%; 1.3–2.4) compared with the 20% of least deprived areas (NZDep2001 quintile 1) (0.8%; 0.3–1.3).

**Figure 5: Problem gambling prevalence rates by socioeconomic deprivation, 2002/03**



Note: The rates for NZDep01 quintiles 1 and 2 have relative sampling errors between 0.3 and 0.5 and should be interpreted cautiously.

## Other sociodemographic variables

Table 7 suggests that there are no significant differences between problem gambling rates for people with no qualifications, school qualifications or trade or vocational training. By comparison, people with university degrees had low problem gambling rates (0.5%: 0.0–1.1), although this result is considered to be somewhat unreliable so should be interpreted cautiously.

Problem gambling rates were higher among employed people (1.5%; 1.1–1.8) than people not in the labour force (0.8%; 0.5–1.1) (Table 7). It is uncertain how unemployed people compare with these two groups, because of the wide confidence intervals.

There does not appear to be a significant difference in the unadjusted problem gambling rates between urban and rural areas or based on the household size (Table 7). The effects of these variables on problem gambling are investigated in more detail in the risk factor regression analysis.

**Table 7: Problem gambling rates for sociodemographic variables, 2002/03**

Sociodemographic variable	Level	Problem gambling (level 3) %	95% CI
Highest qualification	No qualification	1.6	1.0–2.2
	School qualification	1.3	0.7–1.8
	Vocational/trade qualification	1.3	0.9–1.8
	Degree	0.5**	0.0–1.1
Urbanicity/rurality	Urban	1.3	1.0–1.5
	Rural	1.1*	0.3–2.0
Employment status	Employed	1.5	1.1–1.8
	Unemployed	1.4*	0.2–2.6
	Not in labour force	0.8	0.5–1.1
Household size	1 person	1.6	0.7–2.5
	2 people	1.2	0.7–1.7
	3 people	1.3	0.7–1.9
	4 people	1.0	0.4–1.5
	5 or more people	1.4	0.8–2.0

\* This result has a relative sampling error between 0.3 and 0.5, so interpret it cautiously.

\*\* This result has a relative sampling error over 0.5, so interpret it extremely cautiously.

## Risk factors for problem gambling

For this analysis, several potential risk factors for problem gambling were identified and investigated with regression analysis. These risk factors were gender, age, ethnicity, socioeconomic deprivation, employment status, household size, highest qualification, place of birth, and urban/rural residency.

Table 8 presents the results of the risk factor analysis, carried out with stepwise logistic regression. In this analysis, risk factors are indicated by an odds ratio above 1.0, while an odds ratio below 1.0 indicates a protective factor. These factors are statistically significant if the confidence interval does not include 1.0 and the p-value is below .05.

This analysis found that significant risk factors for problem gambling in New Zealand included:

- being aged 25–34
- being of Māori or Pacific ethnicity
- having lower educational attainment
- being employed
- living alone.

In particular, the risk of being a problem gambler is highest for adults aged 25–34, and is also relatively high for people aged 15–24 and 35–55. People aged 55 and over are least at risk of being problem gamblers.

People of Māori or Pacific ethnicity are more likely to be problem gamblers than people of Asian, European or Other ethnicities. Household size also emerged as a significant risk factor for problem gambling, with people who are living alone most at risk and the risk decreasing with an increasing number of people in the household.

Furthermore, employed people were more likely to be problem gamblers than those who were unemployed or not in the labour force.

Having a degree was associated with a lower risk of being a problem gambler than not having a degree.

Being male was not a significant risk factor for problem gambling.

While socioeconomic deprivation was initially included in the model, it was not a statistically significant risk factor when other variables were included in the analysis during the model selection procedure, so it was dropped from the model.

**Table 8: Risk factors for problem gambling: logistic regression results, 2002/03**

Explanatory variable	Odds ratio	95% CI	p-value
<b>Gender</b>			
Male*	1.0		
Female	0.7	0.4–1.0	.057
<b>Age group (years)</b>			
15–24	3.7	1.4–9.7	.008
25–34	6.0	2.7–13.5	.000
35–44	2.9	1.3–6.4	.010
45–54	3.2	1.3–7.8	.013
55+*	1.0		
<b>Ethnicity</b>			
European/Others*	1.0		
Māori	3.5	2.1–6.0	.000
Pacific	5.0	2.4–10.1	.000
Asian	1.7	0.7–4.2	.227
<b>Employment status</b>			
Employed*	1.0		
Not employed	0.6	0.4–0.9	.022
<b>Highest qualification</b>			
No qualification*	1.0		
School qualification	0.7	0.4–1.3	.284
Vocational/Trade qualification	0.8	0.4–1.3	.328
Degree	0.3	0.1–0.9	.032
<b>Household size</b>			
1 person	3.4	1.4–8.1	.005
2 people	1.9	0.9–3.8	.081
3 people	1.4	0.7–2.9	.328
4 people	0.9	0.4–2.1	.872
5 or more people*	1.0		

Note: In each group, one level is chosen as the reference level, which is indicated by \*. The odds ratios for the other levels are expressed with respect to the reference level.

Risk factors for problem gambling found in this analysis are very similar to those found in the 1999 National Prevalence Survey (Abbott and Volberg 2000). In the 1999 study, risk factors for problem gambling included being of Māori or Pacific ethnicity, being male, having a household income of \$40,000–\$50,000 a year, and having a vocational or trade qualification.

## Characteristics of problem gamblers

The 2002/03 New Zealand Health Survey estimated that about 32,800 people in New Zealand are problem gamblers. Table 9 presents the proportion of problem gamblers by demographic group, as well as the demographic group's proportion in the adult population aged 15 years and over, for comparison purposes.

