FACTS on the fiction of Gambling Harm Report

A review[1] has uncovered selective calculations, methodological errors, and fantastical conclusions in a $320,000 report commissioned by the Ministry of Health; "Measuring the Burden of Gambling Harm in New Zealand"[2]

BIAS Results were achieved through "biased application of a one-sided method" to intentionally generate the highest possible cost of gambling. For example, choosing the study with the largest estimate of gambling prevalence introduced an over-estimation of harm of 123%. Many similar biased decisions made it possible to reach absurd conclusions, such as low-risk gambling causing more harm than untreated leg amputation or severe heart failure.

15 x The study has been **cited at least 15 times** in advice to Ministers and submissions on regulation. The most serious citation supported a Cabinet Paper deciding gambling policy.

What is gets wrong	Why
Considered costs but not benefits	The Report's use of a disease-based analogy, a situation with only detrimental outcomes, is flawed form the outset. A basic principle is that policies are evaluated on their incremental costs and benefits. Gambling has benefits (Korn and Shaffer 1999), including connectedness, mental health, and community. But this study ignores benefits entirely and all gambling harm, however small, is counted.
Biggest finding, high total cost of low risk gambling, is the most wrong	The study's headline finding that low-risk gambling contributes almost half the nation's gambling harm proves its unreliability. The Problem Gambling Screen Index referred to in the Report and used by the Ministry of Health in New Zealand, defines 'low risk' gambling is that "this group likely will not have experienced any adverse consequences from gambling". The study manages to find an impossibility; that a group that are described as not likely to have experienced harm, still has an aggregate harm equivalent to each person having severe heart failure.
Used a biased population sample	Participants in surveys were not selected at random. Advertising to attract participants and survey question suggested that harms were caused by gambling. Survey questions included prompts and leading suggestions that harm could be measured in more than time and money. A question about whether there was an equivalent impact from the same time and money being spent on another activity like fishing included the prompt [ANSWER MOST LIKELY NO] . In Phase 3, recruitment targeted current or past gamblers and included a high proportion of problem gamblers relative to the general population. In Phase 4, the survey aimed to quantify the effect of harms on life quality. Participant responses were ultimately used to compare the life quality effect of gambling to the life impact of other diseases. About two-thirds of the Phase 4 sample had a connection to gambling harm. CQU/AUT conducted no tests for bias. It is impossible to know to what extent the estimates of harm in the CQU/AUT study are the product of sample selection bias.

[1] In 2019 the Gaming Machine Association of New Zealand (GMANZ) commissioned TDB Advisory (TDB) to conduct a rigorous and comprehensive assessment of the CQU/AUT study using orthodox economic tools.
[2] July 2017. Central Queensland University (CQU) and Auckland University of Technology (AUT), commission by the NZ Ministry of Health for $319,364 (plus GST)

One-sided treatment of attribution	The study does not adjust its calculations to allow for the attribution of harms to comorbidities. Despite the Royal Australasian and New Zealand College of Psychologists reporting that 'Approximately 90% of people diagnosed with problem gambling have at least one other mental health diagnosis' and the Journal of Clinical Psychiatry USA finding 'Almost three quarters (73.2%) of pathological gamblers had an alcohol use disorder, (38.1%) had a drug use disorder, (60.4%) had nicotine dependence, (49.6%) had a mood disorder, (41.3%) had an anxiety disorder, and (60.8%) had a personality disorder', where harm was found, CQU/AUT attributes **all of that harm to gambling**, nothing else. Gambling can be associated with behaviours and outcomes called "comorbidities" such as age-related health impairments, physical health, depression, psychological disorders, suicide, anxiety, tobacco use, cannabis use, sedentary behaviour, employment, income, family, neighbourhood, social cohesion, financial problems, and other addictions.
One-sided treatment of causation	Causation between gambling and harms run in more than one direction. For some people, gambling is a coping mechanism, a symptom of harm rather than a cause. Causation can also operate through a third variable that leads gambling to be correlated with harm but with neither causing the other. These various causal relationships can all exist at the same time. CQU/AUT treats the relationship between gambling and harm as 100% causal and 0% symptomatic. This means the CQU/AUT study assumes the result it gets.
Failed to conduct sensitivity testing and standard checks for robustness	Mapping strongly incompatible data could require assumptions so unreasonable as to invalidate estimates of aggregate harms. CQU/AUT has not provided information sufficient to form any view on the effects of this mapping on its results and the Ministry of Health declined our request for further information. CQU/AUT reports no checks for robustness. The results of the CQU/AUT analysis may rest on unrelated data being combined, which would render CQU/AUT's aggregate harm findings meaningless.
Failed to verify the reliability of novel methods	The report's empirical conclusions are a product of a long sequence of steps, some of them novel. Despite the dependency of the findings of the CQU/AUT report on novel analytical steps, there is no report of testing that could give comfort in their veracity. The authors claim that the study use "a standard public health methodology endorsed by the World Health Organisation", but this was a reference to the final comparison, not all the calculations preceding it.
Selective use of data	To calculate total cost, CQU/AUT's multiplied the harm per person estimated from their surveys by the prevalence of gambling estimated by National Gambling Study (NGS) by AUT in 2012. It could have used the New Zealand Health Survey 2011/2012 (NZHS), and the 2016 Health and Lifestyles Survey (HLS). CQU/AUT chose the study that shows, by a considerable amount, the greatest prevalence of gambling. This decision introduced, by itself, an over-estimation of harm of 123%.
Omitted variables in econometric models leading to biased results	The study overstated the association between harm and gambling severity by excluding other explanatory variables. This appears to be a classic example of "omitted variable bias", when variables that explain some of the variation of the dependent variable, in this case harm, are excluded from a regression. This increases the apparent explanatory power of the remaining variables. CQU/AUT uses regressions[3] to estimate the econometric relationship between severity of problem gambling, measured by the Problem Gambling Severity Index (PGSI), and the frequency of identified harms. CQU/AUT reports these

