



**AUT GAMBLING & ADDICTIONS  
RESEARCH CENTRE**

**AUT**

**NEW ZEALAND NATIONAL GAMBLING STUDY:  
2018 PARTICIPANT RE-CONTACT AND  
IMPLICATIONS FOR A 2019 INTERVIEW WAVE**

**FINAL REPORT**

28 November 2018

**Prepared for**  
Ministry of Health  
PO Box 5013  
Wellington

**Authors**  
Maria E Bellringer  
Nick Garrett  
Max Abbott

## ACKNOWLEDGEMENTS

We thank the many staff from the National Research Bureau for their hard work in tracking down and contacting participants to obtain current contact details and to ascertain participant interest in continuing in the National Gambling Study. In particular, we thank Ken Sutton who has worked tirelessly to make this happen. The work was funded by the New Zealand Ministry of Health.

## Disclaimer

This report was prepared under contract (Number 359209) to the New Zealand Ministry of Health. The copyright in this article is owned by the Crown and administered by the Ministry. The views of the authors do not necessarily represent the views or policy of the New Zealand Ministry of Health. The Ministry makes no warranty, express or implied, nor assumes any liability or responsibility for use of, or reliance on, the contents of this report.

## CONTENTS

ACKNOWLEDGEMENTS .....	2
INTRODUCTION .....	5
RATIONALE FOR PARTICIPANT RE-CONTACT .....	5
RE-CONTACT PROCESS .....	6
RE-CONTACT RESULTS .....	7
Number agreeing to continue in the NGS .....	7
Geographical location of participants agreeing to continue in the study .....	7
Contact outcomes .....	8
EXPECTED RE-CONTACT RATE IN 2019 .....	8
SAMPLE DEMOGRAPHICS FROM FIRST INTERVIEW TO RE-CONTACT IN 2018 .....	9
STATISTICAL ANALYSIS OF POTENTIAL 2019 COHORT .....	10
Estimated gambling risk level categorisations .....	10
Examining gambling prevalence by gender and ethnicity .....	10
Examining gambling risk level prevalence by gender and ethnicity .....	11
Examining gambling associates by gender and ethnicity .....	11
Examining gambling risk level associates by gender and ethnicity .....	12
Longitudinal examination of gambling risk level associates by gender and ethnicity .....	13
SUMMARY AND IMPLICATIONS FOR A 2019 SURVEY .....	14
REFERENCES .....	16

## LIST OF TABLES

Table 1: Geographical location of participants in 2018 vs. 2013 Census .....	7
Table 2: Final contact outcomes.....	8
Table 3: Re-contact agreement rate of NGS participants by year of last interview .....	8
Table 4: Re-contact agreement rate of additional cohort participants by year of last interview	9
Table 5: Baseline demographics of participants at first interview and at re-contact in 2018....	9
Table 6: Estimated gambling risk level categorisations.....	10
Table 7: Examining gambling prevalence by gender and ethnicity .....	11
Table 8: Examining gambling risk level prevalence by gender and ethnicity.....	11
Table 9: Examining prevalence of gambling associates by gender and ethnicity .....	12
Table 10: Examining prevalence of gambling risk level associates by gender and ethnicity .	13
Table 11: Examining longitudinal prevalence of gambling risk level associates by gender and ethnicity .....	14

## INTRODUCTION

The National Gambling Study (NGS) is a nationally representative longitudinal survey of adults aged 18 years and older, designed to provide information on the prevalence, incidence, nature and effects of gambling in New Zealand. Participants (N=6,251) were recruited in 2012 via face-to-face household recruitment and computer-assisted personal interviews (CAPI). It was designed as a multi-stage, stratified, probability-proportional-to-size sample with over-sampling of Māori, Pacific people and Asian people, so that statistical analyses could be conducted on sub-samples by ethnicity. In 2013, one year after initial recruitment and interviewing, 3,745 participants were re-interviewed. The reduced sample was partly due to insufficient budget to attempt re-contact of all participants (only attempted re-contact with 5,266 participants) and partly due to attrition. Numbers re-interviewed in 2014 and 2015 were 3,115 and 2,770, respectively.