**Table 9: Demographic characteristics of problem gamblers, 2002/03**

Population group	Proportion of problem gamblers (%)	95% CI	Proportion of adult population (%)	Adult population
<b>Gender</b>				
Male	60.9	50.7–71.0	48.1	1,264,433
Female	39.1	29.0–49.3	51.9	1,366,264
<b>Age (years)</b>				
15–24	20.5	11.5–29.6	17.3	455,788
25–34	34.5	23.0–46.1	18.3	482,525
35–44	17.8	11.0–24.7	20.6	540,668
45–54	18.0	9.4–26.5	17.3	454,020
55–64	6.6	2.3–10.8	11.8	309,441
65+	<5.8*		14.8	388,255
<b>Ethnicity</b>				
European/Others	53.1	43.8–62.4	78.7	2,071,551
Māori	28.5	19.1–37.9	10.9	285,835
Pacific	13.3	6.9–19.7	4.4	115,765
Asian	<9.2*		6.0	157,546
<b>NZDep01 quintile</b>				
1 (least deprived)	11.8	4.4–19.1	18.5	486,903
2	13.4	3.5–23.2	19.4	511,313
3	15.0	7.1–22.8	20.5	538,709
4	29.5	19.5–39.5	21.6	568,772
5 (most deprived)	29.8	21.3–38.2	19.9	523,059

\* Denotes cell counts below 10. These results have been suppressed due to low quality. The estimates in these cells represent the upper limits of these proportions.

Males made up 60.9% and females made up 39.1% of problem gamblers, compared with their respective population proportions of 48.1% and 51.9%. More than 50% of problem gamblers were aged 15–34, although people in this age group made up only about 35% of the adult population.

These results suggest Māori and Pacific peoples are disproportionately affected by problem gambling in New Zealand. Māori made up 28.5% of this group of problem gamblers compared with their population proportion of 10.9%. Similarly, Pacific peoples made up 13.3% of problem gamblers compared with their population proportion of 4.4%.

Results also show that almost two-thirds of problem gamblers lived in more deprived areas (NZDep01 quintiles 4 and 5). This suggests the relationships among gambling behaviour, ethnicity and socioeconomic deprivation need to be better understood and warrant further investigation.

## Problem gambling and other addictive behaviours

Evidence suggests there are correlations between gambling problems and other forms of dependency such as alcohol abuse and tobacco use (Abbott 2001b; SERCIS 2001).

Overall, results from this study showed that problem gambling was associated with the addictive behaviours of potentially hazardous drinking behaviour and daily cigarette smoking. The results of the univariate analyses and logistic regression analyses are presented in Table 10. In these analyses, problem gamblers (level 3) are compared to the rest of the population (levels 0–2, referred to as ‘non-problem gamblers’).

**Table 10: Summary of associations between problem gambling and other addictive behaviours, 2002/03**

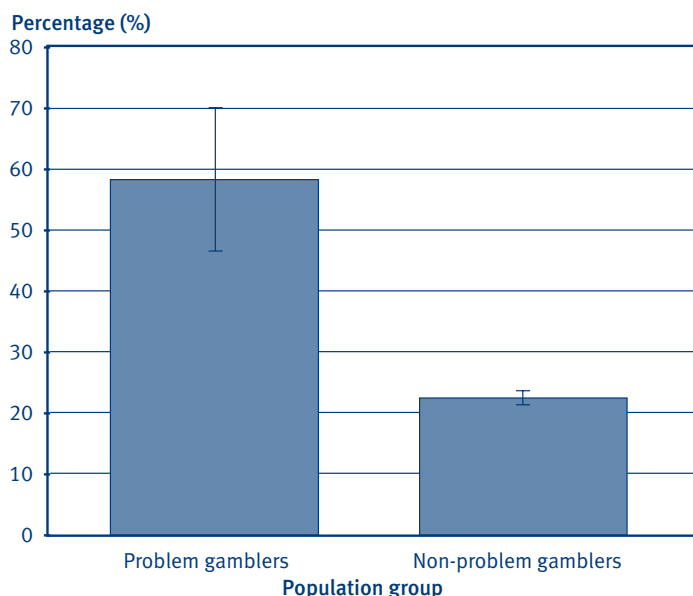
Addictive behaviour	Univariate analysis (%)				Regression analysis with problem gambling as risk factor*		
	Problem gamblers (level 3)		Non-problem gamblers (levels 0–2)				
	%	95% CI	%	95% CI	Odds ratio	95% CI	P-value
Daily cigarette smoker	58.3	46.5–70.0	22.5	21.3–23.6	3.0	1.7–5.2	<.001
Has potentially hazardous drinking patterns	53.5	41.8–65.1	16.8	15.7–17.8	4.0	2.2–7.3	<.001
Increases tobacco amount while gambling	61.2	47.8–74.2	32.4	19.5–45.3	4.5	1.3–15.2	.016
Increases alcohol amount while gambling	13.2	5.3–21.0	6.3	1.7–10.9	1.6	0.3–9.0	.598

\* This association was significant while controlling for the explanatory factors of gender, age, ethnicity, NZDep01 quintile, household size, education and employment status. The odds ratios are presented for problem gamblers, compared to the reference group of non-problem gamblers, which has an odds ratio of 1.

### Tobacco smoking

Problem gamblers have significantly higher rates of smoking, with 58.3% (46.5–70.0) being daily smokers compared with 22.5% (21.3–23.6) of non-problem gamblers (Figure 6). Regression analysis showed that the association between daily smoking and problem gambling was statistically significant, when controlling for gender, age, ethnicity, NZDep01 quintile, household size, education and employment status. Problem gamblers are three times (1.7–5.2) more likely to be daily smokers than non-problem gamblers (Table 10).

