



**Assessment of the  
Social Impacts of Gambling  
in New Zealand**

Report to Ministry of Health

by

Centre for Social and Health Outcomes Research and Evaluation  
& Te Ropu Whariki  
P O Box 6137, Wellesley St, Auckland

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# Executive Summary

This research was funded by the Ministry of Health. The objectives of this survey were to provide quantitative measures of the impacts of gambling from a representative sample of New Zealanders aged 15 to 80 years (to provide information at the individual level and, allow for aggregation, at the societal level). The survey collected quantitative measures which assessed the negative and positive impacts of gambling experienced by the gambler and by significant others (such as family and friends). The survey collected data on the impacts of gambling from three different ethnic groups within New Zealand; specifically Maori, Pacific peoples and Chinese/ Korean peoples.

The total sample size of the survey was 7010 and the survey consisted of 1) a general population sample of 4650 respondents, and 2) oversamples to allow for separate analysis based on 1000 respondents each for the Maori, Pacific and Chinese and Korean samples.

Data collection took place from May 2007 to November 2007 using the SHORE and Whariki in-house Computer Assisted Telephone Interview system (CATI). The response rate was 62% for the general population sample, 74% for the Maori sample, 64% for the Pacific sample and 62% for the Chinese/Korean sample.

## 1. Participation in gambling

The participation in gambling (excluding raffles), in the past 12 months, in the general population was 61.8% (60.6% - 62.9%).

More than half the population had engaged with Lottery products while participation in other modes of gambling was much lower, with fewer than 10% betting at a racetrack or at the TAB. Electronic gaming machines (EGMs) were used by 4% in clubs and 8% in bars/pubs and 8% in the casino. Newer gambling opportunities (such as text messaging and the internet) were used by less than one percent of the sample.

In the present analysis, the definition of higher level participation in gambling was set at three hours or more per week spent gambling and/or a loss of at least 5% of income. This categorisation defined 3.2% of the sample as heavier gamblers.

Almost two-fifth (38.3%) of people had not taken part in any of the gambling activities in the last 12 months. Approximately one in three bought lottery products only and over one in four participated in lower level gambling.

## **2. Gambling by demographic variables**

People who had not gambled in the last 12 months were more likely to be females, younger than 17 or over 65 years of age, single, mainly students or unemployed, have an overseas secondary qualification or university degree as their highest educational qualification, and the majority were Chinese, Korean or Pacific peoples.

People who only bought lottery products were more likely to be females; over 36 years of age, married or divorced, sick, have a diploma as their highest educational qualification, and the majority of them were Pakeha or Maori.

People who had lower levels of participation in gambling activities were more likely to be males; aged between 18-35 years; single; in paid employment; had secondary qualification as their highest educational qualification; and the majority of them were Maori or Pacific peoples.

People who had higher levels of participation in gambling activities were more likely to be males, aged between 18-35 years, single, either sick or unemployed, have secondary qualification as their highest educational qualification and the majority of them were Maori or Pacific.

## **3. Impacts of gambling on domains of life**

Logistic regressions were used to assess the impact of gambling on the quality of life in a number of domains. All the analyses in this study controlled for the effects of the following demographic variables to isolate an independent impact of gambling: age; gender; ethnicity; marital status; educational qualification; occupational status; income (with log transformation) and prevalence of other heavy gamblers in one's life.

The results from the logistic regressions showed that people who had higher levels of participation in gambling activities (based on time spent and losses relative to income) reported experiencing significantly worse physical health, worse mental health, poorer feelings about self, lower satisfaction with life and more likelihood of unemployment.

The measure of loss/income, however, proved to be a more sensitive measure in relation to some of the domains of life (due to some of the more time consuming gambling modes being associated with fewer adverse effects). The measure of loss/income also showed an association with poorer relationships with family/friends, poorer overall quality of life, poorer work performance and study/training performance and poorer material standard of living.

## **4. Effects of gambling modes and venues**

After controlling for all the demographic variables (i.e., age, gender, ethnicity, marital status, education qualification, occupational status, and income), it

was found that playing on the EGMs in any setting (bar, club or casino) was associated with self-reported poorer physical health. Playing EGMs in both bars and casinos affected participants' perceptions of their mental well being, relationships with family/friends, feelings about self, overall quality of life, and overall satisfaction with life. EGMs in bars were associated with poorer child rearing while EGMs in casino were associated with better self-rated housing situation and material standard of living.

Longer times spent playing on casino tables was negatively associated with participants' perceptions of their physical health, mental health, and work performance, and marginally associated with overall quality of life.

Betting at the TAB gave a mixed picture with worse self-reported mental health but a better self-rated financial situation. Playing poker at home or with friends also gave a mixed picture with worse self-rated study/training performance but better feelings about self.

In a contrast with other forms of gambling some positive associations emerged between time spent on the race track with participants' self ratings of their physical health, feelings about self, satisfaction with life, financial situation and material standard of living. Playing housie (in community centres, clubs or bars) was also associated with better material standard of living.

## **5. Self perception of changes on domains of life**

People who were in the higher participation group expected that they would have been better off in terms of their physical health, mental well being, relationships with family/friends, feelings about self, quality of life, satisfaction with life, financial situation, housing situation, material standard of living, study performance, and care giving for children if they had not been gambling in the last 12 months. However, they reported that there would have been no difference in terms of their work performance or their ability to take care of the elderly.

Also, 2.1% of people who reported higher participation in gambling said they would have been in some study or employment-related training if they had not been gambling in the last 12 months and 8.3% said they would have been in paid employment if they had not been gambling in the last 12 months.

## **6. Impact of gambling on illegal activities**

Approximately 1.3% of people admitted they had engaged in illegal activities (mainly stealing and fraud) during the last 12 months.

People who were in the higher participation group were significantly more likely to be involved in illegal activities compared to people who never gambled or people who reported lower levels of participation.

People who played EGMs in a bar or played poker/card games at their own or someone else's house were significantly more likely to be involved in illegal activities compared to people who never gambled.

For those who were involved in illegal activities, 25% of them said they would not have committed such a crime if they had not been gambling in the last 12 months.

## **7. Impacts of other people's gambling on domains of life**

Approximately 12.4% of people had at least one person in their lives whom they considered to have been 'fairly heavy gamblers' in the last 12 months.

The majority of the heavy gamblers were respondents' friends (33.4%) or wider family members (26.8%). Approximately 25% of them were respondents' close family members (i.e., parents and siblings).

Close family members (i.e., partners, children, parents, siblings) of heavy gamblers were most negatively impacted by their family members' gambling. The life domains affected included physical health, mental well being, housing situation, material standard of living, relationships, care-giving for children, feelings about self, overall quality of life and overall satisfaction with life. Gambling addiction in wider family members, friends and work-related associates did not have significant negative impacts on people.

In addition, individuals who had other people in their lives whom they considered to be fairly heavy gamblers were significantly more likely to have been involved in illegal activities.

## **8. Ethnicity and modes of gambling**

Pakeha were more likely than other ethnic groups to bet at a race track while Maori were more likely to buy Lottery products; bet at the TAB; play EGMs in clubs, bars and casinos; and play poker/card games at their own or someone else's house.

Compared to other ethnic groups, Pacific people were more likely to buy Daily Keno and play housie (in community centres, clubs or bars) while Chinese and Koreans were more likely than others to gamble at the casino table games.

For the Maori and Pacific samples there were significant associations between gambling participation and poorer quality of life in a number of life domains. As in the case of the general population findings, there were significant negative associations in a number of domains of life with time spent on EGMs.

These predominantly negative associations for Maori and Pacific peoples contrasted with the findings for Pakeha, which were more mixed and

predominantly positive. Their level of participation measures showed no associations with quality of life but the loss to income ratio showed a negative relationship with physical health and mental well-being. Also, while there were negative associations for Pakeha with playing EGMs in a bar, in contrast, time spent betting at the race track and TAB, playing EGMs in a casino and playing poker and housie were all positively associated with participants' self ratings in regard to a number of life domains.

The findings from the sample of Chinese and Korean peoples showed some similarities with the Pakeha sample in that the levels of gambling participation overall were not associated with negative ratings of quality in relation to the domains of life and, with regard to playing casino table games longer times were associated with better self-reported housing situation and material standard of living. However, longer time spent playing EGMs in bars and clubs was associated with poorer self ratings in regard to physical health, and EGMs in club was also associated with poorer feelings about self.

## **9. Social impact**

Using a no-gambling counterfactual scenario the analysis has suggested that as much as a net 2.4% of the population (74,000 of New Zealanders) had an inferior state of reported mental well-being as a result of gambling in 2006 and 2007. The main source of these numbers are from those who used EGMs and the associates of heavier gamblers.

Extrapolating from the survey, about 10,000 people (just below a third of one percent of the adult population) committed illegal activities in the last year because of gambling.

Of those who had a reduced satisfaction with their lives because of their gambling, the largest contribution was from those who were using EGMs and those who were associates of heavier gamblers.

## **Key Findings**

The measures developed as part of this survey and the subsequent analyses have provided results relevant to measuring the social impacts of gambling in New Zealand.

With regard to the measures of gambling participation and heavier gambling, the loss to income ratio distinguished between gamblers and predicted different ratings of quality of life in many domains. People with higher losses to income ratio had worse physical health, worse mental well-being, poorer relationships with family/friends, poorer feelings about self, poorer overall quality of life, lower overall satisfaction with life, poorer material standard of living, poorer study/training performances, and were less likely to be employed.

In terms of the modes of gambling the results show different ethnic groups experienced different impacts to some degree but the time spent playing EGMs in bars showed up as having an impact with all ethnic groups, and in relation to many domains of life. It was also associated with criminal behaviour. Respondents' self ratings of whether their quality of life in various domains had been affected by their own gambling showed widespread impact.

This study has also provided evidence of quantifiable impacts of the effects of heavier gamblers on their associates. Close family members of heavy gamblers were most negatively impacted by their family members' gambling.

Regarding the social costs of gambling in New Zealand, this study estimated that 2.4% of the population may have had an inferior state of mental wellbeing as a result of gambling and about 10,000 New Zealanders committed illegal activities in the last year because of gambling. The main contribution came from those who used EGMs and those who had heavy gamblers in their lives.

# Introduction

This report on the project Assessment of the Social Impacts of Gambling in New Zealand includes a brief summary of the literature on the impacts of gambling, highlighting some of the limitations in the existing literature relevant to economic costings. The way in which the current research addresses some of these limitations is summarised and an overview of the methodology and results of the research are presented.

## Research on impacts of gambling in New Zealand

The New Zealand prevalence surveys of the 1990s provided some information on the impacts of gambling. Within the New Zealand context (Abbott, 2001a, Abbott, 2001b) the main findings were that financial impacts were particularly common and increased in proportion to the severity of the gambling problem. Health and wellbeing, study and work performance, and interpersonal relationships were also frequently cited as areas in which gambling had negative impacts. Personal impacts of problem gambling were also reported including depression, guilt, anxiety, elevated levels of substance use and in extreme cases suicidal attempts and suicide (Abbott, 2001a, Abbott, 2001b; Abbott and Volberg, 1992; Ministry of Health, 2006b). The provision of health, counselling and other problem gambling services were recorded as financial costs. Criminal offending was identified as a social cost that was more likely to be associated with particularly acute gambling addiction (Abbott, 2001a, 2001b). Analyses of users of treatment services has provided information about the primary mode of gambling associated with problems in New Zealand, that is the electronic gaming machine (EGM) (Ministry of Health, 2007).

The survey instrument used in the current research was developed as part of a qualitative pilot study (SHORE & Whariki, 2006). The pilot study included a qualitative component interviewing gamblers and other key informants (including some family members). A mix of people in terms of gender and age participated and the sample included Maori, New Zealand European, Tongan, Chinese, and Korean individuals. This pilot study found that a number of impacts in different domains of life were consistently reported by heavier gamblers and those in their family (SHORE & Whariki, 2006). These were relationships with others, perception of self, financial situation, housing situation, work and study performance including unpaid work such as care giving of children and the elderly, mental and emotional health and quality of life.

SHORE and Whariki's (2006) qualitative pilot study found that many of the impacts of gambling were the same across different ethnic groups. However, some impacts were specific to ethnic groups. Maori noted that gambling conflicted with Maori values of whanau (family), compromised care-giving, contributed to a loss of mana (respect and status), and the emotional effects of gambling affected an individual's wairua (spirit / spiritual well being) and

identity. Pakeha interviewees mostly mentioned being ostracised by family members. Interviewees of Tongan descent stated that their financial problems had led them to pawn traditional Tongan crafts and left them unable to meet community obligations. Some Chinese students had used their study funds to finance their gambling which had caused them significant problems.

Research on the impacts of gambling in New Zealand has also provided some discussion of the potential beneficial effects of gambling particularly in terms of social interaction. This tends to be reported as gambling mode and/or venue specific. For example, according to the Department of Internal Affairs report *The Social Impact of Gaming in NZ* (1995), Housie is considered a safe, social outlet for women and a good fundraiser and form of social cohesion for Maori marae and Pacific Island church groups. Racing provides an important social focus in rural communities. Casino facilities can provide a venue for social events. Interviewees in the SHORE & Whariki's (2006) qualitative pilot work also considered the benefits of gambling for individuals, families, communities and nationally. Most perceived the benefits of gambling to be negated by its harms. Those who thought there were benefits saw them as entertainment, social interaction, and respite from day-to-day living. Tongan and Maori interviewees, in particular, described how gambling events provided fundraising opportunities for local communities.

## **Effects on those other than the gambler**

There is a lack of quantification of the impact of gambling on people other than the gambler in New Zealand, which also reflects a relative lack of data internationally. The little research that does examine the impact of gambling on others indicates that families are impacted in many ways (Dickson-Swift, James & Kippen, 2005). A qualitative Australian study found that adult children of late onset of gambling parents suffered financial losses, relationship distress within and outside of the family, and strain on mental and physical health (Patford, 2007). In the 2006/7 survey of Gaming and Betting Activities 16% of the sample said there had been arguments over gambling and the family had had to go without because of gambling in the household or wider family (Health Sponsorship Council, 2007).

To our knowledge there have been no published quantitative studies in New Zealand addressing this issue in detail. From the SHORE & Whariki (2006) qualitative pilot study (which was undertaken to inform this current study) the following impacts of other people's gambling were identified: financial problems for the household; lower living standards; eroded savings; increased debt in their household and their wider family/whanau; and loss of money and valuables. Maori and Pacific families helped out with bills as well as larger debts; Pakeha gamblers tended to ask for help only for larger debts. Pacific and Maori people reported that gambling problems seemed to affect more people, as their household and family economies are more connected with their wider communities than those of Pakeha informants. The Korean gamblers in this sample spoke about spending large amounts of money gambling and losing savings reserves.

## **Impacts of gambling among specific ethnic groups**

Past research has shown that within a society certain ethnic groups are disproportionately harmed by gambling. This has been related to their social-economic and political position within a society, access to gambling venues, culturally determined help-seeking attitudes, and the process of acculturation (Clarke, Tse, Abbott, Townsend, Kingi & Manaia, 2006; Raylu & Oei, 2004; Reith and Scottish Executive Social Research, 2006).

### **Maori**

In New Zealand the disproportionate effect of gambling is particularly evident among Maori, to whom gambling was introduced by settlers (Dyall and Hand, 2003). Dyall (2004) reported that Maori are at particular risk for the adverse impacts of gambling. The 2002/3 New Zealand Health Survey showed that gambling problems were experienced by a higher proportion of Maori compared with the total population (Ministry of Health, 2006b). Abbot and Volberg estimated that Maori spent more money on gambling than Pakeha even though household incomes of Maori were significantly lower (Volberg and Abbott, 1997, Abbott and Volberg, 2000). A qualitative survey of participants who worked with Maori whanau suggested that gambling eroded social capital, Maori cultural and family values, and reduced time and money available to families (Dyall and Hand, 2003). The findings in Manukau City by Rankine and Haigh (2003) suggested that common impacts included theft and misappropriation of goods to pay for gambling, the suffering of children and loss of 'mana'.

### **Pacific peoples**

Pacific peoples are also more likely to develop problem gambling compared with Pakeha (Abbott and Volberg, 2000). Cultural beliefs and practices may influence Pacific people's attitudes and participation in gambling (Guttenbeil-Po'uhlia et al., 2004, Bellringer et al., 2006). Negative impacts on Samoan gamblers and their families have included breakdown in family relationships in terms of honesty, trust and spending time with partners, providing for the needs of children, extra financial and care giving burdens placed on extended family members, financial management problems leading to loss of possessions or eviction, and declines in levels of health, employment, education and contribution to the community (Perese and Faleafa, 2000). Similar problems were noted in Tongan communities. Expectations for life in New Zealand have changed as "...the dreams of some Tongan migrants for a better life have been transferred from participation in the economy and social life of New Zealand to the sites of the gambling industry, casinos and EGMs (Guttenbeil-Po'uhlia et al., 2004, p.10).