[3] An econometric method used to estimate the statistical association between variables.

	regressions include demographic control variables (age, ethnicity, gender, and so on), but does not indicate any control variables for gambling comorbidities.
Incomplete reporting of methods and empirical findings	Many results are reported without confidence intervals. Regressions are mostly reported without standard diagnostics. There is almost no reporting of standard econometric tests for robustness or evidence that such tests were conducted. Some numbers (e.g. the 1,374 lives that were "barely worth living" on p. 199) are stated without any explanation for how they were calculated.

Costs without benefits

A two-sided review of a one-sided analysis of gambling

A report prepared for the Gaming Machine Association of New Zealand

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1. Summary

In 2014, the Ministry of Health commissioned a study of gambling harm from Central Queensland University (CQU) and Auckland University of Technology (AUT). The report, "Measuring The Burden of Gambling Harm in New Zealand" (the CQU/AUT study) was published in July 2017.[1] CQU/AUT found gambling causes more harm than diabetes and arthritis, and concluded their findings are a "potent argument for serious public investments" to reduce gambling harm and a guide for where efforts should be targeted. The study has been cited at least fifteen times in advice to Ministers and in submissions to regulatory processes.

The Gaming Machine Association of New Zealand (GMANZ) has commissioned TDB Advisory (TDB) to conduct a rigorous, balanced and comprehensive assessment of the CQU/AUT study using orthodox economic tools. In this review, we consider whether the methods used by CQU and AUT are capable of producing results that inform policy and regulatory decisions, and whether the application of those methods has been reasonable and competent. Our goal is to offer guidance to decision makers, stakeholders and the New Zealand public about the weight they should place on the findings of the CQU/AUT study in decision making.

We find the CQU/AUT study is seriously flawed and should not be considered reliable by policy makers. No weight should be placed on the conclusions or policy recommendations of the CQU/AUT study.

The conclusions of the CQU/AUT study are the result of the biased application of a one-sided method. CQU/AUT takes a method developed to assess the burden of diseases and uses it to assess gambling. While one-sided analysis may be appropriate for matters like disease which have no benefits, it is plainly inadequate as a guide for policy on social issues such as gambling where both costs and benefits are important. CQU/AUT's approach takes no account of gambling as a voluntary activity that, for the great majority of its participants, is a source of pleasure and entertainment.

Policies should be evaluated on their costs and benefits, a principle that is applied nearly universally in public policy analysis, but violated by the CQU/AUT study.[2] That gambling has benefits, alongside costs, is uncontroversial in the academic literature. Benefits include enjoyment, distributions to community and charitable causes and contributions to the government by way of taxes, duty and levies. The industry also supports local employment and business growth. Economic consulting firm Sapere estimates $654 million was distributed to community purposes in 2015/16 on gambling expenditure of $2.2 billion.[3] CQU/AUT acknowledges gambling's benefits (pp. 22, 67, 197, 199) yet its analysis and conclusions are based on costs only.