**Figure 6: Daily cigarette smoking, by problem gambling status, 2002/03**

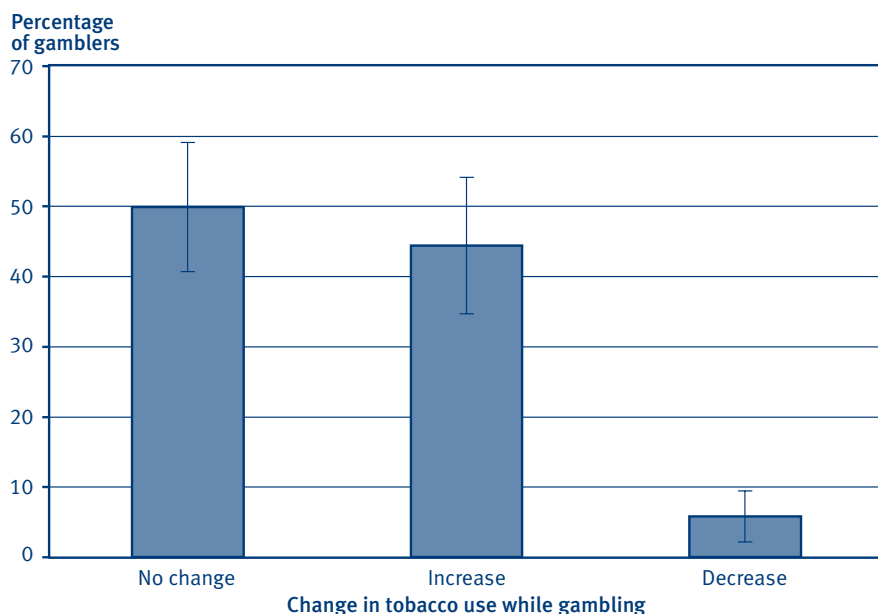


These results support previous studies that have also found associations between problem gambling and daily cigarette smoking (SERCIS 2001; Petry and Oncken 2002). Furthermore, Abbott (2001b) found that 36% of lifetime problem gamblers smoked tobacco at least once a day compared with about 21% of the New Zealand population.

In the 2002/03 New Zealand Health Survey, respondents who answered the gambling screen were also asked whether they changed the amount of tobacco they smoked when they were gambling. Analysis showed that 44.4% (34.6–54.1) of the gamblers who smoked increased the amount they smoked when gambling (Figure 7). A further 5.8% (2.1–9.4) of gamblers decreased the amount they smoked when gambling and 49.9% (40.7–59.1) of gamblers did not change the amount they smoked. This question was asked of all 335 respondents who smoked and had spent over \$30 on gambling during 5 or more weeks in the past 12 months, representing 1.8% of the population.

Furthermore, problem gamblers were also more likely to increase the amount they smoked when gambling (61.2%; 47.8–74.2) compared with non-problem gamblers (32.4%; 19.5–45.3). Regression analysis showed that problem gamblers were 4.5 times (1.3–15.2) more likely to increase the amount they smoked when gambling compared with non-problem gamblers.

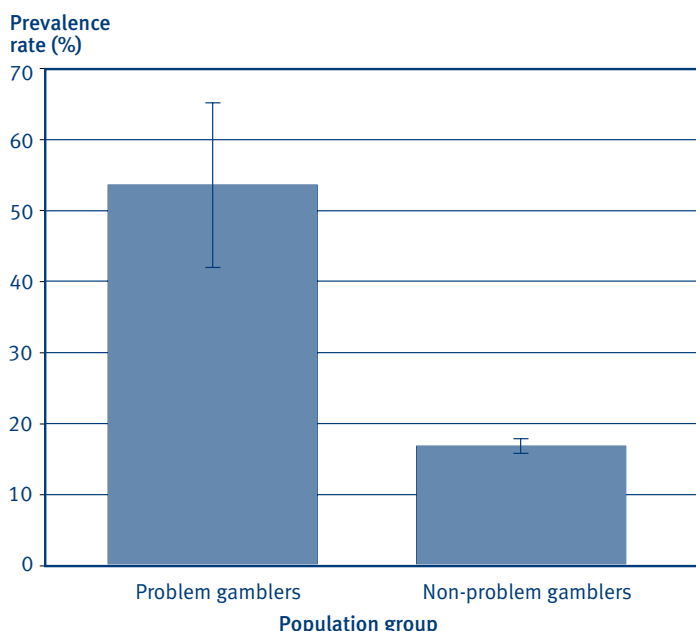
**Figure 7: Self-reported changes in tobacco use when gambling, among gamblers, 2002/03**



### Potentially hazardous drinking behaviour

About half of all problem gamblers exhibited potentially hazardous drinking behaviour (53.5%; 41.8–65.1) according to the AUDIT screen, compared with only 1 in 6 non-problem gamblers (16.8%; 15.7–17.8) (Figure 8).

**Figure 8: Potentially hazardous drinking behaviour, by problem gambling status, 2002/03**



Regression analysis controlling for gender, age, ethnicity, NZDep01 quintile, household size, education level and employment status also showed that problem gambling is significantly associated with an increased risk of potentially hazardous drinking patterns. These results show that problem gamblers are four times (2.2–7.3) more likely to have potentially hazardous drinking patterns than non-problem gamblers.

These regression results support findings in other studies, which showed similar correlations between problem gambling and alcohol abuse (SERCIS 2001; Welte et al 2004). In New Zealand, phase two of the 1991 and 1999 national surveys on problem gambling carried out by the Department of Internal Affairs found significant associations between the severity of gambling problems and potentially hazardous drinking patterns, as measured by elevated AUDIT scores (Abbott and Volberg 1992; Abbott 2001b).

In the 2002/03 New Zealand Health Survey, respondents who answered the gambling screen were also asked whether they changed the amount of alcohol they consumed when gambling. This analysis did not take into account the respondent's initial alcohol consumption before gambling, only the change in consumption when gambling. This question was asked of all 416 survey respondents who consumed alcohol and had spent more than \$30 on gambling during 5 or more weeks in the past 12 months, representing 2.8% of the population.

Among people who gambled and drank alcohol, 8.7% (4.7–12.8) increased the amount they drank when gambling, 15.5% (9.3–21.6) decreased the amount and 75.8% (69.0–82.6) did not change the amount.

Problem gamblers are not significantly more likely to increase their alcohol intake when gambling (13.2%; 5.3–21.0) compared with non-problem gamblers (6.3%; 1.7–10.9). Regression analysis showed no significant association for increasing the amount of alcohol consumed with potentially hazardous drinking patterns or problem gambling.

## **Problem gambling and self-rated health status**

Associations were measured between problem gambling and self-rated health, as measured by the SF-36 screen (Ware and Sherbourne 1992). Definitions of these domains of health are presented in Table 11.