As the number of moderate-risk and problem gamblers in the NGS is relatively small (about two percent of participants), an additional cohort of 106 adult moderate-risk and problem gamblers was recruited from gambling venues and via advertisements in 2014/15, and re-interviewed in 2015/16. An analysis of data from this additional cohort concluded that:

*“... it is feasible to combine the MR/PG cohort with the NGS moderate-risk/problem gamblers in order to conduct sub-group analyses, as the two cohorts are similar in the majority of respects. However, as there are some differences between the cohorts, dependent on the analyses being undertaken, weightings may have to be applied to the MR/PG cohort to make it more representative of the general population moderate-risk and problem gamblers.”* (Bellringer, Prah, Garrett & Abbott, 2018, p. 7)

The NGS was conducted by the Gambling and Addictions Research Centre at Auckland University of Technology (AUT) in collaboration with the National Research Bureau (NRB), an independent research company. In all years, NRB recruited the participants (apart from the additional cohort in 2014/15) and conducted all face-to-face interviews.

## RATIONALE FOR PARTICIPANT RE-CONTACT

NGS surveys were conducted annually from 2012 to 2015. In the Ministry of Health’s ‘Strategy to prevent and minimise gambling harm 2016/17 to 2018/19’, the first bullet point in ‘The research and evaluation work programme’ is “an expansion of the 2012 NGS to include an in-depth qualitative phase and a seven-year follow-up focused on risk and resilience factors relating to gambling harm” (Ministry of Health, 2016, p 45).

The proposed seven-year<sup>1</sup> follow-up would be in 2019 - seven years since the first interview in 2012. This will be a minimum of a four-year gap for participants since their last interview in 2015 and will be a longer gap for participants who were not interviewed in 2015. For many of the participants, the contact details on file will be out-dated (e.g. participants may have moved to a new house, or changed Email provider or telephone number), particularly for those in the moderate-risk and problem gambling categories who are a more transient population, often due to financial problems stemming from the problematic gambling. Thus, to minimise attrition and maximise the sample size for the potential 2019 survey, attempts were made by NRB staff and interviewers to re-contact all the NGS participants and the additional moderate-risk/problem gambler cohort participants, who had not withdrawn from the study, in order to obtain

---

<sup>1</sup> It would be a four to five-year follow-up for the additional moderate-risk/problem gambler cohort.

current contact details and to ascertain willingness to take part in further interviews for the NGS.

Initially, there were 6,251 participants in the NGS (in 2012) plus a further 106 additional cohort gamblers (in 2014/15). However, after the first interview and again at subsequent interviews, some of these participants withdrew from the study asking not to be contacted again. The total number of participants available for a re-contact attempt in 2018 was 4,815.

## **RE-CONTACT PROCESS**

The most recent contact information used in the attempt to contact participants was from any of 2012, 2013, 2014, 2015 and 2016, depending on the last year that each participant was interviewed.

At each NGS interview, participants could choose to provide all, some or none of their contact details, specifically their email address, landline phone number, mobile phone number and postal address. Additionally, participants could provide details of a collateral person - someone who could be contacted and who would know the participant's current contact details. Therefore, attempts were made to contact participants by all possible methods, where these had been provided. Where contact could not be made because the supplied details were out-of-date, other methods were used to find participants including searching telephone white pages and electoral roll data.

Contact attempts were made by multiple methods including by:

- Email whereby current contact details and willingness to continue participation was collected via an online link,
- Interviewers calling landline and mobile phones to verbally obtain the information (up to three calls were made by interviewers in an attempt to make contact),
- Post whereby the information was collected either via an online link or by return in a provided pre-paid envelope.

At the time of contact, each participant was offered an information flyer detailing a few interesting results from the NGS over time (i.e. changes in gambling participation behaviour and attitudes towards gambling) so that they could see how their participation contributed to national gambling knowledge. The flyer was prepared by AUT and provided as PDF and print copies to NRB so that participants could be Emailed or posted the flyer, according to their preference.