## **Asian peoples**

Until this survey, the numbers of Asian peoples interviewed in population studies have been too low to give accurate figures on problem gambling. However, the indication has been that they may have similar levels to those of Pakeha (Ministry of Health, 2006b) despite their lack of visibility within the problem gambling treatment community. It has been suggested that lack of experience of gambling as it exists in New Zealand, spare cash and free time may be the reasons some Asian immigrants develop problem gambling. Also, limited English ability, difficulty in gaining employment and disconnection from family support may lead to social isolation for new immigrants and this feeling of isolation can be eased through gambling games that require no language skill and are provided in venues where other Asians meet. (Li and Chan, 2006, Wong and Tse, 2003). Chinese international students in New Zealand felt that they benefited from gambling through entertainment and fun, winning money, making friends, release from stress, feeling successful, passing time, getting discount vouchers, a feeling of growing up, and improved judgement and counting skills (Li and Chan, 2006).

## **Impacts related to different types of gambling and their availability**

Past research has shown that continuous forms of gambling are more associated with problem gambling. Faster progression from regular gambling to problem gambling has been noted for EGMs in a treatment sample in Rhode Island in the U.S. (Breen and Zimmerman, 2002). In New Zealand use of problem gambling intervention services show that EGMs (mostly non-casino) were the primary mode of gambling for 83% of new users of the gambling helpline, and 82% of gamblers using face-to-face intervention services. Other modes of gambling such as casino tables, track betting, sports betting, Lotto, Keno, scratchies, Housie, the Internet, cards or other forms of gambling accounted for minimal percentages of service users (Ministry of Health, 2007).

Statistics on people seeking treatment indicate that primary modes of problematic gambling varied by ethnicity. Maori (75.1%) and Pakeha (70%) clients were more likely to report non-casino EGMs as their primary mode of gambling. Casino tables were the primary mode of gambling for half the Asians (50%). Asians (35.4%) and Pacific peoples (33.6%) were more likely to report casino EGMs as their primary mode of gambling than other ethnicities (Ministry of Health, 2007).

These statistics also indicated that modes of gambling differed by gender. A large majority of women (91.9%) reported EGMs (73.3% non-casino, 18.6% casino) as their primary mode of gambling. Women (73.3%) more often reported non-casino gaming machines as their primary mode of gambling than men (56.7%), and men reported casino tables, track betting, sports

betting, Lotto/Keno/scratchies and other gambling as their primary mode more than women (Ministry of Health, 2007).

Relatively low numbers are currently engaging in virtual gambling venues on the internet. This form of gambling is, however, predicted to increase in coming years as it is easily accessible, always available, visually exciting, rapidly playable, and governments are likely to enter the market (Derevensky and Gupta, 2007).

## **Methodological issues**

A number of methodological issues which have been identified in international research focused on costing alcohol and tobacco related impacts are also issues for gambling impacts. Single *et al.* (2003), referring to methodology relating to substance abuse state that measurements are not straightforward as a number of issues need to be considered including: defining harmful use, determining causality (and dealing with co-morbidity), clarifying private versus social costs, measuring intangible costs, dealing with research, education and law enforcement costs, estimation of budgetary impacts on national, state or local governments and estimating avoidable costs. Reviews applying directly to gambling have identified very similar issues (Hayward and Colman, 2004).

## **Measuring gambling and defining harmful use**

Disparities in survey item wording can contribute to a significant variations in obtained estimates of gambling. For example, the types of activities provided as gambling options can affect the number of participants classified as gamblers (Ministry of Health, 2006b). Another example relevant to the estimation level of participation is the use of self-reported measures of gambling expenditure. Most studies do not provide respondents with instructions on how to calculate their estimate: the gross amount gambled, net amount lost, or the initial stake (Blaszczynski *et al.*, 1997). Accuracy of estimate is important as amounts are sometimes used to set marks for risk of problem behaviour.

Methodological concerns have also been raised regarding use of screening instruments to assess problem gambling (Duvarci *et al.*, 1997). Cultural differences exist, with New Zealanders having been found to respond more positively to some measurement items than Americans (Abbott and Volberg, 1992). The screening tools themselves conflate participation in gambling with subjective feelings of lack of control and impacts of gambling (such as feelings of shame) which are likely to be subject to cultural difference and change over time. The use of cut off points to dichotomise problem and non problem gambling is also problematic as it ignores the continuity in gambling and its impacts in the wider population (National Gambling Impact Study Commission, 1999).

Other methodological concerns have been related to a focus on clinical populations when measuring the impacts of gambling. Abbott and Volberg (1999) state that a focus on clinical populations will result in a loss of information in that people who do not meet the diagnostic criteria may still experience gambling related problems, which may impact on overall social costs. This group may collectively cause more problems than the pathological group (Abbott and Volberg, 1999).

### **Defining social cost**

Another methodological issue in costing gambling impacts has been related to the inconsistent definitions of social cost in the literature. There are those which focus on the cost to society exclusive of costs from rational choices of individuals, and those which include both personal costs and wider societal ones. As an example of the wider societal costs definition, Walker and Barnett (1999) use the perspective of welfare economics and state “the social cost of an action is the amount by which that action reduces aggregate societal real wealth” (p.185). Therefore, if some people lose and others gain the power over resources there has been no social cost at the societal level unless the subsequent distribution of income is considered inferior to the initial one (but as discussed below economics does not have a comprehensive paradigm for making such judgements).

The negative consequences experienced by a gambler as a result of his or her decision to gamble are not considered a social cost by some (Walker and Barnett, 1999). Others argue that if the gambler ignores or discounts the consequences of her or his actions on her or himself, and/or subsequently regrets their decision, then those consequences are a part of the social costs (Easton, 2006).

The costs and benefits of gambling to those in the gambler’s environment can be considered part of the social costs but are generally less well measured than the effects on the gamblers themselves.

### **Tangible and intangible impacts**

Other methodological concerns in costing gambling impacts have been raised regarding the ability to measure and quantify not only tangible but also intangible impacts of gambling.

Tangible costs (such as financial costs) reflect market transactions. A reduction in them means that resources can be released for other purposes. Intangible costs (such as psychological costs), however, cannot be so easily valued in the market place and they are not transacted there. A reduction in these may not necessarily release any resource although it may markedly change a person’s welfare (e.g. emotional suffering of family, quality of life, stress and cultural impacts). While intangible impacts of gambling have been asked about in many surveys of gambling they have not often been asked about in a way which allows quantification of the impacts.

## **Aggregate or disaggregate figures**

Other concerns have been raised regarding the reporting of the costs of gambling. There is the question of whether to present the cost as a single aggregated figure or as a disaggregated figure specifying a number of costs. Collins and Lapsley (2003) point out that gambling is not a homogeneous product so it needs to be disaggregated into modes such as lotteries, casinos, and racing and other sports. The amount and nature of the social impacts differs between these forms of gambling. These impacts are influenced by the structure and regulation of the gambling industry within a country.

## **Measuring redistribution effects**

Easton (2002) describes gambling as economically regressive in that wealth inequality is increased as funds from a large population are transferred to a smaller number of winners. Measurement of redistribution between (institutional and regional) sectors is recommended by the WHO *International Guidelines for Estimating the Costs of Substance Abuse* (Single et al., 2003). However, the principles to be used to measure the redistribution between income strata have yet to be developed.

There are issues specific to gambling in relation to the mechanisms used to allocate gambling licenses and profits from gambling, including the lack of involvement of Maori (Dyall, 2007). Despite expectations based on Te Tiriti o Waitangi Maori have not been involved in major decisions related to gambling. Commentators have pointed out that the Crown receives commercial benefits from gambling but as a treaty partner Maori receive few benefits but pay heavily in terms of gambling costs (Dyall, 2007).

Also relevant to redistribution effects in New Zealand are the ownership arrangements of EGMs, such that the Trusts managing the machines return profits to communities that facilitate community projects, social cohesion and community self-reliance but it is not clear the extent to which redistribution occurs (Ministry of Health, 2006a).

Regional (and international) redistribution also occurs when a gambling firm (say a casino) generates employment in one region at the expense of employment in another region (if it attracts custom from outside its region).

In summary, there is considerable disparity in the estimates of the costs of gambling between different studies, some of which purport to be measuring the same phenomenon. As mentioned above, reasons for these disparities include variation in methodology; institutional differences; causality issues, including the difficulty in teasing out gambling-related costs contained within areas of crime, health and social welfare; failure to integrate input from economists and researchers from other disciplines; and the difficulty in estimating intangible costs and measuring redistribution effects. Collins and

Lapsley (2003) have suggested that it is desirable to identify social costs, but not feasible to quantify all of them.

## **The current research on the impacts of gambling in New Zealand**

The current research aimed to collect some of the missing information necessary for the estimates of social costs in New Zealand via a general population survey. The survey, by sampling from the general population, avoids the limitations of researching only clinical populations and provides data complementary to that collected from those in treatment for gambling problems in New Zealand. (This is, however, at some cost methodologically as smaller numbers of heavier gamblers are accessible using a general population sampling frame).

The samples surveyed in the present study allow for disaggregation by age groups and gender and, by collecting oversamples of Maori, Pacific peoples, and Chinese and Korean peoples allows for disaggregation of data by ethnic groups, which is of considerable interest to the gambling field.

The measures utilised to assess participation in gambling have been developed to avoid some of the problems identified in the methodological literature. The data collected allow for analysis of a number of different ways of defining gambling participation, do not conflate subjective response to gambling with participation measures and allow for disaggregation by mode and venue of gambling as well as the measure having the potential to add new modes and venues to the measurement instrument if they enter the gambling environment.

In terms of impacts the survey focuses primarily on measures of intangible impacts, including a wide range of potential impacts (both negative and positive) (as identified by prior research) within the same measurement frame. The measurement frame allows for positive as well as negative impacts to be reported. It also includes measures of the impacts from others' gambling using the same framework.

No attempt was made to assess alcohol, tobacco or other drug use, reflecting time constraints and uncertainties about causal links.

The data was collected using a replicable methodology which allows for the opportunity to repeat the measurement of participation and impacts for analysis of the impact of changes in the environment, (if there are changes over time), and also allows for monitoring of any change in relationships between impacts and modes of gambling and specific population groups.

The current project is limited by not being a longitudinal survey. Analysis of the survey compared respondents reporting different levels of participation and experience of gambling in terms of their self reported quality of life in

relation to a number of life domains. These data are cross-sectional and analysis demonstrated the associations found; it is likely that causal links are in both directions and this is discussed in the report. The survey also collected data from respondents about their own assessment of whether gambling has affected their domains of life, enabling triangulation from different methodological approaches.

The final part of the study utilised some of the data from the survey in a preliminary analysis of the social costs using three counterfactuals.

## The Current Survey

The aims of the current study were to provide quantitative measures of the impacts of gambling from a representative sample of New Zealanders aged 15 to 80 years (to provide information at the individual level and, allow for aggregation, at the societal level). The survey also collected quantitative measures which assessed the negative and positive impacts of gambling experienced by the gambler and by significant others (e.g. whanau, workmates). The survey collected data on the impacts of gambling from three different ethnic groups within New Zealand; specifically Maori, Pacific peoples and Chinese and Korean peoples.

### Methodology

The total sample size of the survey was 7010 and included respondents aged 15-80 years living in private residential dwellings. Data collection took place from May 2007 to November 2007.

#### Sample frames

A range of sample frames were utilised in the 2007 survey to achieve a balance between full coverage of the population and to allow information to be gathered from samples of Maori, Pacific peoples and Chinese/Korean peoples

**General population sample:** A stratified sample design was used to reflect the New Zealand population on the basis of geographic regions and level of urbanisation. The strata, when combined, covered the whole of New Zealand. Level of urbanisation was divided into metropolitan (Auckland Urban area) and large cities, such as Hamilton, Christchurch, Wellington) and smaller main urban areas, large towns small towns and rural areas. The strata had been derived from local calling areas but were adjusted to match main urban areas where possible.

A range of sample frames were utilised in the 2007 survey to achieve a balance between full coverage of the population and to allow information to be gathered for samples of Maori, Pacific peoples and Chinese/Korean peoples. Telephone numbers were randomly generated/selected within stratum so that each household would have an equal chance of being called.

The survey population was the usual residents of New Zealand living in permanent private households who were aged 15 to 80 years and had lived in New Zealand for at least 12 months.

Telephone numbers were randomly generated and each household had an equal chance of being selected. Connection testing to establish if phone numbers were working before contact was undertaken. Randomly generated phone numbers have the advantage of including both published and

unpublished phone numbers, therefore greater coverage of the sampling frame, than using non-randomly generated, listed, telephone numbers. Telephone numbers were also screened against the Yellow Pages (to remove business numbers). Some other telephone numbers that did not reach permanent private households were screened out at contact.

Phone numbers were distributed in proportion to the usually resident population aged 15 to 80 years with a telephone across 33 area strata. Telephone numbers from the pool of initially selected numbers were incrementally made available for interviewing until the target number of interviews was almost achieved.

Interviews were mainly conducted on evening shifts on weekdays, and during weekends. Smaller day shifts were held in the week to attempt to access respondents who may not have been contactable at other times.

Each number was called at least ten times at different times and days of the week until contact was made.

The final stage of sampling involved the random selection of one respondent from among those eligible in each household. The number of eligible people living in each household was established and listed so that the data collection software could select one respondent at random (no decimation took place and the data were weighted appropriately prior to analysis to take account of interviews being conducted with one person per household).

**Ethnic oversamples:** The sampling for the Maori sample utilised the Maori electoral roll and used the same approach utilised in a number of other national surveys (National Alcohol Survey 2000, PHI Health Behaviour Surveys: 2003 & 2004). Both the Pacific and Chinese/Korean samples included the use of a lexicon approach previously used for the Public Health Intelligence funded Pacific Alcohol & Drug & Gambling Survey. These samples, like the Maori sample, utilised the electoral roll for sampling.

## **Data collection**

The data were collected using the SHORE and Whariki in-house Computer Assisted Telephone Interview (CATI) system. The target sample sizes were as follows: general population sample 4450; Maori sample 500; Pacific sample 800 and 620 respondents for the Asian sample. The size of the oversamples was calculated to ensure at least 1000 respondents from the oversample and general population sample combined to allow for ethnic specific analysis.

New interviewers were required to attend a minimum of 20 hours of training (five consecutive shifts of four hours). The first hour of the first session was held with the lead researcher of the project who introduced the aims of the study and explained how the data collected would be used. The remaining

training concentrated on the tasks the interviewers must complete as part of the CATI operation and achieving a high quality interview. All new interviewers were required to achieve a high level of competency which included understanding the questionnaire, use of the data collection software and interviewing skills. If, after completing the training sessions, a trainee interviewer was not considered to have achieved the required standard they were asked to complete additional training over and above the standard 20 hours. Supervisors verified and documented that a trainee interviewer had reached the required standard by checking off a list of skills covering all aspects of interviewing. All interviewers had achieved these standards before they interviewed members of the public.

Supervisors were present at each shift and monitored calls by listening into them to check the quality of the interviewing (the respondent was told this may occur).

Interviewer statistics were produced every day in order to monitor interviewers' progress. Short briefings were provided by supervisors at the beginning of each shift to reinforce key issues and requirements, and periodic full training meetings occurred where difficult aspects of interviewing were reviewed. The shift briefings were also an opportunity for the supervisor to respond to interviewer questions and restate the importance of standards and accuracy.

Response rate was monitored throughout the time the survey was in the field.

### **Survey instrument**

This was developed from the existing survey instrument produced from the pilot qualitative study previously conducted by SHORE and Whariki researchers (SHORE & Whariki, 2006). This study included three components: 1) A review of the available literature about methodologies and approaches used for measuring the social and economic impacts of gambling, including economists' cost benefit analysis (CBA); 2) Data collection with various stakeholders from the gambling industry, qualitative interviewing of people from different ethnic groups who participated in gambling, and those affected by the gambling of others to provide insights into the nature and range of gambling impacts within New Zealand; and 3) the development and piloting of a quantitative data collection instrument to assess the social impacts of gambling in New Zealand (SHORE & Whariki, 2006). The survey instrument was piloted thoroughly and found to be largely successful in its aims. The current study builds on the survey designed as part of this pilot project and the lessons learned in the pilot study and following further consultation with the economist (Brian Easton) participating in the project and Professor Jurgen Rehm, a visiting scientist with expertise in measuring harm outcomes.

## **Pre-pilot**

Pre-piloting involved evaluation of the entire questionnaire programmed into CATI script. Pre-piloting provided feedback on the wording of questions and the flow of the interview. Pre-piloting also involved the checking of the programmed computerised CATI skip patterns of the questionnaire. Pre-piloting was carried out by experienced SHORE and Whariki CATI supervisors and interviewers. This internal process provided valuable feedback on the clarity of questions, efficiency of the interview, and the length of the interview.