SF-36 scores are expressed on a 0–100 scale for each of eight health domains, with higher scores representing better self-perceived health. Five scales (physical functioning, role physical, bodily pain, social functioning and role emotional) are unipolar, meaning they define health status in terms of the absence of limitation, and the maximum score of 100 is achieved when no limitation is reported. The other three scales (general health, vitality and mental health) are bipolar scales, covering both positive and negative health states, and the maximum score on these scales indicates not just the absence of disability, but the presence of a positive health state.

**Table 11: Item groupings and abbreviated item content for the SF-36**

Health domain	Abbreviated item content
Physical functioning	Vigorous activities, such as running, lifting heavy objects Moderate activities, such as vacuuming, bowling Lifting or carrying groceries Climbing several flights of stairs Climbing one flight of stairs Bending, kneeling, stooping Walking more than one kilometre Walking half a kilometre Walking 100 metres Bathing or dressing yourself
Role physical	Cut down the amount of time spent on work or other activities Accomplished less than would like Limited in the kind of work or other activities Difficulty performing work or other activities
Bodily pain	Intensity of bodily pain Extent pain interfered with normal work
General health	Is your health: excellent, very good, good, fair, poor I seem to get sick a little easier than other people I am as healthy as anybody I know I expect my health to get worse My health is excellent
Vitality	Feel full of life Have a lot of energy Feel worn out Feel tired
Social functioning	Extent health problems interfered with normal social activities Frequent health problems interfered with social activities
Role emotional	Cut down the amount of time spent on work or other activities Accomplished less than would like to Didn't do work or other activities as carefully as usual
Mental health	Been a very nervous person Felt so down in the dumps that nothing could cheer you up Felt calm and peaceful Felt down Been a happy person

Source: Ware and Sherbourne 1992.

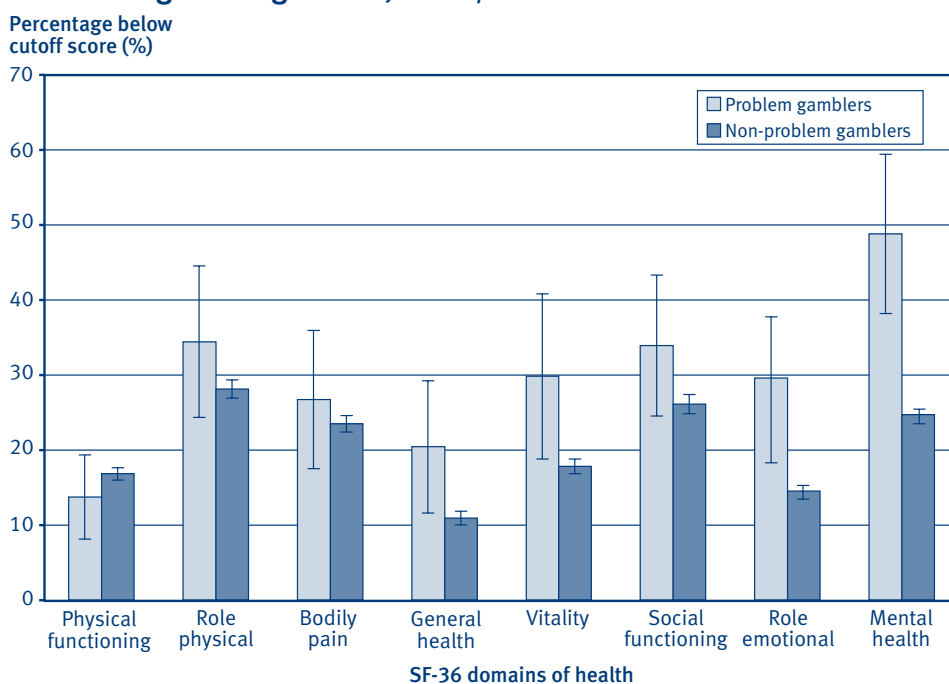
For this analysis, cutoff scores were used to indicate people with worse self-rated health. Cutoff scores were used because of difficulties with modelling the raw SF-36 scores, which generally do not follow a normal distribution for the unipolar and bipolar SF-36 health domains. The results of the 2002/03 New Zealand Health Survey showed that the scores were distributed differently for each health domain. For this reason, different cutoff scores were chosen for each domain, to represent about 10%–30% of the population with worse self-rated health. The particular cutoff scores for each health domain are given in Table 12.

**Table 12: Cutoff points for SF-36 analysis**

SF-36 health domain	Cutoff score
Physical functioning	80
Role physical	90
Bodily pain	60
General health	50
Vitality	50
Social functioning	90
Role emotional	90
Mental health	80

A comparison of self-rated health status between problem gamblers and other people is presented in Figure 9. This graph shows the proportion of people that had worse self-rated health for each health domain, as defined by being under the cutoff score given in Table 12. This graph shows that problem gamblers are significantly more likely to have worse self-rated health status than the rest of the population, for the mental health and role emotional scale.

**Figure 9: Worse self-rated health status on the SF-36 health domains, by problem gambling status, 2002/03**



These differences may be accounted for by external factors such as sociodemographic variables. Logistic regression analysis was used to determine the significance of the association between problem gambling and worse self-rated health, while controlling for other variables. In these analyses, having worse SF-36 health status (as measured by being below the cutoff score) was modelled as the outcome variable, with the explanatory variables including sociodemographic variables and problem gambling status.

Table 13 presents the results from the regression analysis, giving the odds ratio and significance of problem gambling as an explanatory variable, in modelling the probability of being below the cutoff score for the individual SF-36 scales. For all health models, the explanatory variables were gender, age, ethnicity, education, NZDep01 quintile and household size.

**Table 13: Associations between problem gambling and SF-36 scores: logistic regression results, 2002/03**

SF-36 health domain	Odds ratio	95% CI	P-value
Physical functioning	1.0	0.6–1.7	.917
Role physical	1.6	1.0–2.6	.041
Bodily pain	1.2	0.8–2.0	.413
General health	2.1	1.2–3.9	.015
Vitality	2.1	1.3–3.7	.006
Social functioning	1.5	1.0–2.3	.053
Role emotional	2.4	1.5–3.8	.001
Mental health	2.6	1.7–4.1	< .001

Note: Odds ratios are given for problem gamblers compared with the reference group of non-problem gamblers, who have an odds ratio of 1.