In total, 3,316 participants were successfully contacted by these various methods from 16 February to 5 November 2018. Specifically:

- Email: 981 responses received between 16 February and 2 May 2018,
- Landline and mobile phone: 2,285 contacts made between 18 March and 31 May 2018, and between 7 September and 10 October,
- Post: 51 responses received between 15 October and 5 November 2018.

## RE-CONTACT RESULTS

### Number agreeing to continue in the NGS

Of the 3,316 successful contacts made with participants, **2,900 (87%) provided current contact details and agreed to continue participation in the NGS**. Thirteen percent (n=416) of participants withdrew from the NGS. Of the 2,900 participants, **2,855 were NGS participants and 45 were participants from the additional cohort of moderate-risk/problem gamblers**.

### Geographical location of participants agreeing to continue in the study

The geographical location of NGS participants agreeing, in 2018, to continue in the study is similar to national population percentages in the various locations (regions), as assessed by the 2013 Census (Table 1). Thus, the NGS participants remain nationally representative in regard to location of residence. The additional cohort participants were purposively recruited from Auckland, Waikato, Wellington and Canterbury.

**Table 1: Geographical location of participants in 2018 vs. 2013 Census**

Region	NGS 2018 <sup>^</sup>		Additional cohort 2018 <sup>^</sup>		2013 Census <sup>†</sup>	
	n	(%)	n	(%)	n	(%)
Northland	108	(3.8)			58,944	(3.8)
Auckland	963	(33.7)	21	(46.7)	469,497	(30.3)
Waikato	266	(9.3)	7	(15.6)	150,174	(9.7)
Bay of Plenty	205	(7.2)			102,270	(6.6)
Gisborne	65	(2.3)			15,993	(1.0)
Hawke's Bay	142	(5.0)			57,642	(3.7)
Taranaki	65	(2.3)			43,014	(2.8)
Manawatu-Wanganui	168	(5.9)			87,003	(5.6)
Wellington	359	(12.6)	13	(28.9)	176,133	(11.4)
Tasman	32	(1.1)			18,264	(1.2)
Nelson	15	(0.5)			18,543	(1.2)
Marlborough	20	(0.7)			17,673	(1.1)
West Coast	8	(0.3)			13,284	(0.9)
Canterbury	292	(10.2)	4	(8.9)	204,840	(13.2)
Otago	99	(3.5)			78,915	(5.1)
Southland	42	(1.5)			37,449	(2.4)
Area outside region (Census)/Overseas (NGS)	6	(0.2)			249	(0.0)
<i>Total</i>	2,855		45		1,549,887	

<sup>†</sup> Dwelling counts

<sup>^</sup> Participant counts

## Contact outcomes

The final outcome of participant contact attempts is detailed in Table 2. As described earlier, multiple methods were used in the attempt to contact participants so, for example, for the 13.6% of participants with a disconnected phone, we also attempted to contact them by other means (e.g. Email, post, collateral details) but were unsuccessful in all attempts.

**Table 2: Final contact outcomes**

Contact outcome	n	(%)
Updated contact details and agreed to stay in the study	2,900	(60.2)
Disconnected phone/answerphone	1,127	(23.4)
Refused/not available/no reply	456	(9.5)
Wrong number/business number/fax number supplied	126	(2.6)
Moved within New Zealand	75	(1.6)
Deceased	54	(1.1)
Moved overseas	39	(0.8)
Incapacitated (e.g. infirm, in hospital)/in prison	28	(0.6)
Language issues	10	(0.2)
<i>Total</i>	<i>4,815</i>	

## EXPECTED RE-CONTACT RATE IN 2019

The percentage of NGS participants who, in 2018, agreed to continued involvement in the NGS decreased dependent on how long ago the most recent participation year was (Table 3).