As one would expect, CQU/AUT's one-sided analysis has led to absurd conclusions. CQU/AUT finds, in terms of impact on life quality:

- low-risk gambling is worse for the gambler than the untreated amputation of a leg;
- problem gambling is worse for the gambler than terminal cancer or a severe stroke, and nearly as bad as untreated AIDS; [4] and

[1] Available from: https://www.health.govt.nz/publication/measuring-burden-gambling-harm-new-zealand

[2] See for example Treasury (2015), and Department of Prime Minister and Cabinet (2017). The review of gambling by the Australian Productivity Commission (2010) evaluated policy options on a cost-benefit basis.

[3] Sapere (2018).

[4] See Appendix A for full results including references.

- at a national level, gambling causes three times the harm of drug-use disorders.[5]

The Ministry of Health paid $319,364 (plus GST) for these findings using funds raised from gamblers through the Problem Gambling Levy.[6]

The conclusions of the CQU/AUT study are the product of the decision to count costs but not benefits, rather than being any reflection on gambling. CQU/AUT's one-sided method could have reached no other conclusion than that gambling is harmful, making this finding trivial. For this reason alone, policy makers should not rely on the conclusions or policy recommendations of the CQU/AUT study.

The problems with the CQU/AUT study do not end there. This review demonstrates further shortcomings in CQU/AUT's analysis, including:

1. the use of a biased population sample;
2. the use of biased survey tools;
3. failure to conduct sensitivity testing and standard checks for robustness;
4. failure to verify the reliability of novel methods;
5. selective reporting and use of findings from the academic literature;
6. omitted variables in econometric models leading to biased results;
7. incomplete reporting of methods and empirical findings;
8. exclusion of data suggesting unexpectedly small harms from gambling;
9. one-sided and implausible treatment of attribution and causation; and
10. failure to adequately warn of the study's limitations.

These shortcomings result in the costs of gambling being significantly overstated by the study. Given this, and the fact that the conclusions and policy recommendations of the CQU/AUT study take no account of gambling's benefits, we conclude the CQU/AUT study should not be relied on by policy makers and no weight should be placed on its conclusions or recommendations.

The Ministry of Health was publicly warned about the serious limitations of one-sided analysis before it commissioned the CQU/AUT study. In 2009, a review of another study commissioned by the Ministry of Health, this time on alcohol, concluded that the study "cannot even indicate whether more or less regulation… is desirable, because that requires an assessment of benefits as well as costs".[7] This same criticism can be levelled at the CQU/AUT study.

The Ministry of Health has cited the CQU/AUT study in its advice to Ministers without warning that by counting costs but not benefits CQU/AUT's estimates of harm give no measure of the impacts of gambling on overall consumer wellbeing. The Ministry of Health has distributed the study to the public for over two

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[5] CQU/AUT p.245.

[6] The Ministry of Health (2017b) says: "The [CQU/AUT] study was funded under the *Preventing and Minimising Gambling Harm Six-Year Strategic Plan 2010/11-2015/16*. The Ministry receives funding through Vote Health to develop and implement an 'integrated problem gambling strategy' required under the Gambling Act. The Crown then recovers the cost of this appropriation through the Problem Gambling Levy. See Ministry of Health (2018), p. 4. The source for the cost of the CQU/AUT study is a response by the Ministry of Health to a request made under the Official Information Act, available from: https://www.dropbox.com/s/a42inhalz4yvpma/Ministry%20of%20Health%20OIA%20response%2023%20July%202019.pdf?dl=0

[7] Burgess and Crampton (2009:39).

years without warning of its one-sided nature. In our view the Ministry has an ethical and professional responsibility to disclose the limitations of the CQU/AUT study to prevent misuse.

The case for policy must be made on its merits, tested rather than assumed. If one-sided methods are allowed to justify regulation, then analysis has no content and policy ceases to be subject to any kind of test for effectiveness. One-sided analysis that is not caveated as such clearly risks misleading policy makers and mistargeting public policy, with the potential to exacerbate rather than resolve consumer harms.

Over the next three years, the Problem Gambling Levy will raise $60 million, but less than half of this money will go to intervention services supporting gamblers. The majority of levy funds will be spent by the Ministry of Health on further gambling research, public health initiatives that "foster positive behaviours", and administration.[8] Aspects of the Ministry's actions revealed by this review lead us to question whether the Ministry of Health is delivering value for money with the funds raised by the Problem Gambling Levy.

[8] Ministry of Health (2019a), p. 6.