## **Piloting**

Piloting involved experienced interviewers ringing households in the general population and conducting interviews (these pilot interviews were not included in the numbers of interviews completed in the general population sample). Piloting provided feedback as to the flow and the length of the survey.

Frequency tables and cross tabs of the data were produced to check the skip patterning in the survey, that is that the right number of respondents had answered the correct questions. Further checks were also conducted to ensure that the skip patterning was correct.

## **Questionnaire translation**

In order to reach a higher number of Chinese and Korean respondents, the survey instrument was translated from English to Chinese and Korean by existing SHORE staff. It was then translated back to English by individuals who were not familiar with the survey to check the accuracy and the linguistic equivalence of the translation.

## **Measures**

**Participation in gambling:** It was first ascertained whether respondents had gambled in the previous 12 months. This was established by asking respondents if they had gambled using 11 specified (and mutually exclusive) modes/venues of gambling plus any additional types of gambling they used. These modes/venues were buying lottery products, betting at a race track, betting at the TAB, gambling at a member club, gambling at any other bars or pubs, gambling at a casino, gambling using text messaging for money, gambling using telephone for money, gambling on the internet for money, playing housie for money, and playing poker or other card games for money. Raffles and Casino evenings were not included as they were viewed as social events rather than gambling activities. In addition, these forms of gambling were also excluded from the Ministry of Health's 2006/07 New Zealand Health Survey.

For each mode/venue in which a respondent reported gambling (excluding Lotto, Daily Keno, gambling using text messaging and telephone), they were asked how often they gambled using that mode/venue, how much time they would spend gambling on a typical occasion for that particular mode/venue, and the longest amount of time they had spent on any one occasion.

**Volume of time participating in gambling:** For each mode of gambling the time volume measure was calculated by multiplying time spent gambling on a typical occasion by frequency of gambling in that mode/venue. By summing across all modes an annual volume measure of total gambling was obtained from which a weekly rate was calculated. Log time spent in each mode was also calculated and used in the logistic regression analysis. Respondents who only gambled on Lotto or Daily Keno were excluded from the volume of time calculations.

**Gambling losses:** Respondents were asked how much money they had lost in the past 12 months due to gambling.

**Loss to income ratio:** A ratio of losses to personal income was calculated. Those who reported earning more than \$1000 a year were included in the analysis. This was to avoid a high loss to income ratio resulting from low loss by a low income earner. This resulted in the exclusion from this analysis of 462 people, the majority of whom were parenting or doing unpaid work at home (44.3%) or were students (36.4%). A small proportion of them were retired (10.8%) or unemployed (6.1%).

**Categorisation by gambling levels:** Respondents were grouped into four categories:

- Not in last 12 months – those who have not participated in any gambling activity in the last 12 months. (n=2741)
- Lottery products only – those who only participated in Lotto, Daily Keno or Instant Kiwi. (n=2202)
- Lower participation – people who have participated in at least one gambling activity other than lottery products (n= 1838) up to a total of three hours and with losses of less than 5% of personal income (who had an income over 1000 dollars a year).
- Higher participation – people who have gambled more than three hours per week or who have lost more than 5% of their personal income (who had an income over 1000 dollars a year). (n=229)

Lottery products were kept as a separate category because Lotto and Daily Keno are non-continuous forms of gambling and are therefore considered less harmful. Instant Kiwi is also included in this category even though concerns have been raised about the addictive potential of scratch cards as they can be a continuous form of gambling (Griffith, 2002). However, the limited empirical evidence available at the time suggested the addictive potential is relatively low (DeFuentes-Merillas et al., 2003).

**Quality of life domains:** Respondents were asked to rate themselves (from very poor through to very good) on a comprehensive range of life domains identified in the previous qualitative pilot study (SHORE & Whariki, 2006).

Life domains included: physical health; mental well being; financial situation; housing situation, material standard of living, relationships with family/whanau and friends; care of children; care of elderly; feelings about oneself; performance in study or employment-related training; performance at work; and overall quality of life. Respondents also rated themselves (from very dissatisfied through to very satisfied) on how satisfied or dissatisfied they were with their lives in general.

**Perceived impact of gambling on domains of life:** Respondents who gambled were asked to rate themselves on the life domains as if they had not been gambling in the last 12 months. Those who had gambled and responded that they had not done any study or employment-related training or paid work were asked if they would have been engaged in these if they have not been gambling in the last 12 months.

**Gambling by others:** All respondents, including non-gamblers, were asked if they had had any people in their lives whom they considered to be fairly heavy gamblers in the last 12 months. If so, they were asked about their relationship to the gambler, the main type of gambling the person participated in, and how much the gambler had spent in the last 12 months on gambling.

**Perceived impacts of gambling by others on domains of life:** Respondents were reminded of their previous initial self ratings on the life domains and asked to rate how these would have been if other people in their lives had not been gambling.

**Illegal activity:** Respondents who had gambled in the last 12 months were asked if they had engaged in any illegal activity whether the crime had been reported to the police, whether and how many times they appeared in court, whether convictions resulted and if they had been in prison in the last 12 months. Respondents mentioning participation in theft or fraud were asked the approximate dollar value of the property.

**Perceived impact of gambling on illegal activity:** Respondents who reported illegal activity were asked if they would have done it if they had not been gambling in the last 12 months.

**Ethnicity:** Respondents were asked which ethnic groups they belonged to, with no limit on maximum number of selections. Where a person reported more than one ethnic group, they have been counted in each group specified (this is referring to the same format as done in the Census 2006).

Comparison of prevalence rates between ethnic groups used prioritised ethnicity. This assigns ethnicity in a prioritised order of: Maori, Korean, Chinese, Indian, Pacific and European.

**Education:** Respondents were asked about their highest educational qualification. These were categorised into 1. No qualification; 2. Lower secondary qualification (i.e., NCEA Level 1); 3. Median secondary qualification (i.e., NCEA Level 2, NZ University Entrance before 1986 in one or more subjects, or other NZ secondary school qualification); 4. High secondary qualification (i.e., NZ Higher School Certificate or Higher Leaving Certificate; University Entrance qualifications from NZ University Bursary, or NZ A or B Bursary, Scholarship or NCEA Level 3); 5. Overseas secondary qualification; 6. Diploma qualification (i.e., diploma, trade or technical certificate which took more than 3 months full time study, professional qualifications like ACA, teachers, nurses); 7. University qualification (i.e., Bachelors degree, Postgraduate diploma, Masters degree, and PhD degree).

## **Analysis**

### **Weighting**

Survey weights allow the sample to be used to produce estimates for the entire population. Each eligible person aged 15- 80 years was selected into the sample represented a number of eligible people in the population. Therefore, each eligible person had a scale weight value to indicate how many population members were represented by that person.

The data were weighted in three stages. The first stage was to correct for dwelling unit or household selection probabilities (i.e., individuals in a household with many people have a lower chance of being selected, so they were underrepresented and were weighted more). The weight for each individual was obtained by number of eligible people in household, divided by the average number of individuals per household.

The second stage was to match the survey weights to New Zealand 2006 Census population distributions using post-stratification for groups based on gender, age and ethnicity.

The final stage involved a standardisation to match the weighted sample size back to the initial survey size.

### **Income imputation**

There was about 17% of missing income information from this survey. Therefore income was imputed by a mathematical formula obtained from a linear regression model, which used demographic variables as predictors. These included age, gender, ethnicity, education, marriage status and current occupational status.

Before income imputation, the median income of the sample was 35,000. However, after income imputation, the median income of the sample became \$24,000, which was closer to the national median income reported in the 2006 census (i.e., \$24,400).

### Confidence intervals

Ninety-five percent confidence intervals were used in this report to represent the sampling error of a population rate estimate. Ninety-five percent confidence interval were presented in the brackets under the estimates of each table, and as error bars in the bar plots.

An approximate 95% confidence interval for a single population proportion based on a sample size  $n$  with sample proportion  $\hat{p}$  is given by

$$\hat{p} \pm 1.96 \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

The confidence interval was influenced by the sample size of each sub group. When the sample size was small, the confidence interval became wider. When the confidence intervals of two comparing groups did not overlap the difference in rates was statistically significant at 5% level. However, in some cases when the confidence intervals of two groups overlap, there may still be a statistically significant difference in rates, which was tested using a two-tailed t-test.

An approximate 95% confidence interval for the difference between two population proportions  $(\hat{p}_1 - \hat{p}_2)$  based on a two independent sample size  $n_1$  and  $n_2$  is given by

$$(\hat{p}_1 - \hat{p}_2) \pm 1.96 \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

### Logistic regression

All quality of life measures relating to the different domains of life (DOL) were measured by 'In general, in the last 12 months would you say your (DOL) has been?' [1=very good, 2=good, 3=adequate, 4=poor, 5=very poor, respectively]. This study utilised multinomial logistic regression model with each model controlled for the following demographic variables (covariates): age, gender, ethnicity, marital status, education qualification, occupational status, income (with log transformation) and prevalence of other heavy gamblers in one's life.

The multinomial model applies to cases where an observation can fall into one of the  $k$  categories. Binary data occurs in the special cases when  $k=2$ . In this study, an ordinal multinomial model was used which models the

cumulative category probabilities, where  $(p_1, p_2, \dots, p_k)$  were the category probabilities.

The cumulative category probabilities (note that  $P_k = 1$ ) were calculated as follows:

$$P_r = \sum_{i=1}^r p_i, r = 1, 2, \dots, k - 1$$

The ordinal model is given by:

$$g(P_r) = \mu_r + X\beta, \text{ for } r = 1, 2, \dots, k - 1$$

where  $\mu_1, \mu_2, \dots, \mu_{k-1}$  were intercept terms that depend only on the categories and X was a vector of covariates that does not include an intercept term.

In this study, the first logistic regression examined the impacts of gambling level on participants' domains of life. Specifically, this multinomial model examined the differences in domains of life between those reporting higher participation in gambling compared to those who never gambled, only bought lottery products or reported lower levels of participation.

The second logistic regression examined the impact of loss to income ratio on participants' domains of life. This analysis included only those who reported earning more than \$1000 a year.

The third logistic regression examined the impact of time spent gambling in each gambling mode on participants' domains of life. The time spent on each gambling mode was analysed separately, due to the high correlation in time spent between different modes.

The fourth logistic regression examined the self perception of changes in each domain of life across the four categories of gambling levels. Scores ranging from -4 to +4 were derived from participants' responses. A higher score indicated that participants expected an improvement in that particular domain of life if he/she had not been gambling in the last 12 months.

The fifth logistic regression examined the impact of other people's gambling on individuals' domains of life.

The next sets of logistic regression examined the impact of gambling on individuals' involvement of illegal activities. Separate regression analyses were undertaken to examine the effect of gambling level, time spent on each gambling mode, loss to income ratio and other people's gambling on illegal activities.

All analyses in this study were conducted by using SAS 9.1 statistical software. The statistical significance level was at 5%. Cross-sectional surveys

are vulnerable to simultaneity and reverse causation. This study generally reports associations rather than causalities. Where it has been necessary to make causal inferences (in the case of the social cost estimations) we have used those results where there was less reason to think that causality was strong in both directions.

## Results

### Sample sizes

The total sample size was 7010 and the survey consisted of: 1) a general population sample of 4650 respondents; 2) a Maori oversample of 533 respondents; 3) a Pacific oversample of 858 respondents; and 4) a Chinese/Korean oversample of 969 respondents.

### Response rates

The response rate was 62% for the general population sample, 74% for the Maori sample, 64% for the Pacific sample and 62% for the Chinese/Korean sample.

The response rate was calculated as follows:

$$\text{Response rate} = \frac{\text{number of eligible responding}}{\left[ \begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[ \begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right] + \left[ \begin{array}{c} \text{estimated number of eligibles} \\ \text{from the unknowns} \end{array} \right]} \times 100$$

The justification for this response rate is that a proportion of the unknowns were likely to be eligible if contact could have been made. As we were not able to make contact with the estimated number who would be eligible, they were classified as non-respondents. An assumption is made that the estimated number of eligibles from the list of unknowns is in the same proportion as eligibles from the set of known eligibility.

$$\left[ \begin{array}{c} \text{Estimated number} \\ \text{of eligibles from the} \\ \text{unknowns} \end{array} \right] = \left[ \begin{array}{c} \text{number} \\ \text{of} \\ \text{unknowns} \end{array} \right] \times \frac{\left[ \begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[ \begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right]}{\left[ \begin{array}{c} \text{number of eligible} \\ \text{responding} \end{array} \right] + \left[ \begin{array}{c} \text{number of eligible} \\ \text{non-responding} \end{array} \right] + \left[ \begin{array}{c} \text{number of} \\ \text{ineligibles} \end{array} \right]}$$

**Table 1: Response details by ethnic groups**

	<b>General sample</b>	<b>Maori sample</b>	<b>Pacific sample</b>	<b>Asian sample</b>
<b>Household level data</b>				
<b>Non dwellings</b>				
Business	2723	8	39	48
Discontinued – Not in service	747	82	184	417
Fax & connects to silence	1745	12	25	56
Other non dwellings	687	53	132	178
<b>Dwellings otherwise ineligible</b>				
Dormitory/boarded house	4	3	11	42
Non eligible – no one in age range	1246	974	3385	1693
Language problems – gatekeeper not eligible	120	3	35	74
<b>Dwelling status unresolved</b>				
No answer	1170	56	98	92
<b>Gatekeeper refusals</b>				
Gatekeeper refusal eligibility unknown	1596	41	247	339
Gatekeeper refusal eligibility known	108	5	22	49
<b>Household continuously unavailable</b>				
Dwelling continuously unavail. – no selection	21	1	0	28
<b>Respondent level data</b>				
Respondent refusals	841	109	220	224
Parental permission denied	13	2	5	1
Gatekeeper denies respondents existence	25	5	17	40
Other refusals (Partials)	1	0	0	2
Health & Hearing problems	102	22	41	26
Respondent language problems	45	0	50	
Away for duration of study	151	8	38	22
Dwelling continuously unavail. – selection made	15	0	0	32
<b>Completed Interviews</b>	<b>4650</b>	<b>533</b>	<b>858</b>	<b>969</b>
<b>Total</b>	<b>16010</b>	<b>3315</b>	<b>5407</b>	<b>4632</b>

For the general population sample, the estimated number of eligible dwellings from the no answers was 0.19 based on a previous study in which Telecom identified the proportion of residential telephone numbers in this category<sup>1</sup>. This proportion of the no answers was added to the gatekeeper refusals (eligibility unknown) and the proportion of eligibles from the unknowns was estimated using the formula given.

For the Maori, Pacific and Asian samples, the Telecom figure of 0.19 is believed to be inappropriate to assess the residential dwellings among the no answers as we were sampling from the electoral roll (hence we do not expect to encounter many businesses). Therefore, for the ethnic samples, the proportion of likely residential numbers from the no answers was taken to be  $(n_3 + n_4 + n_5 + n_6 + n_7 + n_8 + n_9 + n_{10} + n_{11} + n_{12} + n_{13} + n_{14} + n_{15} + n_{16}) / (n_2 + n_3 + n_4 + n_5 + n_6 + n_7 + n_8 + n_9 + n_{10} + n_{11} + n_{12} + n_{13} + n_{14} + n_{15} + n_{16})$ .

Using the above formula, 92% of no answers in the Maori sample, 93% of no answers in the Pacific sample, and 84% of no answers in the Asian sample were estimated to be residential dwellings. This proportion of the no answers was added to the gatekeeper refusals (eligibility unknown) and the proportion of eligibles from the total unknowns was calculated using the formula given.

### **Participation in gambling**

The participation in gambling (based on past 12 months) in the general population was 61.8% (60.6% - 62.9%).<sup>2</sup>

Table 2 shows that more than 50% of the population had engaged with Lottery products in the previous 12 months. Participation in other modes of gambling was much lower, with under 10% betting at a race track or at the TAB. EGMs were used by 4% in clubs and 8% in bars or pubs and 8% in casinos. Newer gambling opportunities including text messaging and the internet were used by less than one percent of the sample.

The median frequency of playing EGMs in bars or pubs was higher than in clubs and in casinos. Betting on racing was lower.

Longer times spent gambling were at the race track, playing poker, playing housie and in casinos. The time spent playing EGMs in both clubs and pubs/bars were very similar, whereas more time was spent on EGMs in the casinos.

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<sup>1</sup> The Yellow Pages business numbers were removed prior to being loaded into the interviewing software so it is not possible to accurately determine the proportion of residential dwellings versus non residential dwellings from the sample outcome data for the general population sample. Removing the Yellow Pages businesses from the sample before calling takes place is beneficial as it makes data collection more efficient and reduces the cost of the survey.