**Table 3: Re-contact agreement rate of NGS participants by year of last interview**

Participation year				Consent for Re-contact (n)	Total	Re-contact percent (%)
2012	2013	2014	2015			
Yes	-	-	-	447	2,506	(18)
Yes	Yes	-	-	197	630	(31)
Yes	Yes	Yes	-	130	345	(38)
Yes	Yes	Yes	Yes	2,081	2,770	(75)

In 2012, there were 6,251 NGS participants. In 2013, this number reduced to 3,745; a retention rate of 71% of the 5,266 people with whom contact was attempted. The retention rate from 2013 to 2014 was 83% (n=3,115) and from 2014 to 2015 was 89% (n=2,770). The 2018 re-contact indicates a potential 75% retention rate. Based on these figures, a 2019 follow-up of the 2,855 participants who gave consent for re-contact is likely to be reduced by 10% to 20%. However, this reduction might be somewhat offset by the fact that some participants may yet respond by postal or online methods, although the number to do so is unlikely to be large. Given this possibility, the online link will be kept active (open) and monitored until mid-December 2018. Furthermore, there are 256 participants who have not responded to any of our communications but who are still residing at the same address (established from electoral rolls). It is also likely that in any future face-to-face interview for the NGS that a proportion of this group would agree to further participation.

For the additional cohort, the percentage in 2019 agreeing to continued involvement was substantially lower than for the NGS participants (Table 4), and the retention rate between the



first interview in 2014/15 (n=106) and the second interview in 2015/16 (n=70) was also lower at 66%. Based on these findings, a 2019 follow-up of the 45 additional cohort participants who have agreed to continued participation, is also likely to be slightly reduced.

**Table 4: Re-contact agreement rate of additional cohort participants by year of last interview**

Participation year		Consent for		Re-contact
2014/15	2015/16	Re-contact (n)	Total	percent (%)
Yes	-	2	36	(6)
Yes	Yes	43	70	(61)

## SAMPLE DEMOGRAPHICS FROM FIRST INTERVIEW TO RE-CONTACT IN 2018

NGS participants in 2018, who agreed to continued involvement, were examined for baseline gender, age, ethnicity and gambling risk level changes from recruitment to 2018. There appeared to be differential attrition by ethnicity with a larger proportion of European/Other participants agreeing to remain in the study and lower proportions of Māori, and Pacific and Asian people agreeing. Proportions by gender, age and gambling risk level were similar from recruitment to 2018 (Table 5). The differential attrition will require statistical adjustment for analyses of the proposed 2019 data. Wider fluctuations were noted amongst the additional cohort participants (Table 5); however, these may have been due to very small sample sizes in some cases.

**Table 5: Baseline demographics of participants at first interview and at re-contact in 2018**

Baseline demographic	NGS				Additional cohort			
	2012		2018		2014/15		2018	
	n	(%)	n	(%)	n	(%)	n	(%)
<b>Gender</b>								
Male	2,642	(42)	1,233	(43)	76	(72)	32	(71)
Female	3,609	(58)	1,622	(57)	30	(28)	13	(29)
<b>Age (years)</b>								
18-24	571	(9)	196	(7)	19	(18)	5	(11)
25-34	1,069	(17)	415	(15)	49	(46)	21	(47)
35-44	1,261	(20)	606	(21)	13	(12)	4	(9)
45-54	1,195	(19)	616	(22)	9	(9)	5	(11)
55-64	922	(15)	495	(17)	11	(10)	7	(16)
65+	1,226	(20)	526	(18)	5	(5)	3	(7)
Not reported	7	-	1	-	-	-	-	-
<b>Ethnicity</b>								
European/Other	3,448	(56)	1,817	(64)	59	(56)	29	(64)
Maori	1,164	(19)	466	(16)	25	(24)	9	(20)
Pacific	778	(13)	242	(9)	7	(7)	3	(7)
Asian	798	(13)	304	(11)	15	(14)	4	(9)
Not reported	63	-	26	-	-	-	-	-

	NGS				Additional cohort			
	2012		2018		2014/15		2018	
Baseline demographic	n	(%)	n	(%)	n	(%)	n	(%)
<b>Gambling risk level</b>								
Non-problem gambler	4434	(71)	2131	(75)	-	-	-	-
Low-risk gambler	325	(5)	134	(5)	-	-	-	-
Moderate-risk gambler	133	(2)	53	(2)	47	(44)	22	(49)
Problem gambler	58	(1)	27	(1)	59	(56)	23	(51)
Non-gambler	1301	(21)	510	(18)	-	-	-	-
<i>Total</i>	<i>6,251</i>		<i>2,855</i>		<i>106</i>		<i>45</i>	