These results show that problem gambling is significantly associated with worse self-rated health in several health domains. On the mental health scale, problem gamblers are 2.6 times (1.7–4.1) more likely to have worse self-rated mental health status than non-problem gamblers. Similarly, problem gambling was significantly associated with worse self-rated health status on the scales of role emotional, vitality, general health and role physical. A further question in the gambling screen found that 1.2% (0.9–1.5) of the population had felt worried or depressed after gambling.

No significant associations were found at the 5% significance level ( $p < .05$ ) between problem gambling and self-rated scores for physical functioning, social functioning, or bodily pain.

In conclusion, these results show that problem gamblers are significantly more likely than other people to:

- be more nervous or feeling down, or less likely to be happy
- have cut down the amount of time spent on work or other activities, accomplished less than usual or worked less carefully as usual
- be feeling worn out or tired
- be in poorer general health or get sick a little easier.

The associations found in this study between worse self-rated health and problem gambling are supported by other studies, such as in Australia and the United States (SERCIS 2001; Volberg et al 1999), where associations were found between problem gambling and both worse self-rated general and mental health. However, phase two of the 1999 New Zealand Gaming Survey found that, perhaps surprisingly, problem gamblers were more likely to rate their health as good than regular and infrequent gamblers (Abbott 2001b).

# Discussion

## Strengths and limitations

In terms of studying problem gambling in New Zealand, the 2002/03 New Zealand Health Survey has provided an up-to-date source of information. The survey had a good response rate and a large sample size, with increased sampling in key ethnic groups allowing accurate results for many subgroups of the population. Furthermore, the survey included questions on a wide range of health topics, enabling research to be carried out on associations between problem gambling and health status.

However, this study carried with it several limitations. The low prevalence rate of problem gambling caused some limitations in analysis, due to low cell counts and high relative sampling errors. Some levels of problem gambling were unable to be reported separately, and needed to be aggregated by gambling level. Low cell counts resulted in a lack of statistical power in some of the analyses. This was the case during regression analysis, so it was often not possible to include a large number of parameters or interactions into regression models.

The 2002/03 New Zealand Health Survey gambling screen was developed specifically for use in this national survey, as at the time of the survey design, no existing gambling screens were thought to meet certain criteria for the questionnaire. These included having a short gambling section that would still measure a range of negative effects associated with gambling. A new gambling screen was developed to minimise response burden; the screen was limited to only 10 questions, and was asked only of people most likely to be problem gamblers. The questions covered a wide variety of effects caused by problem gambling, and had each been individually validated as part of other gambling screens. A previously used screen, the Lie/Bet Screen (Johnson et al 1997) was also incorporated into the gambling screen.

However, the use of a newly developed gambling screen resulted in some limitations, particularly in comparisons with previous surveys. The new gambling screen has not been tested for consistency with other gambling screens, nor has it been clinically validated. However, it showed very good internal reliability, with a Cronbach's alpha score of 0.94, well above the recommended minimum cutoff score of 0.7 (Cronbach 1951, cited in Graham and Lilly 1984). Nonetheless, the results of this study must be interpreted with caution in relation to other gambling research.

Furthermore, the gambling screen was administered only to people most likely to be problem gamblers, that is, people who had spent over \$30 on gambling during at least 5 weeks in the past 12 months. This criteria may have missed 'binge' problem gamblers or people who did not report or acknowledge the extent of their gambling, resulting in conservative estimates for problem gambling rates.

Researching population prevalence rates of problem gambling using surveys has some general limitations. While cross-sectional surveys allow the analysis of associations

between variables, they do not allow analysis into causal relationships, so no conclusions can be made about causation from this study.

Furthermore, it is possible that responses to gambling questions may not be reliable, for several reasons. There may be difficulties with recalling gambling behaviour for the full 12-month period. In measuring gambling expenditure, respondents may interpret expenditure in different ways, and may also over- or under-estimate their gambling expenditure by not keeping track of how much they spent. The sensitivity of the topic of problem gambling may also lead to respondents intentionally giving inaccurate responses, through a reluctance to report their gambling problems during the questionnaire. Other studies have raised the possibility that some heavy gamblers do not report their gambling habits and spending correctly, as they may be in denial or wish to conceal their gambling from other people (Abbott and Volberg 2000; Productivity Commission 1999). These issues may result in conservative estimates for problem gambling rates.

## Gambling participation

The majority of New Zealand adults have participated in a gambling activity in the past 12 months. The most popular gambling activities are Lotto, Instant Kiwi and non-casino gaming machines. Participation rates were significantly higher among Māori and people aged 45–54, while they were lower among Asian and Pacific peoples and people aged 15–24.

When comparing these results with previous studies, gambling participation rates appear to have decreased recently. However, this drop in overall gambling participation may be explained by the shorter list of gambling activities in the 2002/03 New Zealand Health Survey compared with previous studies. Some of the excluded gambling activities included making bets with friends, raffles, non-casino card and dice games, and mah-jong. Nonetheless, results for this survey showed a decrease in participation rates in certain gambling activities, such as Lotto and Instant Kiwi.

## Problem gambling prevalence

Problem gambling is recognised as a significant public health issue in New Zealand. This study found the prevalence of problem gambling in New Zealand is about 1.2% (1.0–1.5) of the adult population aged 15 and over, representing 26,200–39,400 people.

Comparability with other studies is limited, because this study used a different gambling screen and different classifications of problem gambling than previous studies. However, while this lack of comparability is acknowledged, the prevalence rate in this study is similar to the prevalence rate of 1.3% (0.9–1.8) found in the 1999 New Zealand Gaming Survey, for past 6-month probable pathological and problem gambling (Abbott and Volberg 2000). These recent estimates of problem gambling in New Zealand are all lower than the prevalence rate of current pathological and problem gambling found in Australia in 1999 of 4.9% (4.4–5.4) (Productivity Commission 1999), although as noted previously, it would be expected that the New Zealand prevalence rate would be lower than the Australian

prevalence rate, because of differences in gambling participation and opportunities in the two countries.