<sup>2</sup> Gambling modes did not specifically include raffles and casino evenings

**Table 2: Prevalence by modes and venues of gambling; median frequency and median time**

Mode of gambling played in the last 12 months	Total (N=7010)	Percentage (%)	Median Frequency (times/yr)	Median Time (mins/yr)
<b>Lottery Products</b>	<b>3781</b>	<b>53.9</b>	<b>14.5</b>	<b>N/A</b>
• Lotto	3505	50.0	14.5	N/A
• Daily Keno	105	1.5	7.5	N/A
• Played Instant Kiwi	1456	20.8	7.5	7.5
<b>Betting at a race track</b>	<b>398</b>	<b>5.7</b>	<b>1.5</b>	<b>150</b>
• On horse races	392	5.6	1.5	150
• On dog races	29	0.4	4	90
• Other	1	0	4	90
<b>Betting at the TAB (either in person, by phone or internet)</b>	<b>541</b>	<b>7.7</b>	<b>4</b>	<b>7.5</b>
• On horse races	425	6.1	4	7.5
• On dog races	84	1.2	7.5	7.5
• On a sporting event	161	2.3	4	7.5
• Other	3	0	4	90
<b>Gambled at a member club</b>	<b>308</b>	<b>4.4</b>	<b>4</b>	<b>37</b>
• Playing gaming (or pokie) machines	266	3.8	4	37
• Playing housie	10	0.1	9.3	90
• Other	35	0.5	5.8	37
<b>Gambled at any other bars or pubs</b>	<b>561</b>	<b>8</b>	<b>7.5</b>	<b>37</b>
• Playing gaming (or pokie) machines	540	7.7	7.5	37
• Playing housie	4	0.1	4.5	150
• Other	21	0.3	4	93.5
<b>Gambled at a casino</b>	<b>741</b>	<b>10.6</b>	<b>1.5</b>	<b>90</b>
• Playing gaming (or pokie) machine	596	8.5	1.5	90
• Playing any table games or other types of games	238	3.4	1.5	90
<b>Gambled using text messaging for money (excluding the TAB)</b>	<b>39</b>	<b>0.6</b>	<b>1.5</b>	<b>N/A</b>
• On horse races	1	0	1.5	N/A
• On dog races	0	0	0	N/A
• On a sporting event	5	0.1	2.8	N/A
• Other	31	0.4	1.5	N/A
<b>Gambled using telephone for money (excluding text messaging and excluding gambling at TAB)</b>	<b>15</b>	<b>0.2</b>	<b>14.5</b>	<b>N/A</b>
• On horse races	11	0.2	22	N/A
• On dog races	5	0.1	2.8	N/A
• On a sporting event	3	0	4	N/A
• Playing an 0900 game	0	0	0	N/A
• Other	1	0	4	N/A
<b>Gambled on the internet for money (excluding the TAB)</b>	<b>42</b>	<b>0.6</b>	<b>7.5</b>	<b>90</b>
• On horse races	4	0.1	8	48.75
• On dog races	1	0	54.5	37

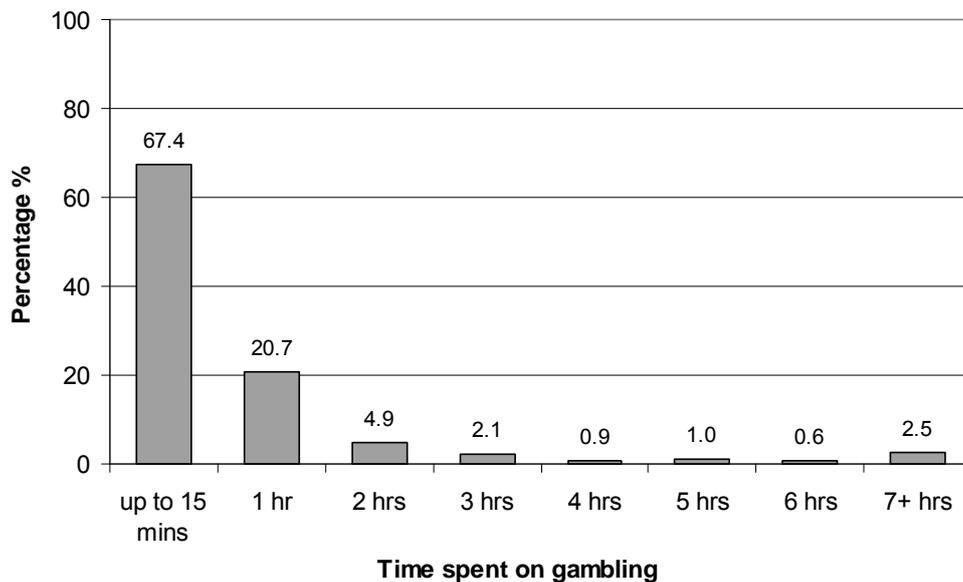
• On a sporting event	11	0.2	5.8	14.75
• At an online casino – playing gaming (or pokie)	4	0.1	2.8	86
• At an online casino – playing any table game or other types of games	11	0.2	1.5	90
• Entering a lottery or raffle not in an online casino	3	0	1.5	7.5
• Playing bingo (housie) not in an online casino	1	0	7.5	90
• Playing card games not in an online casino	5	0.1	109.5	71
• Other	2	0	0	0
<b>Played housie for money in a community centre, hall, or other location not already mentioned</b>	<b>148</b>	<b>2.1</b>	<b>4</b>	<b>90</b>
<b>Played poker or other card games for money at your house or someone else's house</b>	<b>304</b>	<b>4.3</b>	<b>4</b>	<b>150</b>
<b>Take part in any other gambling for money not already mentioned</b>	<b>130</b>	<b>1.9</b>	<b>4</b>	<b>7.5</b>

Totals do not sum up because respondents can choose multiple gambling activities. Percentages were rounded to 1 decimal plc, values less than 0.05 were counted as 0%.

### Time spent on gambling

Of those who participated in gambling, other than only using lottery products, the majority, 67.4%, participated in gambling for less than 15 minutes per week. Almost 20% of the gamblers participated for between 15 minutes and one hour. The remaining 12% of the gamblers participated for over an hour per week and 7.1% for three hours or more.

**Figure 1: Volume of time spent gambling by all gamblers (other than lottery products only) (weighted)**

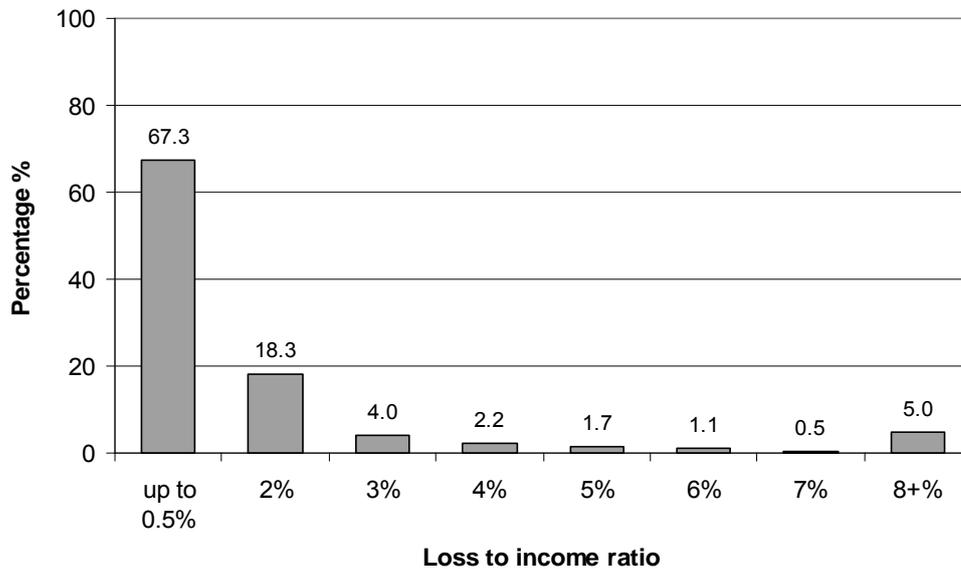


### **Loss to income ratio**

Of those who participated in gambling<sup>3</sup>, other than only bought lottery products, the majority of them (67.3%) lost less than 0.5% of their annual income, and 18.3% lost between 0.5% and 2%. The remaining 14.4% lost more than 2% of their annual income and 8.3% of participants lost more than 5% of their annual income.

<sup>3</sup> Only included participants with income more than \$1000 per year.

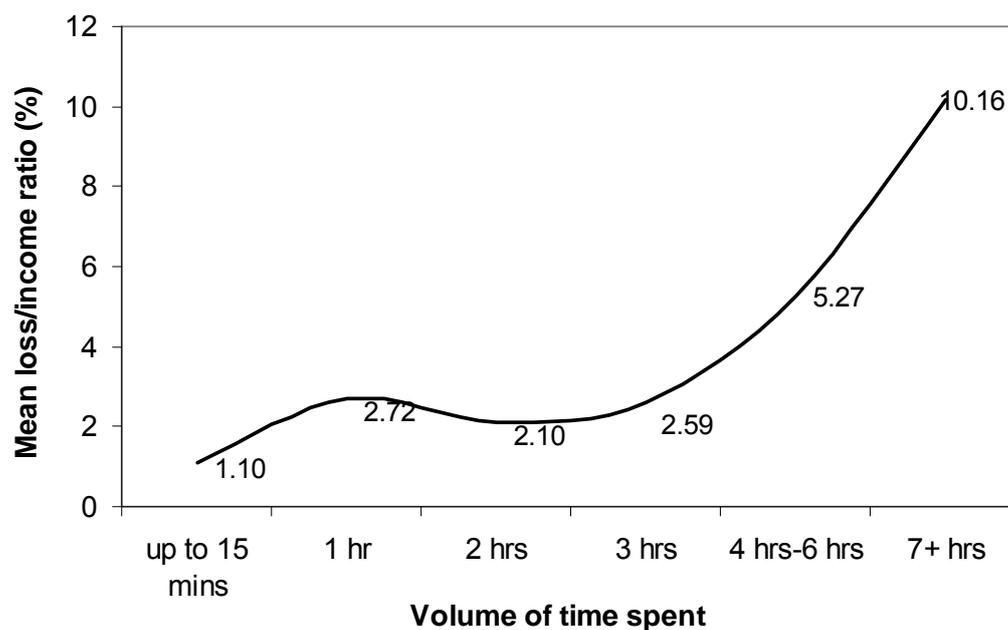
**Figure 2: Loss to income ratio of all gamblers (other than lottery products only) who had an income over \$1000 a year (weighted)**



### Time spent gambling and loss to income ratio

Among those who participated in gambling other than lottery products, their mean loss to income ratio increased as they spent more time on gambling. On average, participants who gambled less than 15 minutes per week had lost 1.1% of their annual income; participants who gambled between three to four hours per week had lost 2.6% of their annual income, while participants who gamble more than seven hours per week had lost an average of 10.2% of their annual income.

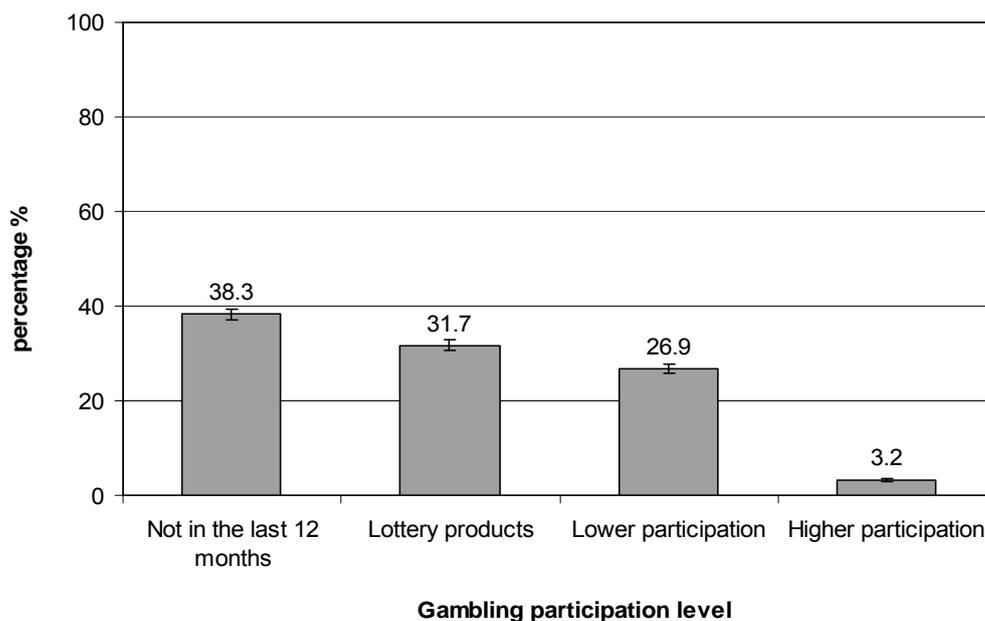
**Figure 3: Mean loss to income ratio at different volume levels F (weighted)**



## Categorization by gambling level

Almost two-fifth (38.3%) of people had not taken part in any of the gambling activities mentioned in the last 12 months. Approximately 31.7% bought lottery products only and 26.9% participated in lower level gambling. Almost 3.2% of the sample reported higher levels of participation.

**Figure 4: Percentage of general population (weighted) at each gambling level**

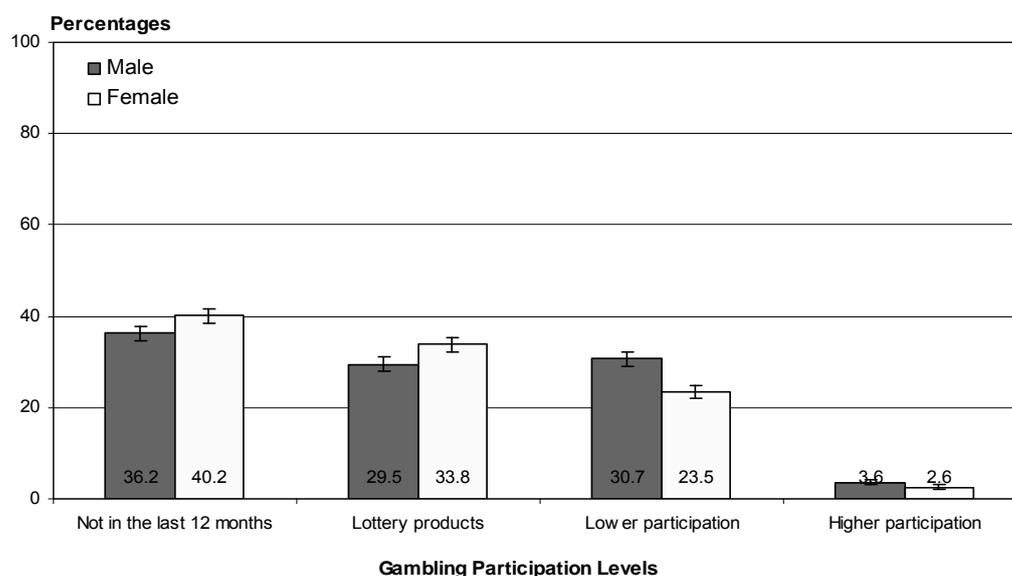


## Gambling by demographic variables

### Gender

Figure 5 shows that a higher percentage of females compared to males had not gambled in the last 12 months or had only bought Lottery products, while significantly more males than females were likely to be in both the lower and higher gambling participation groups.

**Figure 5: Percentage of men and women in each gambling participation level (weighted)**



### Age

Table 3 shows that for people aged 15 – 17 years, the majority of them (75.9%) had not gambled in the last 12 months, 19.2% were in the lower gambling participation group, and the remaining few were either in the lottery products only or higher participation groups.

For people aged 18 -35 years, almost 38% had not gambled in the last 12 months. Approximately 25% gambled using only lottery products and 33% were in the lower gambling participation group. Almost 4% were in the higher participation group. Compared to other age groups, the 18 – 35 group had a higher percentage in both the lower and higher participation levels.

Approximately 34% of the age group 36 – 65 years had not gambled in the past 12 months. These were the people most likely to buy lottery products (37.3%).

For people aged 65 and over, the majority had not gambled in the last 12 months (40.8%). They were the second most likely group to buy lottery products (34.1%). Approximately 22.4% were in the lower participation group and 2.6% were in the higher participation group.