Note: Numbers are unadjusted

## STATISTICAL ANALYSIS OF POTENTIAL 2019 COHORT

### Estimated gambling risk level categorisations

Utilising baseline past-year gambling and gambling risk level categorisations, Table 6 shows estimated distributions for the re-contacted NGS cohort by gender and ethnicity breakdown. Note that the sample sizes for the problem gambler category by ethnicity, and for the Asian moderate-risk/problem gambler category are very small.

**Table 6: Estimated gambling risk level categorisations**

Demographic	Total N	Past-year gambler		Low-risk/ moderate- risk/problem gambler		Moderate-risk/ problem gambler		Problem- gambler	
		n	(%)	n	(%)	n	(%)	n	(%)
<b>Gender</b>									
Male	1,233	1,014	(82.2)	90	(8.9)	38	(3.7)	13	(1.3)
Female	1,622	1,331	(82.1)	124	(9.3)	42	(3.2)	27	(2.0)
<b>Ethnicity</b>									
Māori	466	405	(86.9)	59	(14.6)	27	(6.7)	12	(3.0)
Pacific	242	188	(77.7)	47	(25.0)	20	(10.6)	5	(2.7)
Asian	304	193	(63.5)	19	(9.8)	3	(1.6)	2	(1.0)
European/Other	1,817	1,539	(84.7)	89	(5.8)	30	(1.9)	8	(0.5)
<i>Total</i>	<i>2,855</i>	<i>2,351</i>	<i>(82.1)</i>	<i>214</i>	<i>(9.1)</i>	<i>80</i>	<i>(3.4)</i>	<i>27</i>	<i>(1.1)</i>

### Examining gambling prevalence by gender and ethnicity

Assuming a 10% attrition<sup>2</sup> from 2018 to 2019, and with 80% power and 95% confidence, the following estimates for gambling prevalence by gender and ethnicity can be made. There is likely to be reasonable accuracy in measuring gambling prevalence overall and by gender. However, estimates of prevalence for Pacific and Asian ethnic groups are likely to be within  $\pm 5\%$  or  $\pm 6\%$  (e.g. 95% confidence intervals for Asian participants, assuming 90% retention from now until interviewing will range from 58% to 70%) (Table 7).

<sup>2</sup> Note that a 10% attrition is an under-estimate based on historical data but takes into consideration the possibility that more participants may yet agree to continue in the study (see “Expected re-contact rate in 2019” on page 8).

**Table 7: Examining gambling prevalence by gender and ethnicity**

	N	Approx. prevalence	Accuracy of prevalence estimate <sup>†</sup>
<i>Total</i>	2,855	82%	± 1%
	2,570 (-10%)	82%	± 1%
Male	1,233	82%	± 2%
	1,110 (-10%)	82%	± 2%
Female	1,622	82%	± 2%
	1,460 (-10%)	82%	± 2%
Māori	466	87%	± 3%
	419 (-10%)	87%	± 3%
Pacific	242	78%	± 5%
	218 (-10%)	78%	± 5%
Asian	304	64%	± 6%
	274 (-10%)	64%	± 6%

<sup>†</sup> Based on exact Clopper-Pearson confidence intervals

### Examining gambling risk level prevalence by gender and ethnicity

The at-risk (low-risk/moderate-risk/problem gambler) and moderate-risk and problem gambler (combined) outcomes will have reasonable accuracy overall and for gender. However, estimates for Pacific and Asian ethnic groups are likely to be quite wide and may be problematic for Asian moderate-risk/problem gambling estimates (Table 8).

The numbers of estimated problem gamblers are too small for any reliable prevalence estimates by sub-groups.