## Risk factors for problem gambling

In the 2002/03 New Zealand Health Survey, problem gambling rates were found to be higher among Māori and Pacific peoples, people aged 25–34, and people living in more deprived areas. Risk factors for problem gambling were also investigated by controlling for other variables with regression analysis, to indicate the key underlying risk factors. In this analysis, significant risk factors for problem gambling were being aged 25–34, being of Māori or Pacific ethnicity, living alone and being employed. In this way, the method of analysis used here (logistic regression) was useful for separating risk factors from confounding factors.

These risk factors can help provide a context for statistics from problem gambling intervention services in New Zealand. For example, the 2002/03 New Zealand Health Survey found that 55.0% of problem gamblers were younger than 35. This was slightly higher than the 2003 problem gambling counselling statistics, which showed that people younger than 35 made up 48.2% of new telephone helpline clients and 47.5% of new face-to-face counselling clients (Paton-Simpson et al 2004).

The results from this study also showed that Māori and Pacific peoples are disproportionately affected by problem gambling. Māori have higher gambling participation rates than the national average, and this is mirrored by higher problem gambling rates. About 3.3% (2.1–4.4) of adult Māori are classified as problem gamblers, and Māori are 3.5 times (2.1–6.0) more likely than Europeans/Others to be problem gamblers. Survey results also showed that Māori made up 28.5% of problem gamblers in New Zealand in 2002/03. These results are similar to the 2003 problem gambling counselling statistics, which showed that Māori made up 27.8% of new helpline clients and 31.3% of new face-to-face counselling clients in New Zealand in 2003 compared with their population proportion of 10.9% that year (Paton-Simpson et al 2004).

Pacific peoples also have significantly higher problem gambling rates than the rest of the population, with 3.8% (1.9–5.7) of Pacific peoples classified as problem gamblers. However, Pacific peoples have a lower overall gambling participation rate than the national average rate. This suggests a large proportion of Pacific peoples do not gamble, but a greater proportion of those who do gamble have gambling problems. The survey found that Pacific peoples make up about 13.3% (6.9–19.7) of problem gamblers in New Zealand, compared with their population proportion of 4.4%. Furthermore, 2003 counselling figures showed that Pacific peoples comprised only 9.1% of new helpline clients and 6.5% of new face-to-face counselling clients in 2003 (Paton-Simpson et al 2004). These comparisons suggest Pacific peoples are less likely to seek help for their gambling problems than other people.

Regression results showed that significant socioeconomic risk factors included living alone and being employed. The high risk of being a problem gambler for people living alone

may potentially be due to factors such as social isolation. Another risk factor for problem gambling was being employed, suggesting that further research into the identification of the types of occupation that might be associated with problem gambling would be informative.

The results from this study also suggest that problem gambling rates are higher in more deprived areas. Interestingly, a previous study showed that low-income groups spent proportionally more of their household incomes on gambling in New Zealand than high-income groups (Abbott and Volberg 2000). This suggests that many people affected by problem gambling may have little disposable income to spend on gambling, which may in turn result in less money being spent on basic household costs, such as food and heating. However, analysis suggests that socioeconomic deprivation is not a significant risk factor for problem gambling when other variables are controlled for. Further research is needed into the relationships between gambling behaviour and gambling-related harm, and other factors such as socioeconomic deprivation and ethnicity.

## **Associated addictive behaviours and health status**

Results show correlations between problem gambling and potentially hazardous drinking and tobacco smoking. In particular, problem gambling is associated with potentially hazardous drinking behaviour, with over 50% of problem gamblers showing potentially hazardous drinking patterns compared with less than 20% in the general population.

In New Zealand, some gambling activities are far more likely to be available in licensed premises where alcohol is readily available, such as hotels, clubs, and pubs. Alcohol may impair judgement, and may lead to individuals spending more money on gambling than they had originally planned, not keeping track of the money they have spent, or trying to recoup their gambling losses more, thus perpetuating their gambling problems. One study found that gamblers (and in particular probable pathological gamblers) spent more time playing gaming machines once having consumed alcohol (Ellery et al 2005). These associations suggest that people presenting for alcohol addictions should be screened for gambling problems and vice versa.

A significant association was also found between problem gambling and being a daily smoker. Almost 3 in 5 problem gamblers were daily cigarette smokers (58.3%) compared with about 22.5% of the general population. In addition to this, over half of gamblers who smoked reported that the amount they smoke increased when gambling. Following this study, smokefree laws came into effect that banned smoking in all licensed sites in New Zealand from December 2004. This may reduce the amount smoked by gamblers, and may also reduce the amount of money spent on gambling by smokers. Further research could investigate the impacts of the smokefree legislation on gambling behaviour and problem gambling in New Zealand.

A significant association was found between problem gambling and worse self-rated health status, according to SF-36 scores for the mental health, general health, vitality and role emotional domains. This suggests that problem gambling can affect many sectors of the gambler's life, especially their mental health and overall feelings of wellbeing and vitality.

## Conclusion

Problem gambling is a significant public health issue in New Zealand. The rate of current problem gambling in New Zealand is about 1.2% (1.0–1.5) of the adult population aged 15 and over, affecting 26,200–39,400 people.

Population groups with high rates of problem gambling included Māori (2.1–4.4%) and Pacific peoples (1.9–5.7%). These groups remained significantly at risk from problem gambling, even when controlling for other sociodemographic variables, including gender, age and socioeconomic deprivation. Other significant risk factors included being aged 25–34, living alone, being employed and having lower educational attainment.

Problem gambling is significantly associated with both having potentially hazardous drinking patterns and being a daily smoker. Furthermore, problem gamblers are significantly more likely to have worse self-rated mental health than non-problem gamblers, as well as worse self-rated general health and vitality.

This study provides further evidence about problem gambling in the New Zealand population. These results also show a significant association between problem gambling and worse mental health and general health, as well as an increased likelihood amongst problem gamblers to show addictive behaviours. The results from this study, which include the identification of the risk factors for problem gambling, will be useful for developing further strategies to prevent and minimise problem gambling harm in New Zealand.