**Table 3: Percentage of age groups in each gambling participation level (weighted)**

Age group	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
15-17 yrs	75.9 (71.4 – 80.3)	3.7 (1.7 – 5.6)	19.2 (15.1 – 23.3)	1.3 (0.1 – 2.4)
18-35 yrs	37.8 (35.7 – 40.0)	25.3 (23.3 – 27.2)	33.1 (31.0 – 35.1)	3.9 (3.0 – 4.7)
36-65 yrs	33.7 (32.1 – 35.3)	37.3 (35.7 – 38.9)	25.7 (24.2 – 27.1)	3.3 (2.7 – 3.8)
65+ yrs	40.8 (38.1 – 43.6)	34.1 (31.5 – 36.8)	22.4 (20.1 – 24.8)	2.6 (1.7 – 3.5)

### Marital status

Table 4 shows that those who were single were either more likely to participate in gambling activities (other than those who only bought lottery products) or to have not gambled at all in the last 12 months compared to those who were currently living or previously living with a partner.

**Table 4: Percentage of marital status in each gambling participation level (weighted)**

Marital Status	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
Living with a partner (e.g. married or de facto)	35.0 (33.6 - 36.4)	36.1 (34.7 - 37.5)	25.8 (24.5 - 27.0)	3.2 (2.7 - 3.7)
Previously Living with a partner (e.g. widowed, divorced, separated)	38.9 (35.3 - 42.4)	34.8 (31.3 - 38.2)	24.2 (21.1 - 27.3)	2.2 (1.1 - 3.3)
Single	46.6 (44.2 - 48.9)	18.6 (16.7 - 20.4)	31.1 (28.9 - 33.3)	3.7 (2.8 - 4.6)

### Occupational status

Table 5 shows that people who were sick were more likely than others to gamble using lottery products (37.5%) and to be in the group with higher participation in gambling (6.3%). People who were in paid employment,

however, were more likely to be involved in the lower participation group (30.2%).

**Table 5: Percentage of occupational status in each gambling participation level (weighted)**

Occupational Status	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
Student	59.8 (56.2 – 63.3)	14.8 (12.0 - 17.1)	22.1 (19.1 – 25.1)	3.6 (2.3 – 5.0)
Unemployed	52.1 (44.1 – 60.0)	23.5 (16.8 - 30.3)	18.8 (12.5 – 25.0)	5.7 (2.0 - 9.3)
Sick	35.9 (27.9 – 43.9)	37.5 (29.4 – 45.6)	20.3 (13.6 – 27.0)	6.3 (2.2 - 10.4)
Retired	40.5 (37.8 – 43.3)	33.9 (31.2 - 36.5)	23.2 (20.9 - 25.6)	2.4 (1.5 – 3.2)
Parenting/caregiving or doing unpaid work at home	44.9 (40.8 – 49.1)	31.7 (27.8 – 35.6)	20.6 (17.2 – 23.9)	2.8 (1.4 – 4.2)
Employee	32.3 (30.9 - 33.7)	34.2 (32.8 – 35.6)	30.2 (28.8 - 31.6)	3.3 (2.7 - 3.8)

## Education

Table 6 shows that people in the lower secondary qualification group were more likely to be in the higher participation group, whereas those with a higher secondary qualification were more likely to be in the lower participation group.

People who had a diploma as their highest educational qualification were more likely than others to gamble using only lottery products.

**Table 6: Percentage of educational qualifications in each gambling participation level (weighted)**

Education	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
None	38.3 (35.0 – 41.1)	30.3 (27.6 - 33.0)	27.6 (25.0 – 30.3)	3.8 (2.7 – 5.0)
Lower Secondary	37.0 (35.4 - 40.4)	27.6 (24.4 - 30.7)	29.7 (26.5 – 33.0)	5.7 (4.1 – 7.4)
Median Secondary	37.9 (33.6 - 42.2)	29.6 (25.5 - 33.6)	29.2 (25.2 - 33.2)	3.4 (1.8 – 4.9)
High Secondary	33.2 (30.4 – 36.0)	31.6 (28.8 - 34.3)	31.2 (28.4 - 33.9)	4.1 (2.9 – 5.2)
Overseas Secondary	49.1 (44.1 - 54.1)	24.4 (20.1 - 28.7)	24.9 (20.6 – 29.2)	1.7 (0.4 – 2.9)
Diploma	32.7 (30.7 - 34.6)	36.6 (34.5 - 38.6)	28.0 (26.1 - 29.8)	2.8 (2.1 – 3.5)
University	43.9 (41.5 - 46.3)	31.2 (28.9 - 33.4)	22.8 (20.7 – 24.8)	2.2 (1.5 – 2.9)

## Ethnicity

Table 7 shows that across all ethnic groups, Chinese/Korean people were least likely to participate in gambling activities as 55.8% had not gambled in the last 12 months. Compared to all the other ethnic groups, Maori had a higher percentage in both the lower and higher participation groups (32.0% and 7.2%, respectively). Pakeha (34.3%) followed by Maori (31.3%) had the highest percentages of buying lottery products.

**Table 7: Percentage of ethnic groups in each gambling participation level (weighted)**

Ethnicity	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
Pakeha	35.1 (33.6 – 36.6)	34.3 (32.8 – 35.8)	28.0 (26.6 - 29.4)	2.6 (2.1– 3.1)
Maori	29.5 (26.7 – 32.4)	31.3 (28.5 – 34.2)	32.0 (29.0 -34.9)	7.2 (5.6 – 8.8)
Pacific	50.1 (45.2 – 54.9)	21.0 (17.0 – 24.9)	24.1 (19.9 - 28.2)	4.9 (2.8 – 7.0)
Chinese/Korean	56.3 (51.9 – 60.7)	21.1 (17.5 – 24.7)	20.4 (16.9 – 24.0)	2.2 (0.9 – 3.4)

## Income

Table 8 shows that people who hadn't gambled in the last 12 months had the lowest income (average annual income = \$35,100) followed by those who were in the higher participation group (average annual income = \$37,900). In general, people who were in the lower participation group had the highest income compared to people in the other gambling levels (average annual income = \$45,600).

**Table 8: Mean income for each gambling participation level (weighted)**

	Gambling Participation Level			
	Not in the last 12 months	Lottery products	Lower participation	Higher participation
<b>Income per 1000 NZD</b>	35.1 (33.4 – 36.8)	44.2 (42.2 – 46.3)	45.6 (43.3 – 48.0)	37.9 (34.4 – 42.4)

## Summary

In summary those who had not gambled in the last 12 months were more likely to be females, younger than 17 or over 65 years of age, single, mainly students or unemployed; had overseas secondary qualification or university degree as their highest educational qualification and the majority of them were Chinese, Korean or Pacific peoples.

People who only bought lottery products were more likely to be females; over 36 years of age, married or divorced, sick, have a diploma as their highest educational qualification, and the majority of them were Pakeha or Maori.

People who had lower levels of participation in gambling activities were more likely to be males, aged between 18-35 years, single; in paid employment, have secondary qualification as their highest educational qualification and the majority of them were Maori or Pacific peoples.

People who had higher levels of participation in gambling activities were more likely to be males, aged between 18-35 years, single, either sick or unemployed, have a secondary qualification as their highest educational qualification and the majority of them were Maori or Pacific.

## Impacts of gambling on domains of life

Logistic regression was used to assess the impact of gambling on domains of life. Three measures of participation in gambling are reported on in this analysis: first, the four categories of gambling described earlier (never in past twelve months, bought lottery products only, lower levels of participation

and higher levels of participation) ; second, the ratio of losses to income; and third, time spent gambling in different modes. These analyses control for the effects of key socio demographic variables to isolate an independent impact of gambling.

### **Physical health**

Logistic regression shows that people who were in the higher participation group had poorer self-rated physical health compared to people who had not gambled in the last 12 months ( $p = .002$ ) or those who bought only lottery products ( $p = .019$ ).

People with a higher loss to income ratio reported significantly poorer physical health ( $p < .001$ ).

People who spent a longer time playing EGMs in a bar ( $p < .001$ ), club or casino ( $p = .040$  and  $.003$  respectively) and gambling at the casino's table games ( $p = .046$ ) reported poorer self-rated physical health than those who spent less time on these activities. However, people who spent longer time betting on a race track reported better physical health compared to those who spent less time betting on a race track ( $p = .040$ ).

### **Mental well being**

Significant differences in mental well-being was observed between those reporting higher participation in gambling compared with those who never gambled, bought only lottery products or reported lower levels of participation. People who were in the group who reported higher participation in gambling had significantly poorer self-rated mental well-being compared to all the other three groups ( $p < .001$ ).

People with a higher loss to income ratio reported significantly poorer mental well-being ( $p < .001$ ).

People who spent a longer time playing EGMs in a bar or casino ( $p < .001$ ), gambling at the casino's table games ( $p = .43$ ), and betting at the TAB ( $p < .001$ ) reported significantly poorer mental health than people who spent less time on these gambling activities.

### **Relationships with family/friends**

No significance difference was observed in the relationships with family/friends between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

People with a higher loss to income ratio perceived themselves having significantly poorer relationships with family/friends ( $p < .001$ ).

People who spent la onger time playing EGMs in a bar or casino ( $p < .001$  and  $p = .027$  respectively) reported significantly poorer relationships with family/friends than those who spent less time on these gambling activities.

### **Feelings about self**

People who were in the higher participation group reported poorer feelings about self compared to people who hadn't gambled in the last 12 months ( $p = .036$ ), only bought lottery products ( $p = .001$ ) and people who reported lower levels of participation ( $p = .001$ ).

People with a higher loss to income ratio had significantly poorer feelings about self ( $p < .001$ ).

People who spent a longer time playing EGMs in a bar or casino ( $p < .001$  and  $p = .039$  respectively) reported poorer feelings about self compared to those who spent less time on these gambling activities. However, people who spent a longer time betting on a race track reported better feelings about self compared to those who spent less time betting on a race track ( $p = .015$ ).

### **Overall quality of life**

No significance difference was observed in the overall quality of life between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

People with a higher loss to income ratio reported significantly poorer overall quality of life ( $p < .001$ ).

People who spent a longer time playing EGMs in a bar ( $p < .001$ ) or casino ( $p = .039$ ) and gambling at a casino's table games ( $p = .058$ ) reported poorer overall quality of life than those who spent less time on these gambling activities. However, people who spent longer times playing poker/card games at own or someone else's house reported better overall quality of life compared to those who spent less time playing poker/card games ( $p = .037$ ).

### **Overall satisfaction with life**

People who were in the higher participation group had lower overall satisfaction with life compared to people who were in the lower participation group ( $p = .017$ ).

People with a higher loss to income ratio reported significantly lower overall satisfaction with life ( $p = .001$ ).

People who spent a longer time playing EGMs in a bar ( $p = .002$ ) or casino ( $p < .001$ ) reported lower overall satisfaction with life than those who spent less time on these gambling activities. However, people who spent a longer time betting at a race track reported higher satisfaction with life than those who spent less time betting at a race track ( $p = .002$ ).

### **Financial situation**

No significant difference was observed in the financial situation of those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant impact on people's financial situation.

People who spent a longer time betting at the TAB or at a race track perceived themselves having significantly better financial situation ( $p = .003$  and  $.005$ , respectively) compared to people who spent less time on these activities.

### **Housing situation**

No significance difference was observed in the housing situation between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant impact on people's housing situation.

People who spent a longer time playing EGMs in a casino reported better housing situation than those who spent less time on EGMs ( $p = .047$ ).

### **Material standard of living**

No significance difference was observed in the living standard between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

People with a higher loss to income ratio reported significantly poorer material standards of living ( $p = .007$ )

People who spent a longer time playing EGMs in a casino ( $p = .040$ ), betting at a race track and playing housie ( $p = .030$ ) perceived themselves having significantly better standard of living than those who spent less time on these gambling activities.

### **Work performance**

No significant difference was observed in work performance between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant impact on work performance.

People who spent a longer time gambling at a casino's table games rated themselves poorer in work performance than those who spent less time on casino tables ( $p = .045$ ).

### **Study or employment-related training performance**

No significant difference was observed in study or employment-related training performance between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

People with a higher loss to income ratio rated themselves worse in their study-related performances ( $p = .007$ ).

People who spent a longer time playing poker/card games at own or someone else's house rated themselves poorer in study-related performance than those who spent less time on poker/card games ( $p = .006$ ).

### **Care giving – children**

No significant difference was observed in care giving for children between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant impact on individuals' self perceptions of their ability to take care for children.

People who spent a longer time playing EGMs at a bar rated themselves as a poorer parent/caregiver compared to those who spent less time on EGMs ( $p = .016$ ).

### **Care giving – elderly or others**

No significance difference was observed in care giving for the elderly between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant impact on individuals' self perceptions of their ability to take care for elderly.

Time spent on each gambling mode had no significant impact on individuals' self perceptions of their ability to take care for elderly.

### **Summary**

In summary those who had higher levels of participation in gambling activities (based on time spent and losses relative to income) perceived themselves to have experienced significantly worse physical health, worse mental health, poorer feelings about self and lower satisfaction with life. However, there was no association with their perceptions of their relationships with family/friends and their overall quality of life; nor was there an association with their self-rated work and study performances and their ability to take care for children and elderly. There were also no associations with participants' self ratings of their financial situation, housing situation or material standard of living. Further analysis on the data revealed that there are differences found in the reports of

actual income relative to respondents' ratings of their financial situation. Gamblers in the higher participation group who rated themselves good or very good in terms of their financial situation had an average annual income of \$37,200 compared with people who rated themselves as good or very good who hadn't gambled in the last 12 months (\$39,400), only bought lottery products (\$50,300) or who reported lower levels of participation (\$52,400).

The second indicator of participation in gambling used, loss of money while gambling expressed as a ratio of income, gave somewhat similar results. Loss to income ratio had significant negative impact on participants' self perceptions of their physical health, mental well being, feelings about self and satisfaction with life. However, in this case, participants with higher loss to income ratio also reported poorer relationships with family/friends, poorer overall quality of life, and poorer study-related performance. There was no association between loss to income ratio and self-rated financial situation or housing situation but there was a poorer standard of living reported. Further analysis on the data (by dividing participants into different gambling levels in terms of loss to income ratio) again revealed that there are differences found in the reports of actual income relative to respondents' ratings of their financial situation. Among those rating themselves as good or very good in terms of their financial situation, people with higher gambling losses had a lower actual income compared to those with lower gambling losses. Specifically, gamblers in the higher loss group<sup>4</sup> who rated themselves good or very good in terms of their financial situation had an average annual income of \$38,000 compared with people who rated themselves as good or very good who reported low gambling losses (\$65,900).

The length of time spent gambling in different modes showed different relationships. Playing EGMs in any setting (bar, club or casino) was associated with self-reported poorer physical health. Playing EGMs in both bars and casinos affected participants' perceptions of their mental well being, relationships with family/friends, feelings about self, overall quality of life, and overall satisfaction with life. EGMs in a bar were associated with poorer child rearing while EGMs in a casino were associated with better self-rated housing situation and material standard of living.

Other results specific to the gambling mode were that a longer time spent playing on casino tables was negatively associated with participants' perceptions of their physical health, mental health, and work performance, and marginally associated with overall quality of life.

Betting at the TAB gave a mixed picture with worse self-reported mental health but a better self-rated financial situation. Playing poker at home or with friends also gave a mixed picture with worse self-rated study/training performance but better feelings about self.

In contrast with other forms of gambling some positive associations emerged between time spent at the race track and participants' self ratings of their

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<sup>4</sup> People with loss to income ratio in the top 20% of the sample

physical health, feelings about self, satisfaction with life, financial situation and material standard of living. Playing housie (in community centres, clubs or bars) was also associated with better material standard of living.

**Table 9: Impacts of gambling on domains of life (statistically significant at 5% level)**

<b>Domain of Life</b>	<b>Gambling levels</b>	<b>Gambling losses relative to income</b>	<b>Gambling modes</b>
<b>Physical health</b>	<ul style="list-style-type: none"> <li>Higher levels = poorer physical health</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer physical health</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/club/casino = poorer physical health</li> <li>Casino tables = poorer physical health</li> <li>Race track = better physical health</li> </ul>
<b>Mental well being</b>	<ul style="list-style-type: none"> <li>Higher levels = poorer mental well being</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer mental well being</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/ casino = poorer mental well being</li> <li>Casino tables = poorer mental well being</li> <li>TAB = poorer mental well being</li> </ul>
<b>Relationships with family/friends</b>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer relationships</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/ casino = poorer relationships</li> </ul>
<b>Feelings about self</b>	<ul style="list-style-type: none"> <li>Higher levels = poorer feelings about self</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer feelings about self</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/ casino = poorer feelings</li> <li>Race track = better feelings about self</li> </ul>
<b>Overall quality of life</b>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer quality of life</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/ casino = poorer quality of life</li> <li>Casino tables = poorer quality of life</li> <li>Poker/card games = better quality of life</li> </ul>
<b>Overall satisfaction with life</b>	<ul style="list-style-type: none"> <li>Higher levels = lower satisfaction with life</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = lower satisfaction with life</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar/ casino = lower satisfaction</li> <li>Race track = higher satisfaction</li> </ul>
<b>Financial Situation</b>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>TAB = better financial situation</li> <li>Race track = better financial situation</li> </ul>
<b>Housing situation</b>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in casino = better housing situation</li> </ul>
<b>Material standard of living</b>	<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer standard of living</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in casino = better standard of living</li> <li>Race track = better standard of living</li> <li>Housie = better</li> </ul>

			standard of living
<b>Work performance</b>	• No impact	• No impact	• Casino tables = poorer work performance
<b>Study/training performance</b>	• No impact	• Higher loss to income ratio = poorer study-related performances	• Poker/card games = poorer study-related performance
<b>Care giving - children</b>	• No impact	• No impact	• EGMs in bar = poorer parent/caregiver
<b>Care giving - elderly</b>	• No impact	• No impact	• No impact

### Self perception of changes in domains of life

Logistic regression was used to assess the self perception of changes in each domain of life between those reporting higher participation in gambling compared to those who only bought lottery products or reported lower levels of participation. The effects of age, gender, ethnicity, marital status, education qualification, occupational status, income (with log transformation) and prevalence of other heavy gamblers were controlled for to isolate an independent impact of gambling.