**Table 8: Examining gambling risk level prevalence by gender and ethnicity**

	At-risk		Moderate-risk/problem gambler		
	N	Approx. prevalence	Accuracy of prevalence estimate <sup>†</sup>	Approx. prevalence	Accuracy of prevalence estimate <sup>†</sup>
Total	2,351	9%	± 1%	3%	± 1%
	2,116 (-10%)	9%	± 1%	3%	± 1%
Male	1,041	9%	± 2%	4%	± 1%
	937 (-10%)	9%	± 2%	4%	± 1%
Female	1,331	9%	± 1%	3%	± 1%
	1,198 (-10%)	9%	± 1%	3%	± 1%
Māori	405	15%	± 4%	7%	± 2%
	365 (-10%)	15%	± 4%	7%	± 2%
Pacific	188	25%	± 6%	11%	± 5%
	169 (-10%)	25%	± 7%	11%	± 5%
Asian	193	10%	± 4%	2%	± 2%
	174 (-10%)	10%	± 5%	2%	± 2%

<sup>†</sup> Based on exact Clopper-Pearson confidence intervals

### Examining gambling associates by gender and ethnicity

A detectable odds ratio of less than 2 is considered a reasonable associate effect. Odds ratios greater than 3 are considered very strong effects. In behavioural based research such as for gambling, odds ratios greater than 3 are highly unlikely.

Therefore, overall and for gender, associates for gambling activity are likely to be successfully modelled for the proposed sample size. Sub-group analysis by ethnic group will identify strong associate effects but only for relatively common associates (i.e. those that occur for 20% or 50% of the time) (Table 9).

**Table 9: Examining prevalence of gambling associates by gender and ethnicity**

	N	Approx. prevalence	Prevalence of associate	Detectable odds ratio
<i>Total</i>	2,570 (-10%)	82%	50%	1.33
	2,570 (-10%)	82%	20%	1.41
	2,570 (-10%)	82%	10%	1.57
Male	1,110 (-10%)	82%	50%	1.55
	1,110 (-10%)	82%	20%	1.68
	1,110 (-10%)	82%	10%	1.94
Female	1,460 (-10%)	82%	50%	1.47
	1,460 (-10%)	82%	20%	1.58
	1,460 (-10%)	82%	10%	1.80
Māori	419 (-10%)	87%	50%	2.28
	419 (-10%)	87%	20%	2.54
	419 (-10%)	87%	10%	3.19
Pacific	218 (-10%)	78%	50%	2.56
	218 (-10%)	78%	20%	2.83
	218 (-10%)	78%	10%	3.60
Asian	274 (-10%)	64%	50%	2.05
	274 (-10%)	64%	20%	2.24
	274 (-10%)	64%	10%	2.73

#### Examining gambling risk level associates by gender and ethnicity

Examination of associates for at-risk gamblers (low-risk/moderate-risk/problem gambler) will be reasonably powered overall and by gender. Examination of associates for moderate-risk/problem gamblers will only detect strong associations overall and by gender (Table 10).

For ethnic sub-group analyses, Māori and Pacific analyses will detect the strong associates for at-risk gamblers. However, Asian analyses for at-risk gamblers, and any analyses by ethnicity for moderate-risk/problem gamblers, are unlikely to provide any useful results (Table 10).

**Table 10: Examining prevalence of gambling risk level associates by gender and ethnicity**

	N	Prevalence of associate	At-risk		Moderate-risk/ problem gambler	
			Approx. prevalence	Detectable odds ratio	Approx. prevalence	Detectable odds ratio
Total	2,116 (-10%)	50%	9%	1.54	3%	2.07
	2,116 (-10%)	20%	9%	1.63	3%	2.16
	2,116 (-10%)	10%	9%	1.84	3%	2.53
Male	937 (-10%)	50%	9%	1.92	4%	2.63
	937 (-10%)	20%	9%	2.02	4%	2.66
	937 (-10%)	10%	9%	2.36	4%	3.17
Female	1,198 (-10%)	50%	9%	1.78	3%	2.70
	1,198 (-10%)	20%	9%	1.88	3%	2.71
	1,198 (-10%)	10%	9%	2.17	3%	3.23
Māori	365 (-10%)	50%	15%	2.34	7%	3.39
	365 (-10%)	20%	15%	2.44	7%	3.26
	365 (-10%)	10%	15%	2.92	7%	3.93
Pacific	169 (-10%)	50%	25%	2.84	11%	4.55
	169 (-10%)	20%	25%	2.91	11%	4.04
	169 (-10%)	10%	25%	3.58	11%	4.94
Asian	174 (-10%)	50%	10%	5.06	2%	#
	174 (-10%)	20%	10%	4.14	2%	#
	174 (-10%)	10%	10%	4.74	2%	#