## Appendix:

# Gambling participation and problem gambling prevalence rates

**Table A1: Gambling participation rates in past 12 months by gambling activity, 2002/03**

Gambling activity	Participation rate %	95% CI
Overall	69.4	68.2–70.6
Lotto	58.7	57.5–60.0
Instant Kiwi	29.2	27.8–30.6
Non-casino gaming machines	12.8	12.0–13.6
Casino games	8.3	7.5–9.2
Track betting (horse and dog races)	11.3	10.5–12.1
Sports betting	4.2	3.7–4.7
Daily Keno	2.1	1.8–2.5
Housie	1.9	1.6–2.1
0900 telephone gambling	< 0.2*	–
Internet gambling	0.7	0.5–1.0

\* Denotes cell count below 10. This result has been suppressed due to low quality. The estimate in this cell represents the upper limit of this proportion.

**Table A2: Gambling participation rates in past 12 months by demographic variable, 2002/03**

Demographic variable	Overall		Lotto		Instant Kiwi		Non-casino gaming machines		Track betting	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Total	69.4	68.2–70.6	58.7	57.5–60.0	29.2	27.8–30.6	12.8	12.0–13.6	11.3	10.5–12.1
<b>Gender</b>										
Male	70.7	69.0–72.5	60.3	58.5–62.2	26.7	24.4–29.0	14.3	12.8–15.7	14.7	13.3–16.0
Female	68.1	66.4–69.9	57.3	55.6–59.0	31.6	29.8–33.4	11.4	10.4–12.5	8.2	7.2–9.2
<b>Age group (years)</b>										
15–24	58.8	55.6–62.1	31.2	27.8–34.6	38.1	34.1–42.1	19.3	16.0–22.5	8.2	6.2–10.1
25–34	72.0	69.2–74.8	62.4	59.4–65.3	32.8	29.9–35.7	15.7	13.3–18.1	12.6	10.7–14.5
35–44	72.6	70.4–74.8	66.8	64.4–69.3	28.4	25.6–31.3	11.9	10.1–13.6	12.0	10.1–13.9
45–54	75.6	73.2–78.1	69.3	66.5–72.1	29.4	26.8–31.9	12.3	10.2–14.5	14.5	12.1–16.8
55–64	72.1	69.2–75.0	65.3	62.1–68.6	25.1	22.5–27.7	9.7	7.7–11.6	11.5	9.4–13.5
65+	64.4	61.8–67.0	57.6	55.2–60.0	18.5	16.3–20.7	5.8	4.5–7.2	8.5	7.1–10.0
<b>Ethnicity</b>										
European/Other	71.8	70.5–73.1	61.4	60.0–62.8	31.2	29.7–32.7	12.3	11.3–13.3	12.1	11.2–13.1
Māori	74.1	71.1–77.0	59.8	56.6–63.1	30.9	27.4–34.5	21.7	19.1–24.4	11.5	9.6–13.3
Pacific	53.9	48.1–59.6	44.6	39.7–49.5	17.7	12.7–22.7	10.7	7.5–13.8	7.4	4.4–10.3
Asian	40.4	35.8–45.0	32.2	28.2–36.2	8.6	6.0–11.2	4.0	2.1–6.0	3.1*	1.0–5.3
<b>NZDep01 quintile</b>										
1 (least deprived)	68.7	65.7–71.6	58.7	55.5–61.8	29.1	25.7–32.4	11.8	9.4–14.3	12.3	10.4–14.3
2	71.0	68.1–74.0	58.8	55.6–62.0	29.0	26.1–31.9	11.8	10.0–13.6	12.6	10.8–14.5
3	71.9	69.3–74.5	61.3	58.3–64.4	32.3	29.1–35.5	11.7	9.5–13.9	12.0	9.9–14.2
4	68.5	65.2–71.9	59.5	56.7–62.3	29.8	26.6–33.0	14.5	12.4–16.6	10.2	8.4–11.9
5 (most deprived)	66.8	62.9–70.7	55.4	51.5–59.3	25.8	21.1–30.6	13.8	11.1–16.6	9.6	7.8–11.3

\* This value has a relative sampling error between 0.3 and 0.5, so interpret it cautiously.

**Table A3: Prevalence rates of problem gambling by demographic variable, 2002/03**

Demographic variable	Population totals	Proportion of New Zealand adult population %									
		Non-gamblers (past 12 months) Level 0	95% CI	Gamblers not at risk Level 1	95% CI	At-risk gamblers Level 2	95% CI	Problem gamblers Level 3	95% CI	Problem gamblers and at-risk gamblers Levels 2-3	95% CI
<b>Total</b>	2,631,003	30.6	29.4-31.8	67.5	66.2-68.7	0.7	0.4-0.9	1.2	1.0-1.5	1.9	1.6-2.2
<b>Gender</b>											
Male	1,264,561	29.3	27.5-31.0	68.2	66.4-69.9	1.0	0.6-1.4	1.6	1.1-2.0	2.6	2.0-3.1
Female	1,366,442	31.9	30.1-33.6	66.8	65.0-68.6	0.4	0.2-0.5	0.9	0.7-1.2	1.3	1.0-1.6
<b>Age group (years)</b>											
15-24	455,788	41.2	37.9-44.4	56.7	53.5-60.0	-	-	1.5	0.7-2.2	2.1	1.2-3.0
25-34	482,525	28.0	25.2-30.8	68.5	65.6-71.5	1.1*	0.4-1.8	2.3	1.4-3.3	3.5	2.3-4.6
35-44	540,668	27.4	25.2-29.6	70.7	68.5-72.8	0.8*	0.2-1.4	1.1	0.6-1.5	1.9	1.2-2.7
45-54	454,192	24.4	21.9-26.8	73.7	71.0-76.4	0.7*	0.1-1.2	1.3	0.7-1.9	1.9	1.2-2.7
55-64	309,575	27.9	25.0-30.8	71.1	68.2-74.1	0.3*	0.1-0.5	0.7*	0.3-1.1	1.0	0.5-1.5
65+	388,255	35.6	33.0-38.2	64.0	61.4-66.6	0.2**	0.0-0.5	-	-	0.4*	0.1-0.8
<b>Ethnicity</b>											
European/Other	2,071,723	28.2	26.9-29.5	70.4	69.0-71.7	0.6	0.3-0.8	0.8	0.6-1.1	1.4	1.1-1.7
Māori	285,969	25.9	23.0-28.9	69.3	66.2-72.3	1.5*	0.6-2.4	3.3	2.1-4.4	4.8	3.4-6.2
Pacific	115,765	46.1	40.4-51.9	49.2	44.0-54.5	0.9**	0.0-1.7	3.8	1.9-5.7	4.6	2.5-6.7
Asian	157,546	59.6	55.0-64.2	39.2	34.7-43.6	-	-	-	-	1.2*	0.3-2.2
<b>NZDep quintile</b>											
1 (least deprived)	486,903	31.3	28.4-34.3	67.1	64.2-70.0	-	-	0.8*	0.3-1.3	1.5	0.7-2.4
2	511,313	29.0	26.0-31.9	69.6	66.5-72.7	-	-	0.9*	0.2-1.5	1.5	0.7-2.3
3	538,709	28.1	25.5-30.7	70.7	68.0-73.3	-	-	0.9	0.4-1.4	1.2	0.6-1.8
4	569,072	31.5	28.1-34.8	66.2	62.7-69.6	0.7	0.3-1.1	1.7	1.0-2.4	2.4	1.5-3.2
5 (most deprived)	523,065	33.2	29.3-37.1	63.9	60.2-67.6	1.0*	0.3-1.6	1.9	1.3-2.4	2.8	2.0-3.7
<b>Urbanicity/rurality</b>											
Urban	2,263,931	31.6	30.2-32.9	66.5	65.2-67.9	0.6	0.4-0.9	1.3	1.0-1.5	1.9	1.6-2.3
Rural	367,072	24.9	21.7-28.1	73.1	69.8-76.5	0.8*	0.1-1.5	1.1*	0.3-2.0	1.9	0.9-3.0