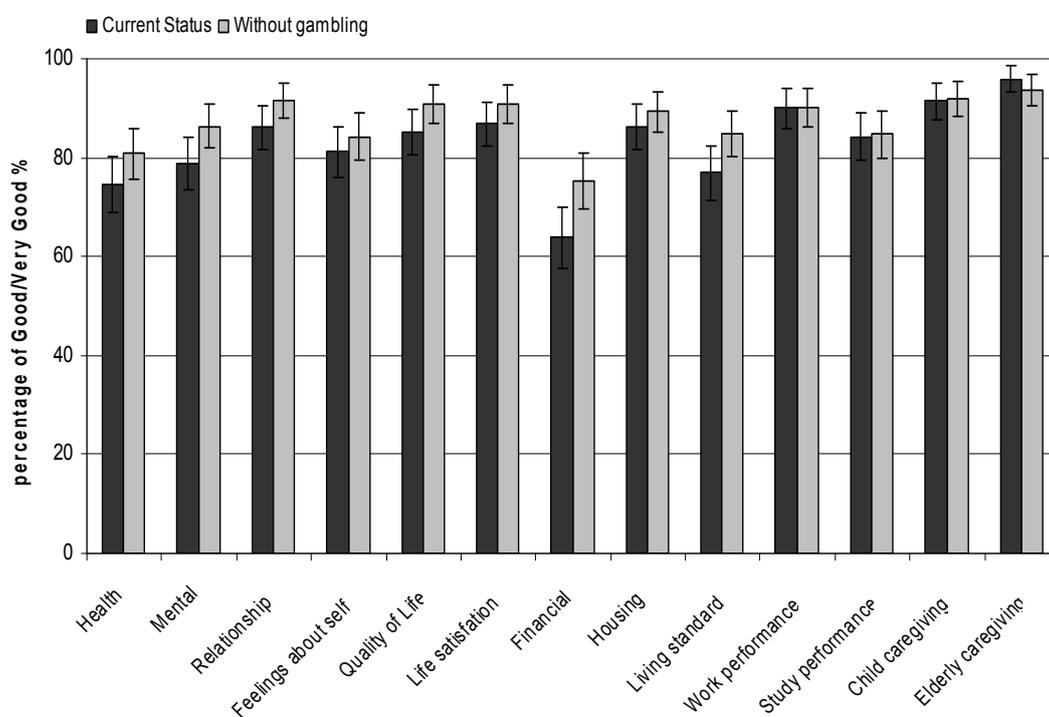
People who reported higher participation in gambling were significantly more likely than those who only bought lottery products and those who reported lower levels of participation to perceive a positive change in the following domains of life, if they had not been gambling in the last 12 months: physical health ( $p < .001$ ); mental well being ( $p < .001$ ); relationships with family/friends ( $p < .001$ ); feelings about self ( $p < .001$  and  $p = .017$ , respectively); overall quality of life ( $p < .001$ ); overall satisfaction with life ( $p < .001$ ); financial situation ( $p < .001$ ); housing situation ( $p < .001$  and  $p = .007$ , respectively); material standard of living ( $p < .001$ ); study performance ( $p < .001$ ) and care giving for children ( $p = .008$  and  $.035$ , respectively).

Furthermore, 2.1% of people who reported higher participation in gambling said they would be in some study or employment-related training if they had not been gambling in the last 12 months and 8.3% said they would have been in paid employment if they had not been gambling in the last 12 months.

For the remaining two domains of life (i.e., work performance and care giving for elderly), no difference in the self perception of changes was observed between the four categories of gambling level.

People who were in the higher participation group expected that they would have been better off in terms of their physical health, mental well being, relationships with family/friends, feelings about self, quality of life, satisfaction with life, financial situation, housing situation, and standard of living if they had not been gambling in the last 12 months. However, they reported that there would have been no difference in terms of their work or study performances, or their ability to take care of children or the elderly.

**Figure 6: Self-perception of change in domains of life for people who reported higher participation level in gambling (weighted)**



### Impacts of gambling on illegal activities

Approximately 1.3% of people admitted they had engaged in illegal activities (mainly stealing and fraud) during the last 12 months.

Logistic regression was used to assess the impact of gambling on individuals' involvements in illegal activities. The results show that people who were in the higher participation group were significantly more likely to be involved in illegal activities compared to people who hadn't gambled in the last 12 months ( $p = .006$ ) or people who reported lower levels of participation ( $p < .001$ ).

Loss to income ratio had no significant effect on people's involvement in illegal activities.

People who played EGMs in a bar or played poker/card games at their own or someone else's house were significantly more likely to be involved in illegal activities compared to people who hadn't gambled in the last 12 months ( $p = .011$  and  $.008$ ).

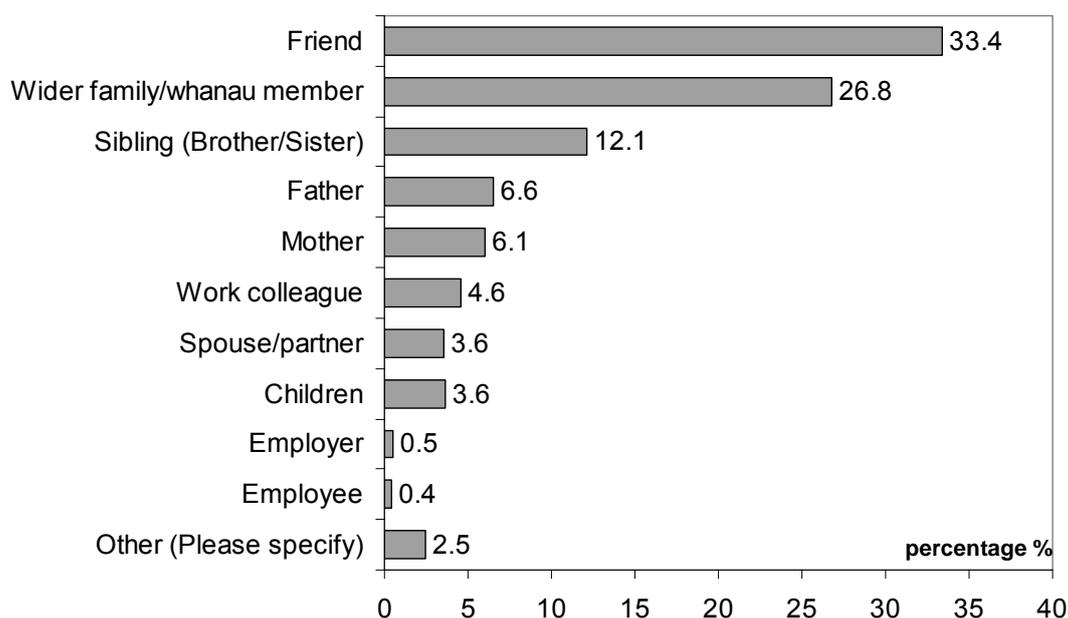
For those who were involved in illegal activities, 25% of them said they would not have committed such a crime if they had not been gambling in the last 12 months.

## Impacts of other people's gambling on domains of life

Approximately 12.4% of people had at least one person in their lives whom they considered to have been 'fairly heavy gamblers' in the last 12 months.

The majority of the heavy gamblers were respondents' friends (33.4%) or wider family members (26.8%). Approximately 25% of them were respondents' close family members (i.e., parents and siblings).

**Figure 7: Relationship between participants and the other heavy gamblers**



Logistic regression was used to assess the impact of other people's gambling on individuals' lives. Specifically, this multinomial model examined the differences in domains of life between those who had no other gamblers in their lives compared to: (1) those whose close family members (including parents, siblings, partners and children) were fairly heavy gamblers; (2) those whose wider family members were fairly heavy gamblers; (3) those whose friends were fairly heavy gamblers; and (4) those whose work-related associates (including work colleagues, employers and employees) were fairly heavy gamblers. The effects of age, gender, ethnicity, marital status, education qualification, occupational status, and income (with log transformation) were controlled for to isolate an independent impact of other's gambling.

The results show that people who had close family members who were fairly heavy gamblers reported experiencing significantly poorer physical health ( $p < .001$ ), mental well being ( $p = .004$ ), housing situation ( $p = .022$ ), material standard of living ( $p = .017$ ), relationships ( $p = .002$ ), care-giving for children

( $p = .005$ ), feelings about self ( $p = .003$ ), overall quality of life ( $p = .049$ ) and overall satisfaction with life ( $p = .015$ ).

Participants with friends who were fairly heavy gamblers reported experiencing significantly poorer mental well being ( $p = .039$ ) and rated themselves lower on financial situation ( $p = .008$ ).

In contrast to the above findings, participants with wider family members who were fairly heavy gamblers rated themselves significantly better on material standards of living ( $p = .009$ ). Likewise, participants with work-related associates who were fairly heavy gamblers rated themselves better on financial situation ( $p = .033$ ). However, other domains of life were not affected by wider family members' and work-related associates' gambling.

Logistic regression was used to assess the impact of other people's gambling on individuals' involvements in illegal activities. Results show that individuals who had other people in their lives whom they considered to be fairly heavy gamblers were significantly more likely to have been involved in illegal activities ( $p < .001$ ).

## **Ethnic oversamples**

The following analyses utilised the data from the ethnic oversamples and those people in the general population sample from the targeted ethnicities. The ethnic specific samples consisted of 4068 Pakeha, 1162 Maori, 1031 Pacific peoples and 984 Chinese or Korean peoples.

### **Ethnicity and modes of gambling**

Table 10 shows that Pakeha were more likely than other ethnic groups to bet at a race track.

Maori were more likely than other ethnic groups to buy Lottery products, bet at the TAB, play EGMs in clubs, bars and casinos and play poker/card games at their own or someone else's house.

Compared to other ethnic groups, Pacific people were more likely to buy Daily Keno and play housie (in community centres, clubs or bars) while Chinese and Koreans were more likely than others to gamble at casino table games.

**Table 10: Prevalence of gambling modes in each ethnic group**

Modes of Gambling	Ethnicity			
	Pakeha	Maori	Pacific	Chinese/ Korean
Lotto	53.0	60.2	40.2	32.7
Daily Keno	1.2	3.0	3.0	0.9
Instant Kiwi	23.3	26.2	12.9	10.2
Race Track	8.4	6.0	2.4	1.0
TAB	8.7	12.6	7.0	3.5
EGMs (clubs)	4.4	6.4	2.4	0.6
EGMs (bars)	7.0	15.2	8.5	3.2
EGMs (casinos)	7.8	10.3	9.2	9.4
Casino table	2.9	2.9	2.6	6.2
Housie	1.7	4.9	5.0	0.5
Poker	3.4	7.3	5.7	5.9

### **Impacts of gambling on domains of life within each ethnic group**

Logistic regression was used to assess the impact of gambling on the domains of life within each ethnic group. Three measures of participation in gambling are reported on: first, four categories of gambling (never in past twelve months, bought lottery products only, lower levels of participation and higher levels of participation); second, the ratio of losses to income; and third, time spent gambling in different modes. The effects of age, gender, ethnicity, marital status, educational qualification, occupational status, income (with log transformation) and prevalence of other heavy gamblers were controlled for to isolate an independent impact of gambling.

#### **Pakeha**

No significant difference was observed in any domain of life between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Pakeha who had higher loss to income ratio reported poorer physical health ( $p = .006$ ) and poorer mental wellbeing ( $p = .002$ ).

Pakeha who spent a longer time playing EGMs in bars reported significantly poorer mental well being ( $p < .001$ ) and poorer relationships with family/friends ( $p = .011$ ) compared to those who spent less time on EGMs.

Playing table games at a casino gave a mixed picture with poorer self-rated material standard of living ( $p = .001$ ) but a better housing situation ( $p = .024$ ).

For Pakeha, the length of time spent on playing EGMs in a casino, betting at the racetrack or TAB, and playing poker or housie were positively associated with participants' self ratings in regard to a number of life domains. Specifically, people who spent a longer time playing EGMs in a casino reported better financial situation ( $p < .001$ ), better housing situation ( $p = .005$ ) and better material standard of living ( $p < .001$ ) compared to those who spent less time on casino EGMs. Time spent on the race track was positively associated with ratings of participants' financial situation ( $p = .032$ ), material standard of living ( $p = .028$ ), and satisfaction with life ( $p = .007$ ). Betting at the TAB was positively associated with participants' ratings of their financial situation ( $p < .001$ ), material standard of living ( $p = .003$ ), and study and work performances ( $p = .018$  and  $.022$  respectively). Playing poker at home or with friends was associated with better self ratings in regard to material standard of living ( $p = .009$ ), quality of life ( $p = .005$ ), and care giving for children ( $p = .014$ ). The length of time spent on playing housie was associated with better self-rated study-related performance ( $p = .021$ ).

For Pakeha, the length of time spent on playing EGMs in a club had no significant impact on individuals' self ratings of their domains of life.

### **Maori**

Maori who had higher levels of participation in gambling activities reported experiencing significantly worse physical health, worse mental well being, poorer feelings about self, lower overall satisfaction with life, and rated themselves a poorer care-giver for children.

Maori with higher loss to income ratio reported significantly poorer mental well being ( $p < .001$ ), poorer feelings about self ( $p = .040$ ) and lower satisfaction with life ( $p = .004$ ).

Maori who spent a longer time playing EGMs in bars reported poorer mental well being ( $p < .001$ ), poorer feelings about self ( $p < .001$ ), poorer quality of life ( $p = .003$ ), lower overall satisfaction with life ( $p < .001$ ), poorer housing situation ( $p = .029$ ), and rated themselves a poorer parent/care-giver ( $p = .015$ ). Those who spent a longer time playing EGMs in a club reported poorer feelings about self ( $p = .003$ ) and poorer overall quality of life ( $p = .048$ ). Furthermore, playing EGMs in a casino was associated with poorer self ratings in regard to mental well being ( $p = .013$ ), relationships with family/friends ( $p < .001$ ) and feelings about self ( $p = .013$ ).

Playing table games at a casino was associated with poorer self ratings in regard to work performance ( $p = .053$ ) while playing housie was associated with better self-rated material standard of living ( $p = .049$ ).

For Maori, the length of time spent on betting at the race track and TAB, and playing poker at home or with friends had no significant impact on individuals' self ratings of their domains of life.

### **Pacific peoples**

Pacific peoples who had higher levels of participation in gambling activities reported experiencing significantly worse physical health, worse mental well being and rated themselves worse care givers for the elderly.

Pacific peoples with a higher loss to income ratio reported poorer mental wellbeing ( $p = .023$ ).

Pacific peoples who spent a longer time playing EGMs in bars reported poorer physical health ( $p < .001$ ), mental well being ( $p < .001$ ), feelings about self ( $p = .011$ ), quality of life ( $p = .003$ ), satisfaction with life ( $p = .006$ ), and financial situation ( $p < .001$ ). Those who spent a longer time playing EGMs in clubs reported poorer physical health ( $p = .006$ ) and poorer mental well being ( $p = .021$ ). Furthermore, playing EGMs in a casino was associated with poorer self ratings in regard to overall satisfaction with life ( $p = .007$ ), financial situation ( $p = .053$ ), and care giving for elderly ( $p = .036$ ).

Betting at the TAB was negatively associated with participants' self ratings of their physical health ( $p = .036$ ), mental well being ( $p < .001$ ), and care giving for elderly ( $p = .054$ ). Also, those who spent a longer time betting at the race track reported poorer physical health ( $p = .034$ ) and poorer mental well being ( $p = .001$ ).

Playing poker at home or with friends was associated with poorer self-rated mental well being ( $p = .027$ ) while playing housie was associated with better self ratings in regard to feelings about self ( $p = .037$ ).

For Pacific peoples, the length of time spent on playing table games at a casino had no significant impact on individuals' self ratings of their domains of life.