# Not calculable

**Longitudinal examination of gambling risk level associates by gender and ethnicity**

An auto-correlation of 0.4 has been assumed between time points, corresponding to the present auto-correlation across the four time points of 2012, 2013, 2014 and 2015.

With the inclusion of a fifth time point (proposed in 2019), there is improved performance over the single time point examined in Table 10. This demonstrates a small improvement by the addition of the additional time point. However, Asian results will only be feasible for the most common associate factors and only for the at-risk outcome (i.e. Asian associates for moderate-risk/problem gamblers will not be possible).

**Table 11: Examining longitudinal prevalence of gambling risk level associates by gender and ethnicity**

	N	Prevalence of associate	At-risk			Moderate-risk/problem gambler		
			Approx. prevalence	Detectable odds ratio		Approx. prevalence	Detectable odds ratio	
				t=4 <sup>†</sup>	t=5 <sup>‡</sup>		t=4 <sup>†</sup>	t=5 <sup>‡</sup>
Total	2,116 (-10%)	50%	9%	1.35	1.34	3%	1.60	1.34
	2,116 (-10%)	20%	9%	1.46	1.45	3%	1.85	1.82
	2,116 (-10%)	10%	9%	1.67	1.65	3%	2.30	2.26
Male	937 (-10%)	50%	9%	1.54	1.52	4%	1.81	1.79
	937 (-10%)	20%	9%	1.76	1.73	4%	2.20	2.16
	937 (-10%)	10%	9%	2.14	2.09	4%	2.92	2.84
Female	1,198 (-10%)	50%	9%	1.47	1.46	3%	1.82	1.80
	1,198 (-10%)	20%	9%	1.65	1.63	3%	2.22	2.18
	1,198 (-10%)	10%	9%	1.97	1.93	3%	2.96	2.88
Māori	365 (-10%)	50%	15%	1.74	1.71	7%	2.05	2.02
	365 (-10%)	20%	15%	2.06	2.02	7%	2.61	2.55
	365 (-10%)	10%	15%	2.64	2.57	7%	3.66	3.57
Pacific	169 (-10%)	50%	25%	1.98	1.95	11%	2.35	2.31
	169 (-10%)	20%	25%	2.42	2.36	11%	3.13	3.05
	169 (-10%)	10%	25%	3.30	3.19	11%	4.77	4.58
Asian	174 (-10%)	50%	10%	2.40	2.35	2%	4.26	4.15
	174 (-10%)	20%	10%	3.21	3.12	2%	7.22	6.96
	174 (-10%)	10%	10%	5.03	4.83	2%	15.14	14.39

<sup>†</sup> t = 4 time points

<sup>‡</sup> t = 5 time points

## SUMMARY AND IMPLICATIONS FOR A 2019 SURVEY

Attempted re-contact of NGS participants in 2018 has led to 2,900 participants agreeing to further contact in the NGS. Of these, 2,855 are main NGS participants and 45 are participants from the additional moderate-risk/problem gambler cohort. We expect that there will be additional attrition in 2019 and anticipate this to be about 10% overall, as attrition will be mitigated, to some extent, by the fact that some participants are still responding to postal requests for contact and there are several whom we could attempt to contact face-to-face at the time of future interviews. Our estimations of viability of the proposed 2019 data collection have been made using the 10% reduced sample size. They have not included the 45 additional moderate-risk/problem gambler cohort participants who could be included to boost sample size for some analyses.