Demographic variable	Population totals	Proportion of New Zealand adult population %											
		Non-gamblers (past 12 months) Level 0	95% CI	Gamblers not at risk Level 1	95% CI	At-risk gamblers Level 2	95% CI	Problem gamblers Level 3	95% CI	Problem gamblers and at-risk gamblers Levels 2-3	95% CI		
<b>Employment status</b>													
Employed	1,706,691	25.5	24.1-27.0	72.1	70.6-73.7	0.9	0.6-1.2	1.5	1.1-1.8	2.3	1.1-1.8	2.3	1.9-2.8
Unemployed	103,392	31.1	25.9-36.2	66.8	61.8-71.8	-	-	1.4*	0.2-2.6	2.1*	0.2-2.6	2.1*	0.6-3.6
Not in Labour Force	819,876	41.3	39.0-43.5	57.8	55.6-59.9	0.2*	0.0-0.4	0.8	0.5-1.1	1.0	0.5-1.1	1.0	0.6-1.3
<b>Household income</b>													
≤\$20,000	500,316	37.6	34.4-40.9	60.7	57.5-63.9	0.1*	0.0-0.2	1.5	1.0-2.1	1.6	1.0-2.1	1.6	1.1-2.2
\$20,001-\$30,000	398,318	33.6	30.5-36.6	65.0	62.0-67.9	0.5*	0.1-1.0	1.0*	0.4-1.5	1.5	0.4-1.5	1.5	0.8-2.2
\$30,001-\$40,000	316,442	32.4	29.0-35.8	65.9	62.6-69.3	0.9*	0.2-1.6	0.8*	0.3-1.3	1.7	0.3-1.3	1.7	0.8-2.5
\$40,001-\$50,000	269,215	26.6	23.1-30.0	69.8	66.1-73.6	1.9*	0.6-3.1	1.7*	0.6-2.8	3.6	0.6-2.8	3.6	2.0-5.2
\$50,001-\$70,000	423,915	26.1	23.3-28.8	72.2	69.3-75.0	0.4*	0.1-0.7	1.4	0.7-2.1	1.8	0.7-2.1	1.8	1.0-2.5
\$70,001+	720,653	27.5	25.2-29.9	70.5	68.1-73.0	0.8*	0.3-1.2	1.2	0.6-1.7	1.9	0.6-1.7	1.9	1.2-2.6
<b>Household size</b>													
1 person	277,004	32.8	30.1-35.6	65.2	62.4-68.0	0.3*	0.1-0.6	1.6	0.7-2.5	1.9	0.7-2.5	1.9	1.1-2.8
2 people	832,982	26.7	24.9-28.5	71.5	69.6-73.3	0.6*	0.2-1.0	1.2	0.7-1.7	1.8	0.7-1.7	1.8	1.2-2.4
3 people	507,916	30.5	27.5-33.4	67.1	64.1-70.1	1.1	0.5-1.8	1.3	0.7-1.9	2.4	0.7-1.9	2.4	1.6-3.3
4 people	527,092	29.6	26.8-32.3	68.8	66.0-71.7	0.6*	0.1-1.1	1.0	0.4-1.5	1.6	0.4-1.5	1.6	0.9-2.3
5 or more people	486,009	37.4	34.0-40.8	60.8	57.4-64.1	0.4*	0.1-0.8	1.4	0.8-2.0	1.8	0.8-2.0	1.8	1.1-2.6
<b>Highest qualification</b>													
No qualification	582,342	28.0	25.4-30.7	69.5	66.8-72.2	0.9*	0.3-1.4	1.6	1.0-2.2	2.5	1.0-2.2	2.5	1.7-3.3
School qualification	770,670	32.0	29.7-34.4	66.3	63.9-68.7	0.4*	0.1-0.8	1.3	0.7-1.8	1.7	0.7-1.8	1.7	1.1-2.3
Vocational/trade qualification	866,295	26.3	24.3-28.2	71.5	69.5-73.5	0.9	0.4-1.4	1.3	0.9-1.8	2.2	0.9-1.8	2.2	1.6-2.9
Degree	410,075	40.8	37.8-43.9	58.3	55.3-61.3	-	-	0.5**	0.0-1.1	0.9*	0.0-1.1	0.9*	0.3-1.5

\* This value has a relative sampling error between 0.3 and 0.5, so interpret it cautiously.

\*\* This value has a relative sampling error greater than 0.5, so interpret it extremely cautiously.

- Results have been suppressed when there has been a cell count under 10.

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