### **Chinese/Koreans**

No significance difference was observed in any domains of life between those reporting higher participation in gambling compared with those who never gambled, only bought lottery products or reported lower levels of participation.

Loss to income ratio had no significant association among Chinese/Koreans in any domain of life.

Chinese/Koreans who spent a longer time playing EGMs in bars reported poorer physical health ( $p = .046$ ). Those who spent a longer time playing EGMs in clubs reported significantly poorer physical health ( $p = .032$ ) and poorer feelings about self ( $p = .049$ ). However, playing EGMs in a casino was associated with better self ratings in regard to material standard of living ( $p = .036$ ).

In addition, Chinese/Koreans who spent a longer time playing table games at a casino also reported a better housing situation ( $p = .004$ ) and a better

material standard of living ( $p = .031$ ) compared to those who spent less time on casino table games.

Betting at the TAB was associated with poorer self ratings in regard to study/training-related performance ( $p = .017$ ).

Playing poker at home or with friends gave a mixed picture with poorer self-rated study performance ( $p = .008$ ) but better relationships with family/friends ( $p = .014$ ) and better housing situation ( $p = .057$ ). In addition, time spent on the race track was associated with better self ratings in regard to quality of life ( $p = .013$ ).

For Chinese and Korean peoples, the length of time spent on playing housie (in community centres, clubs or bars) had no significant impact on one's domains of life

**Table 11: Impacts of gambling on domains of life within each ethnic group (statistically significant at 5% level)**

Gambling levels	Gambling losses relative to income	Gambling modes
<b>Pakeha</b>		
<ul style="list-style-type: none"> <li>No impact</li> </ul>	<ul style="list-style-type: none"> <li>Higher loss to income ratio = poorer physical health and mental well being</li> </ul>	<ul style="list-style-type: none"> <li>EGMs in bar = poorer mental health, poorer relationships</li> <li>EGMs in casino = better financial situation, better housing situation, better material standard of living</li> <li>Casino tables = poorer material standard of living but a better housing situation,</li> <li>TAB = better financial situation, better material standard of living, better work performance, better study performance</li> <li>Race track = higher satisfaction with life, better financial situation, better material standard of living</li> <li>Poker/card games = better quality of life, better material standard of living, better parent/caregiver</li> <li>Housie = better study performance</li> </ul>

<b>Maori</b>		
<ul style="list-style-type: none"> <li>• Higher levels = poorer physical health, poorer mental well being, poorer feelings about self, lower satisfaction with life, poorer child rearing</li> </ul>	<ul style="list-style-type: none"> <li>• Higher loss to income ratio = poorer mental well being, poorer feelings about self, lower satisfaction with life</li> </ul>	<ul style="list-style-type: none"> <li>• EGMs in bar = poorer mental well being, poorer feelings about self, poorer quality of life, lower satisfaction with life, poorer housing situation, poorer child rearing</li> <li>• EGMs in club = poorer feelings about self, poorer quality of life</li> <li>• EGMs in casino = poorer mental well being, poorer relationships, poorer feelings about self</li> <li>• Casino tables = poorer work performance</li> <li>•</li> <li>• Housie = better material standard of living</li> </ul>
<b>Pacific People</b>		
<ul style="list-style-type: none"> <li>• Higher levels = poorer physical health, poorer mental well being, poorer elderly care</li> </ul>	<ul style="list-style-type: none"> <li>• Higher loss to income ratio lower mental well being</li> </ul>	<ul style="list-style-type: none"> <li>• EGMs in bar = poorer physical health, poorer mental well being, poorer feelings about self, poorer quality of life, lower satisfaction with life, poorer financial situation</li> <li>• EGMs in club = poorer physical health, poorer mental well being</li> <li>• EGMs in casino = lower satisfaction with life, poorer financial situation, poorer child rearing</li> <li>• TAB = poorer physical health, poorer mental well being, poorer elderly care</li> <li>• Race track = poorer physical health, poorer mental well being</li> <li>• Poker = poorer mental well being</li> <li>• Housie = better feelings about self</li> </ul>
<b>Chinese/Korean</b>		
<ul style="list-style-type: none"> <li>• No impact</li> </ul>	<ul style="list-style-type: none"> <li>• No impact</li> </ul>	<ul style="list-style-type: none"> <li>• EGMs in bar = poorer physical health</li> <li>• EGMs in club = poorer physical health, poorer feelings about self</li> <li>• EGMs in casino = better standard of living</li> <li>• Casino tables = better housing situation, better standard of living</li> <li>• TAB = poorer study performance</li> <li>• Race track = better quality of life</li> <li>• Poker = poorer study performance but better relationships and housing situation</li> </ul>

## Discussion

### Participation in gambling

In our study, almost two-fifth (39.1%) of people had not taken part in the last 12 months in any of the gambling activities mentioned. This figure is higher than the figure from participation surveys undertaken by the Department of Internal Affairs (13%) (Amey, 2001), and the 2009/07 survey on Gaming and Betting Activities for the Health Sponsorship Council (18%) (Health Sponsorship Council, 2007). A major reason for this difference was because the questioning in the previous surveys included activities not specified in our survey. These were: buying raffle tickets for fundraising; attending 'gaming or casino' evenings for social /fundraising purposes; and betting with friends, workmates on the outcome of events. In the DIA study, for example, 67% of people had bought a raffle tickets, 10% had attended a gaming or casino evening, and 24% had made money bets with family or friends. In the HSC study, 52% had gone to a gaming or casino evening or bought a raffle ticket for fundraising, and 10% had made money bets with family or friends. The participation level was also somewhat lower than the Ministry of Health analysis of the data from the New Zealand Health Survey 2002/3 (30%) (Ministry of Health, 2006b) which used a briefer list of gambling modes. It is, however, also possible that participation rates have declined in recent years given the decline in users of treatment services (Ministry of Health, 2007) and indications of lower expenditure in real terms (inflation and population adjusted ) on a number of gambling modes (Markland, 2008 pers comm.).

### Measures of heavier gambling

In the present study, a problem gambling screen was not employed and instead a number of different ways of examining the impact of heavier gambling were investigated including first: categorisation of participation in terms of both time spent and money lost (as a ratio of income); second, the individual's loss of money as a proportion of income (excluding those on very low incomes); and third, the time spent in different modes of gambling. The definition of higher level participation was set at three hours or more per week spent gambling and/or a loss of at least 5% of income. This categorisation defined 3% of the sample as heavier gamblers. The definition of heavier gambling used in this study is probably somewhat more inclusive than the categorisation used in the MoH analysis of problem gambling from data collected in the NZ Health Survey which used a unique screening tool and estimated 1.9% of the population to be either problem or at risk gamblers (Ministry of Health, 2006b). It is, however, much lower than the 9% of gamblers in the Gaming and Betting Activities Survey who were described as gambling to a harmful level based on having spent more time or money on gambling than they intended to at least once during the past 12 months (Health Sponsorship Council, 2007).

## **Association of heavier gambling with quality of life**

In this study, logistic regressions were used to assess the impact of gambling on the quality of life in a number of domains. All the analyses in this study controlled for the effects of the following demographic variables to isolate an independent impact of gambling: age; gender; ethnicity; marital status; educational qualification; occupational status; income (with log transformation) and prevalence of other heavy gamblers in one's life.

The results from the logistic regressions showed some consistency between the categorisation into higher and lower levels of participation and the loss/income ratio (not surprisingly since the latter contributes to the former measure). Both measures showed evidence of impairment of physical health, mental health, feelings about self, satisfaction with life and employment status.

The measure of loss/income, however, proved to be a more sensitive measure in relation to some of the domains of life. This measure also showed an association with poorer relationships, poorer overall quality of life, poorer work performance and study/training performance and poorer material standard of living.

This failure of the measure of higher participation to show an association with some domains of life is probably due to the inclusion of an overall volume of time spent gambling in this measure. The analysis of times spent in different modes of gambling showed different relationships depending on the mode (and the demographic group), for example positive relationships with race track gambling among Pakeha respondents and positive relationships with casino table betting among Chinese and Korean respondents. Furthermore housie, which (like racing) contributes heavily to the overall time spent gambling, showed only some associations with participants' self ratings of their domains of life. This suggests that in future analysis the use of an overall measure including total volume of time spent gambling will be less valuable than disaggregation into different modes of gambling.

## **Associations with financial, housing and material domains of life**

The finding that among the general population respondents in the different gambling categories did not show any association with ratings of their financial situation, housing situation or material standard of living is in contrast with previous research, including the qualitative research which formed the first phase of this research programme. However, as discussed above, this general population finding masked differences found within the different ethnic groups and in relation to different modes of gambling. For example, Pakeha gamblers at the race track and on the TAB and casino EGMs rated themselves as better off financially whereas Pacific respondents who were users of EGMs in a bar or casino rated themselves as financially less well off and Maori EGMs users rated themselves as having a worse housing situation.

Furthermore there are some differences found in the reports of actual income relative to respondents' ratings of their financial situation. Among those rating themselves as good or very good the higher participation gamblers had the lowest actual income. Similarly, people with higher gambling losses who rated themselves as good or very good in terms of their financial situation also had a lower actual income compared to those with lower gambling losses. Also the respondent's own perception of how their financial situation, housing situation and material standard of living would have been had they not been gambling showed that they perceived a negative impact from their gambling. These findings illustrate the complexity of measuring the impact of gambling on financial well being, while appearing to support previous findings of a negative impact of heavier gambling.

### **Associations with physical and emotional wellbeing**

The findings in relation to ratings of domains of life relating to physical health, and emotional well being including the quality of relationships and feelings about self, are in keeping with previous research. For example, the findings of a significant association with self ratings of poorer mental and physical health have also been reported in previous New Zealand studies. In the New Zealand Health Survey 2004 a significant association was found with self rated health in the mental health and general physical health domains (Ministry of Health, 2004).

### **Employment**

The finding that heavier gamblers were more likely to report poorer work performance is in keeping with the qualitative work undertaken in the first phase of this research project (SHORE & Whariki, 2006) and earlier work from the New Zealand prevalence surveys of the 1990s (Abbott, 2001a, 2001b).

### **Criminal activity**

Heavier participation was associated with criminal activity and 25% of those engaged in criminal activity in the past 12 months said that they would not have done so if it had not been for their gambling. This is also in keeping with previous research in New Zealand (Abbott, 2001a, 2001b).

### **Modes of gambling**

When respondents' reports of quality of life in the various domains were analysed in relation to the time spent gambling in various modes and venues there was a clear picture, supported by previous findings (e.g., Abbott and Volberg, 2000; Ministry of Health, 2006b) that time spent on EGMs (especially EGMs in bars) was a risk for people's quality of life and also for criminal

behaviour even after controlling for participants' age, gender, ethnicity, marital status, education qualification, occupational status, and income.

The length of time playing EGMs in different settings, however, had different impact on participants' domains of life. While playing EGMs in bars was associated with poorer self ratings in regard to several life domains, playing EGMs in clubs showed only one negative association with quality of a life domain (namely, physical health). Furthermore, in contrast with playing EGMs in bars and clubs which showed only negative associations with participants' domains of life, playing EGMs in casino showed some positive associations with participants' self ratings in regard to their housing situation and material standard of living. More research (ideally with a longitudinal design) would allow us to further understand these relationships.

Other results specific to the gambling mode were that time spent playing on casino table games was also associated with poorer quality of life in a number of domains and playing poker was associated with criminal behaviour. The race track, in contrast, provided a picture of better quality of life and financial situation. TAB betting was also associated with better self-rated financial situation and housie was associated with better self-reported material standard of living.

### **Affected others**

The 12% reporting a fairly heavy gambler in their environment was somewhat comparable to the Gaming and Betting Activities Survey finding of 16% reporting arguments and financial impacts.

After controlling for all the demographic variables (i.e., age, gender, ethnicity, marital status, education qualification, occupational status, and income), it is found that close family members (i.e., partners, children, parents, siblings) of heavy gamblers were most negatively impacted by their family members' gambling. The life domains which have been affected included physical health, mental well being, housing situation, material standard of living, relationships, care-giving for children, feelings about self, overall quality of life and overall satisfaction with life. Heavier gambling by wider family members, friends and work-related associates did not have significant negative impacts.

### **Ethnic differences**

The samples of Maori, Pacific peoples and Chinese and Korean peoples allowed for a detailed analysis of the relationship between their gambling behaviour and their self ratings of their quality of life in various domains. These results showed some differences between ethnic groups. For the Maori and Pacific samples there were significant associations between gambling participation and poorer quality of life in a number of life domains. As in the case of the general population findings, there were significant negative associations in a number of domains of life with time spent on EMGs. Among Maori and Pacific peoples, housie was the only gambling mode that showed

some positive associations with participants' self ratings of their quality of life. Specifically, housie was associated with reporting better material standard of living for Maori and, for Pacific peoples, better feelings about self.

The main differences between Maori and Pacific peoples was the perceived impact of casino tables, TAB, race track, and poker/card games on people's domains of life. To be more precise, while casino table gambling showed negative association with Maori respondents' self-rated work performance, it had no impact on Pacific people's self ratings of their domains of life. On the contrary, betting at the race track and TAB, and playing poker/card games were associated with poorer self ratings in regard to physical health and mental well being for Pacific peoples, but these gambling activities had no impact on Maori people's domains of life.

These predominantly negative associations for Maori and Pacific peoples contrasted with the findings for the Pakeha, which were more mixed and predominantly positive. Their level of participation measures showed no associations with quality of life but the loss to income ratio showed a negative relationship with physical health and mental well being. Also, while there were negative associations for Pakeha with playing EGMs in a bar, time spent betting at the race track and TAB, playing EGMs in a casino and playing poker and housie were all positively associated with participants' self ratings in regard to a number of life domains, which included better financial situation, housing situation, material standard of living, overall quality of life, overall satisfaction with life, work and study performance, and care giving for children.

The findings from the sample of Chinese and Korean peoples showed some similarities with the Pakeha sample in that the levels of gambling participation overall were not associated with negative ratings of quality in relation to the domains of life and, with regard to playing casino table games longer times, were associated with better self-reported housing situation and material standard of living. In addition, playing EGMs in a casino was also associated with better self-reported material standard of living. Betting at the race track was associated with better self ratings in regard to overall quality of life and playing poker/card games was associated with better self-rated housing situation and relationships with family/friends but a worse study performance. In contrast, longer time spent playing EGMs in bars and clubs was associated with poorer self ratings in regard to physical health, and playing EGMs in clubs was also associated with poorer feelings about self.

## **The social cost of gambling**

The results from the survey reported above were utilised in an economic analysis of the social cost of gambling.

In a systematic analysis, the social cost of an activity is always measured against a 'counterfactual', that is an alternative scenario in which the activity occurs differently (or not at all). The cost (or benefit) of an activity is the additional resources used (or released) where the actual situation differs from the counterfactual situation (For reference on the methodology used here see Anielski and Braaten, 2006, Collins and Lapsley, 2003, Single et al., 2003).

The economic analysis argues that where there are voluntary individual decisions the net cost to society is zero. (Some complications are considered below.)

However where there are involuntary consequences of other people's actions, that generates a social cost. For instance a gambler may ignore the impact of her or his actions on her or his associates. The gambler may turn to crime or have a deterioration in her or his mental well-being as a result of her or his gambling. Each of these has consequences on the welfare of others either directly (as in the case of associates), or indirectly insofar as others suffer from the individuals criminal actions, or the public sector has to supply services for criminal prosecution and punishment or mental health treatment. It is also possible that gambling affects work and study performance and even whether the individual takes the option of working or studying. Ideally too these should be taken into account but, as will be explained, they prove much harder to measure.

There are of course, benefits from gambling. Usually these benefits are allowed for via the voluntary actions but sometimes they are not. For instance the benefits to society from taking an educational course may exceed the benefits to the individual. We are not aware, however, of any such benefits from gambling. (The possibility that gambling improved mental well-being and quality of life is included in the approach taken here.)

In summary, we looked at whether there are any involuntary costs in the current situation as a result of gambling, measuring them against an alternative situation.

## **The counterfactual situations**

For the purposes of this study, three counterfactuals are considered and reported upon:

1. No Gambling: There is no gambling. This assumes that all gambling (in every mode) does not occur. The analysis does not make any assumptions as to how this happens (e.g. by law, or by everybody

- voluntarily giving up the activity). In that sense the counterfactual is artificial – but that is true for almost all counterfactuals. Its purpose is to give a sense of the general significance of gambling.
2. No Affected-Others: That the gambling of others does not impact on those who are their family, friends, and associates. This counterfactual is even more artificial than the previous ones. Its purpose is to enable the assessment of the degree to which the social costs of gambling directly affect the gamblers' associates. In the discussion it is treated as a subset of the No-gambling counterfactual, in order to separate out the impact on gamblers from their associates.
  3. No EGMs: That there is no gambling on poker machines and there is no displacement to other gambling activities. (The activity here is all gambling on machines, whether they are in bars, casinos and clubs.) The aim of this counterfactual is to assess the contribution of one particular gambling mode to overall social costs. The mode to illustrate the principle is chosen because both the literature and this study suggested that EGMs are the most socially costly of all modes. This may seem to be the most policy realistic scenario, but it crucially assumes that no EGM gambler switches to another mode (say roulette) or to any other socially costly activity (say heavy drinking).