There is some differential attrition in the present sample from baseline with lower proportions of Māori, Pacific people and Asian people agreeing to future participation. Whilst this can be statistically adjusted for analysis purposes, the small sample size poses a problem for certain Pacific and, in particular, Asian sub-group analyses, such as examination of findings by gambling risk level. Analyses will be possible investigating non-gamblers, gamblers, non-problem gamblers and at-risk gamblers (low-risk/moderate-risk/problem gambler); however, ethnic analyses for moderate-risk/problem gambling will only be possible for Māori and European/Other groups. The sample size of problem gamblers alone (based on baseline categorisation) is too small for sub-group analyses.

The addition of a fifth data collection wave in 2019 will improve longitudinal performance of the study results above the results previously collected over the four prior data collection waves in regard to gambling risk level analyses, although analyses of data by ethnicity will again be

problematic for the Asian population due to the small sample size. Additionally, as the NGS is a much broader study than just an examination of gambling risk levels, there will also be merit in collecting data in 2019 to understand gambling behaviours in general, in conjunction with co-existing issues and socio-demographic correlates, and to understand changes in attitudes to gambling, harms from gambling and effects on self and to other people.

Another benefit of conducting a seven-year repeat assessment in the NGS (in 2019) is that it will be possible to compare the results with those from the first New Zealand national gambling survey conducted nearly three decades ago that also had a seven-year follow-up (noting limitations due to methodological differences), and differences due to the changed gambling environment may be discernible. That survey took place in 1991 (Abbott & Volberg, 1991, 1996; Volberg & Abbott, 1994). Seven years later in 1998, a follow-up survey was conducted with selected participants including those who had gambled frequently and those who were lifetime probable pathological gamblers or problem gamblers (Abbott, Williams & Volberg, 1999, 2004). The main findings from the seven-year follow-up assessment included a substantial reduction in problematic gambling apparently due to ‘natural recovery’ (i.e. professional help had not been sought), and evidence that problems with some gambling activities (e.g. track betting) were more persistent than with other gambling activities (e.g. electronic gaming machines) (Abbott, Williams, & Volberg, 1999, 2004).

In conclusion, there is validity in completing the proposed seven-year follow-up of the NGS cohort although some sub-group analyses by ethnicity will be limited, particularly for Asian participants and, to a lesser, extent for Pacific participants. Nonetheless, adding a fifth data collection to this longitudinal study has merits for other analyses, including by gender and will improve our understanding of transitions between gambling risk levels, stability of risk level states, and information about relapse rates. The latter cannot be predicted/modelled due to the unknown nature of the fluctuations in behaviour. To date, there is a lack of long-term follow-up analyses in longitudinal surveys, which makes the NGS particularly important in terms of the opportunity to more comprehensively examine and understand risk and protective factors contributing to transitions in gambling risk levels and behaviours, and relapse.

## REFERENCES

- Abbott, M.W., & Volberg, R.A. (1991). *Gambling and problem gambling in New Zealand*. Research Series No. 12. Wellington: Department of Internal Affairs.
- Abbott, M.W., & Volberg, R.A. (1996). The New Zealand national survey of problem and pathological gambling. *Journal of Gambling Studies*, 12(2), 143-160.
- Abbott, M.W., Williams, M., & Volberg, R. (1999). *Seven years on: A follow-up study of frequent and problem gamblers living in the community. Report No. 2 of the New Zealand Gaming Survey*. Wellington: Department of Internal Affairs.
- Abbott, M.W., Williams, M.M., & Volberg, R.A. (2004). A prospective study of problem and regular non-problem gamblers living in the community. *Substance Use & Misuse*, 39(6), 855-884.
- Bellringer, M.E., Prah, P., Garrett, N., & Abbott, M. (2018). *Comparing an additional high-risk gambler cohort with National Gambling Study high-risk gamblers. NGS series Report number 7*. Auckland: Auckland University of Technology, Gambling and Addictions Research Centre.
- Ministry of Health. (2016). *Strategy to prevent and minimise gambling harm 2016/17 to 2018/19*. Wellington: Ministry of Health.
- Volberg, R.A., & Abbott, M.W. (1994). Lifetime prevalence estimates of pathological gambling in New Zealand. *International Journal of Epidemiology*, 23, 976-983.