As explained, it is not intended that these counterfactual scenarios are necessarily realistic, or feasible from a policy perspective. Rather, they allow an exploration of the implications of gambling by contrasting it with an alternative situation.

## **The method**

As reported earlier the respondents in the survey were asked about their demographic characteristics, their gambling behaviour (and the gambling of those close to them), and how they assessed themselves on various dimensions of life.

This section of the report focuses on the following dimensions: mental wellbeing; satisfaction with life together with the reports of illegal activities.

For each dimension an econometric equation is estimated across the 7000 individuals which is used to predict the outcome for each survey response based on their demographic characteristic and their gambling behaviour. The equation is a 'probit', which predicts the probability of an individual being in each of the five categories associated with the dimensions of life. (The question and response options are given at the head of each section.)

The equations are summarised elsewhere (SHORE & Whariki, 2006). The particular advantage of this econometric approach is that the predictions from the equations (which we need for the counterfactuals) are best linear unbiased estimates, even if the individual parameters are not precisely estimated.

We can then use the econometric equation to predict what the individual will report if they have different gambling behaviour consistent with each counterfactual (that is no gambling; no affected-others; no EGMs). Aggregating across all individuals (in the age range from 15 to 80) gives the proportions of the population in each category. (Because there was some oversampling there has been a re-weighting of the sample observations to the national pattern.)

To illustrate the method consider two identical people, say twins. One gambles and the other does not. We assess the mental well being and the satisfaction of life of the two. We find, as it happens, that the twin who is not a gambler has higher scores than the one who is. It is a reasonable assumption that if the latter twin were to give up gambling he or she would have the same scores as the other. This score gain from the No-gambling counterfactuals is what we shall report. Admittedly the twin comparison is not practical from this data set. Instead the econometric equations control for age, gender, marital status, ethnicity, income and employment status which is as close as it can get for a 'twin' comparison.

It should be noted that the equations do not automatically assume that there will be a deterioration of mental well-being or satisfaction with life from gambling. (The gambling twin could have higher score.) In principle they could have improvements from gambling, and we shall see that this situation applies for some in regard to satisfaction with life.

### **Mental wellbeing**

*Now we are interested in finding out about your mental well-being. In general, in the last 12 months would you say your mental well-being has been ...*

- *very good*
- *good*
- *adequate*
- *poor*
- *very poor*

The relevant population responses from the sample are given in the 'actual situation' column of the table below, with the estimated responses from the counterfactuals shown in the following three columns.

**Table 12: Mental well-being by reported state**

STATE OF MENTAL WELL-BEING	ACTUAL SITUATION	COUNTERFACTUAL		
		No Gambling	No Affected Others	No EGMs
Very Good	1,722,000	1,767,000	1,734,000	1,767,000
Good	1,112,000	1,089,000	1,104,000	1,085,000
Adequate	273,000	255,000	269,000	257,000
Poor	46,000	42,000	45,000	43,000
Very Poor	8,200	7,300	7,900	7,500
TOTAL	3,160,000	3,160,000	3,160,000	3,160,000
Net Improvement		74,000	18,000	69,500

To summarise the myriads of changes in the impact of gambling on the mental well-being of all those involved in gambling (including their associates) it is proposed to measure the change by the number of people who would upgrade their category (e.g. from 'good' to 'very good'). The summary indicator is measured net, so that a person who downgrades their mental well-being state, is offset by a person who upgrades their state.

The general conclusion is that under each of the counterfactuals, there would be mental well-being gains. If there were no gambling at all 74,000 (2.4 percent) of the population would expect to have a better state of mental well-being.

Almost a quarter of these (24.8% or 18,000) are associates of the gamblers. Moreover, of those 74,000 whose mental well-being would benefit from stopping gambling altogether, 69,500 would benefit from stopping gambling on all forms of EGM (assuming they did not displace their gambling to another mode) and including those who report being associated with others who gamble on the EGMs. That represents 94.0 percent of the net numbers who would benefit if all gambling was stopped. This figure may be slightly misleading since the remaining six percent is a net figure.

Unfortunately we can not from these figures calculate what would be the reduction of pressures on and associated cost savings in the mental well-being services in each of the scenarios. That requires the health system recording those it treats by the whether they are gamblers or not, and then calculating the epidemiological fractions.

We can however give a heuristic indications, by comparing the reduction of numbers in the lowest categories (although, even here, care is needed since the sample frame is likely to undersample those with high mental well-being

treatment requirements, since – among other omissions – it does not include those in mental institutions). What the sampling estimates is that some 54,000 people describe themselves as having ‘poor’ or ‘very poor’ mental well-being amounting to 1.7% of the relevant population. The Ministry of Health reports that “Estimates of the prevalence of mental health problems amongst adult New Zealanders suggest that: about 3% of the population have severe mental health problems or disorders; another 5% of adult New Zealanders have moderate/severe mental health problems or disorders; another 12% of adult New Zealanders have mild/moderate mental health problems or disorders” (Ministry of Health, 2002). After allowing for the undercount consequent on the sampling frame, the ‘poor and very poor’ category probably responds to the group of New Zealanders with severe mental health problems or disorders.

If there were no gambling there would be a reduction of 4000 in this category (7.6% of the total<sup>5</sup>), of whom 3000 are there because they use EGMs or are associates of their users.

## **Crime**

*The next questions are related to illegal activities. Remember all answers you give a strictly confidential. In the last 12 months have you ever done any of the following for whatever reason?*

*Stolen money or property (including from family and friends)*

*Committed Fraud*

*Any other illegal activity (Please specify)*

*None of these.*

The numbers of responses were small, so responses to the first three questions were aggregated. The suggest that 1.3% of the sample, after re-weighting for over-sampling, said they had engaged in illegal activity.

That represents a total of 39,000 for the population as a whole. In contrast there are about 200,000 convictions a year (Ministry of Justice, 2007). So even allowing for multiple convictions, the reported estimate is probably biased down. Possible reasons are poor memory, a reluctance to confess, and an undersampling of those who have carried out illegal activities (the sample frame excluded prisoners).

Almost exactly a quarter (25.0%) of those who admitted illegal behaviour said it was due to gambling. We need to be careful with this reported proportion, since it is possible that the epidemiological fraction, which is calculated on objective criterion, may be different. However insofar as the proportion provides guidance it suggests that just below a third of percent of the relevant population, or 10,000 people, committed illegal activities in the last year because of gambling; that is, at least, what they say.

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<sup>5</sup> If allowance is made for the undercount as a result of the survey framework, and that the relevant population is 3 percent of the total population, the proportion of who were there as a result of gambling could be as low as 4.3%

## Life satisfaction (the quality of life variable)

A number of questions were asked of the sample which amounted to questions about their quality of life. We have chosen to assess it with the last question asked of them in the dimension of life block.

*Taking everything into account, how satisfied or dissatisfied are you with life in general these days?*

*Very satisfied*

*Satisfied*

*Neither satisfied or dissatisfied*

*Dissatisfied*

*Very dissatisfied*

The relevant population responses from the sample are given in the 'actual situation' column of the table below, with the estimated responses from the counterfactuals shown in the following three columns.

As in the case of mental well-being, the myriads of changes are summarised by the changes by the number of people who would upgrade their category. As before the summary indicator is measured net, so that a person who downgrades their mental health state, is offset by a person who upgrades their state.

**Table 13: Satisfaction with life by reported state**

STATE OF SATISFACTION WITH LIFE	ACTUAL SITUATION	COUNTERFACTUAL		
		No-Gambling	No-Associates	No-EGMs
Very Satisfied	1,245,000	1,240,000	1,261,000	1,259,000
Satisfied	1,666,000	1,676,000	1,655,000	1,658,000
Neither Satisfied or Dissatisfied	174,000	172,000	171,000	171,000
Dissatisfied	52,000	51,000	51,000	51,000
Very Dissatisfied	22,000	21,000	21,000	21,000
TOTAL	3,160,000	3,160,000	3,160,000	3,160,000
Net Improvement		1,000	22,000	22,000

The counterfactual outcomes for satisfaction with life are quite a different pattern from the mental wellbeing ones. The total net improvement is only 1000. While there are small reductions in the lowest three categories, there is also a reduction in the top (very satisfied) category, with the increase in the

satisfied category. Thus some people who are currently very satisfied would be less satisfied if there was no gambling. For them some gambling must add to their satisfaction with their life.

We can further see the complexity from the other two counterfactuals. If no one had any associates who gambled, there would be a net 22,000 who would feel more satisfied with life (to the extent they would reclassify themselves in a higher category). Since that No-Associates counterfactual is a subset of the No-Gambling counterfactual, that means that 21,000 who are gamblers (i.e. 22,000 - 1,000) would have a less satisfying life if there was not gambling at all. Many, of course, would be those whose gambling is modest involvement in lotteries, housie and the races.

The No-EGMs counterfactual also shows that there would be a net 22,000 who would report a more satisfying life if there were no EGMs. This includes some, but not all, of those who would benefit from not having any associates who gambled. Again by comparison with the No-Gambling counterfactual, we may conclude there would be a net 21,000 who would be less satisfied with life if all forms of gambling, other than EGMs, were prohibited.

That there are people who would be worse off if a particular activity was not available need not surprise us. Indeed, much of a modern economy is about how offering the population new products and services which improve some people's life. What is perhaps more unusual is that the product makes an even greater number of people's lives substantially worse off.

### **The social costs of gambling (tangibles)**

As already explained, where commercial transactions are voluntary – between a willing buyer and willing seller – the social costs of the transactions are zero. Sometimes this analysis is criticised. Here are some standard criticisms and the responses to them.

1. The activity, gambling or whatever, creates jobs, and these should be taken into account.

It is true that the activity may create jobs, but were there no such activity the (voluntary) expenditure would go on other activities and generate jobs there too. The jobs created in the actual and counterfactual activity will be much the same.

There is a caveat here, seen most clearly when a casino (say) attracts international tourists. That involves the transfer of jobs from some other country to New Zealand since the counterfactual is that the tourists would spend in another country. Note that it also applies where New Zealanders travel in order to avail themselves of a facility in another part of the country but not available where they live (e.g. a casino). In both cases the outcome of the analysis depends upon the perspective which is taken. There is a

tendency to take a nationalistic perspective, so that transfers of jobs with countries are ignored, but gains and losses between countries are valued.

2. The analysis ignores the redistributive impact of the activity, treating all (production and transfer) 'dollars' as the same, irrespective whether they pertain to a rich or a poor person.

This criticism is true, but it is not relevant. It is true for all market transactions. It is also true for aggregate economic measures (such as GDP which is derived from the same theory as social cost). Their purpose is to measure the total quantity of goods and services available, irrespective of how they are distributed. Evaluating how they are distributed requires the addition of value judgements, which will vary from observer to observer.

It is possible in principle to assess the shares between sectors (e.g. public, household and business) and ideally this should be done when the data is available. In practice there has never been the data available to assess the shares between income strata within the household sector.

3. The analysis does not recognise the benefits to a consumer of a new product (or innovation).

There is some truth in this, although the very purchasing of the new product is included in the calculation. (The same criticism applies to price indexes). The 1999 report of the Australian Productivity Commission (Productivity Commission, 1999) attempts to do this by measuring the 'consumer surplus'. However it does not use a rigorous 'counterfactual' framework. Had it, the researchers would have realised that they should have deducted the consumer surplus that was lost, as individuals switch from some products to gambling services. The method used here includes the benefits of a new product in the quality of life measure as when we observed that some people would be worse off were gambling services to be prohibited.

4. The analysis includes as value consumption by addicts which they do not subsequently value.

This again is true. In recent years economists have begun to systematically analyse addictive consumer behaviour using the notion of time inconsistency (Rabin and O'Donoghue, forthcoming). It suggests that consumption of goods and services which occurs as a result of time inconsistent behaviour should not be included in the aggregate measure because ultimately (retrospectively) they are not valued by the consumer. It is, however, hard in practice to measure such expenditure. It should be noted, too, that the quality of life measure used above implicitly allows for individuals' regrets for their addictive consumption.

In summary, we cannot expect a single dimension measure, such as the social costs of gambling, to summarise every aspect of human behaviour.

Where there are involuntary transactions, then they may reduce the production available for consumption. In such cases there is a social cost which arises in the tangible sector. There are three significant areas where such involuntary transactions occur:

*Health:* The survey showed that gambling is associated with perceptions of poorer mental well-being. Around 2.4% of population would expect to have a better state of mental well-being if there were no gambling, and between 4.3% and 7.6% of the adult population with severe mental health problems and disorders are there because of gambling. However there are not the epidemiological fractions to enable us to estimate the cost to the health system of these gambling generated people with severe mental health problems and disorders. (There will also be some people with physical health problems from gambling, but again there are not the epidemiological fractions for them.)

*Crime:* Insofar as gambling generates criminal activity, which requires investigation, prosecution and punishment as well as preventative measures, each of which is a burden upon the state, crime represents a social cost (for a given counterfactual). We observed earlier that there is evidence that crime is associated with and probably caused by gambling. However the numbers in this survey are too small to be used for quantification purposes and, furthermore, there are no general estimates of the social costs of crime for New Zealand.

*Other Government Spending:* Government expenditure includes outlays for the regulation and enforcement of gambling. These also represent a diversion of resources not available for other purposes. However, they are small compared to the previous two items, and are offset (to some degree) by taxes and levies imposed upon gambling.

In summary, tangible social costs measure the additional goods and services available in the counterfactual scenario relative to the actual situation. Where voluntary transactions are involved, the amount available is the same. However, as in the case of gambling, there are involuntary transactions from the government sector for health and, justice and regulatory services. These are a social cost of gambling.

We have noted various caveats. They arise because very complex outcomes are being measured by a single dimension measure which, of course, is unable to capture all the complexities.

### **The social costs of gambling (intangibles)**

As well as the impact on available goods and services, any activity impacts on the quality of life of individuals in ways which the goods and service do not directly measure. These were measured by responses to the satisfaction of life question in the survey.

The responses showed that many people were worse off, as measured by this satisfaction question, as a result of the gambling, especially those who were associated with gamblers and those involved with EGMs. However, almost as many people would lead less satisfactory lives, if there were no opportunities for them to gamble.

In any case, given the numbers of winners and losers from gambling (the irony is intended) a single statistic may not be a useful summary of the social costs of gambling on people's lives.

## Conclusions

The measures developed as part of this survey and the subsequent analyses have provided useful results relevant to measuring the social impacts of gambling. They show consistency with previous research findings and a reasonable degree of internal consistency.

With regard to the measures of gambling participation and heavier gambling the loss/income ratio distinguished between gamblers and predicted different ratings of quality of life in many domains.

The use of time in the aggregate, as a measure of heavier gambling is less useful due to the different impacts of gambling in different modes. Time spent gambling disaggregated into different modes of gambling is, however, very informative.

The measurement of quality of life in relation to a number of domains shows consistency with previous research. The domains elicited in the qualitative research and measured in this survey provided quantifiable impacts associated with gambling.

In terms of the modes of gambling the results show different ethnic groups experience different impacts to some degree, but the time spent playing EGMs in bars showed up poorly with all ethnic groups and in relation to many domains of life.

The study revealed a number of ethnicity differences. It was striking that for Maori and Pacific peoples there was only one positive association with gambling and many negative associations. This may reflect both higher participation levels but also the relative lack of resource available to Maori and Pacific peoples, meaning that the adverse consequences of gambling are not mitigated. These findings suggest the value of exploring redistribution effects in future work on economic impacts of gambling. It also reinforces concerns over the higher levels of availability of access to EGMs in more deprived areas.

This study has provided evidence of quantifiable impacts of the effects of heavier gamblers on their associates. Close family members of heavy gamblers were most negatively impacted by their family members' gambling.

Using a no-gambling counterfactual scenario the analysis has shown that as much as a net 2.4% of the population may have an inferior state of reported mental wellbeing as a result of gambling. The main contribution comes from those who use EGMs and those who are associated with gamblers. It suggests that for those classified as having severe mental health problems or disorders, between 4.3% and 7.6% may be caused by gambling.

About 10,000 people (just below a third of percent of the adult population) say they committed illegal activities in the last year because of gambling.

While some people increased their satisfaction with their lives because of their gambling, others had a reduced satisfaction. There were slightly more of the latter than the former. The largest components of that group were those using EGMs and those who were associates of heavier gamblers.

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