2. Background

2.1 Overview of the CQU/AUT study

In 2014, the Ministry of Health commissioned a study of gambling harm in New Zealand from Auckland University of Technology and the Central Queensland University.[9] The introduction of the CQU/AUT study says the Ministry's goal was to better target efforts to prevent or reduce the consequences of gambling.[10] CQU/AUT delivered its final report in May 2017. The Ministry of Health summarises the main findings of the CQU/AUT study:[11]

> *…the total burden of harms occurring to gamblers is greater than common health conditions (such as diabetes and arthritis) and approaches the level of anxiety and depressive disorders.*
>
> *Both qualitative and quantitative results suggest that this burden of harm is primarily due to damage to relationships, emotional/psychological distress, disruptions to work/study and financial impacts.*
>
> *The most critical result from the research is regarding absolute scale of harms from gambling to the New Zealand population. There was an estimated 161,928 years of life lost to disability as a result of harms from gambling in 2012.*
>
> *…the results suggested that at a population level the majority of harm is accruing to those who are not necessarily problem gamblers.*

The CQU/AUT study is in four phases[12] beginning with a review of the academic literature on gambling harm (p.11-14). The second phase of the study aims to "refine and expand" the definition of gambling-related harm, building on work from a prior study (p.55) and the literature review in phase one, to produce a taxonomy of harm that could be used in population surveys. CQU/AUT produced a list of gambling harms by consulting with gamblers and gambling treatment providers. CQU/AUT grouped these harms into eight categories: financial; relationship disruption, conflict or breakdown; emotional or psychological distress; decrements to health; cultural harm; reduced performance at work or study; criminal activity; and life course and intergenerational harms (p.115-128).[13] In the final step of this phase, CQU/AUT converts this list into a set of 83 specific potential harms arising from gambling grouped in six domains (p. 131) using a procedure that is largely unspecified.

The third phase of the study estimates the frequency of the 83 harms among gamblers and 'affected others', that is, people affected by the gambling of another person. Participants were selected on the basis that gambling had caused problems, no matter how minor, either because of their own gambling or the gambling of a person close to them.[14] A total of 1,524 people participated in the survey, which was conducted online.

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[9] Matthew Browne, Maria Bellringer, Nancy Greer, Komathi Kolandai-Matchett, Vijay Rawat, Erika Langham, Matthew Rockloff, Katie Palmer Du Preez, Max Abbott (2017), "Measuring the Burden of Gambling Harm in New Zealand," Wellington, May.

[10] CQU/AUT p.10.

[11] Key findings. Source: Ministry of Health web site https://www.health.govt.nz/publication/measuring-burden-gambling-harm-new-zealand (accessed 2 July 2019).

[12] We note CQU/AUT's description of the methods used is confusing and appears incomplete in places. The Ministry of Health refused our Official Information Act request for further information on methodology.

[13] CQU/AUT's definition of gambling harms is nothing if not inclusive. CQU/AUT counts as a gambling harm alleged biases in the distribution of gambling proceeds to community causes (pp. 75-76).

[14] CQU/AUT used the following wording to screen participants: "that the participant's own gambling had caused them problems, no matter how minor, or having had a close relationship with a person whose gambling had caused them problems, no matter how minor". The wording in the second half of the quoted sentence is ambiguous as to who the "them" in "caused them problems" is: the person gambling or the survey participant? It appears the answer is both. On p. 131 CQU/AUT says: "For affected others, the PGSI was completed 2nd hand, from the perspective of the affected person (e.g., 'At this time, did gambling cause the person any health

In addition to testing for the frequency of harms, participants were also assessed for the degree of gambling problems they suffered using a measure called the Problem Gambling Severity Index (PGSI). Having measured both the frequency of harms and problem severity, the study is able to see how the frequencies of each type of harm vary with the degree of problem gambling (p. 198).

In the fourth and final phase, CQU/AUT estimated the quality of life impacts of gambling per-person and in aggregate across the population. This final phase is in three parts. First, each of the 83 identified harms is graded for their decrement on life quality using online surveys. Participants were shown "vignettes" – short statements describing an identified gambling harm – and asked to indicate its effect on life quality using one of two health research methods, called Time Trade-off and Variable Analogue Scale.

Then, having obtained estimates of the life impact of each identified harm, and having estimated the frequency of identified harms relative to the severity of problem gambling in phase 3, CQU/AUT estimates the average per-person impact of gambling on life quality for low, medium and high-risk gamblers. CQU/AUT compares these per-person estimates of gambling harm on life quality with the effect of diseases using a study called the Global Burden of Disease.[15] The results of this comparison are shown in Figure 1. CQU/AUT found:[16]

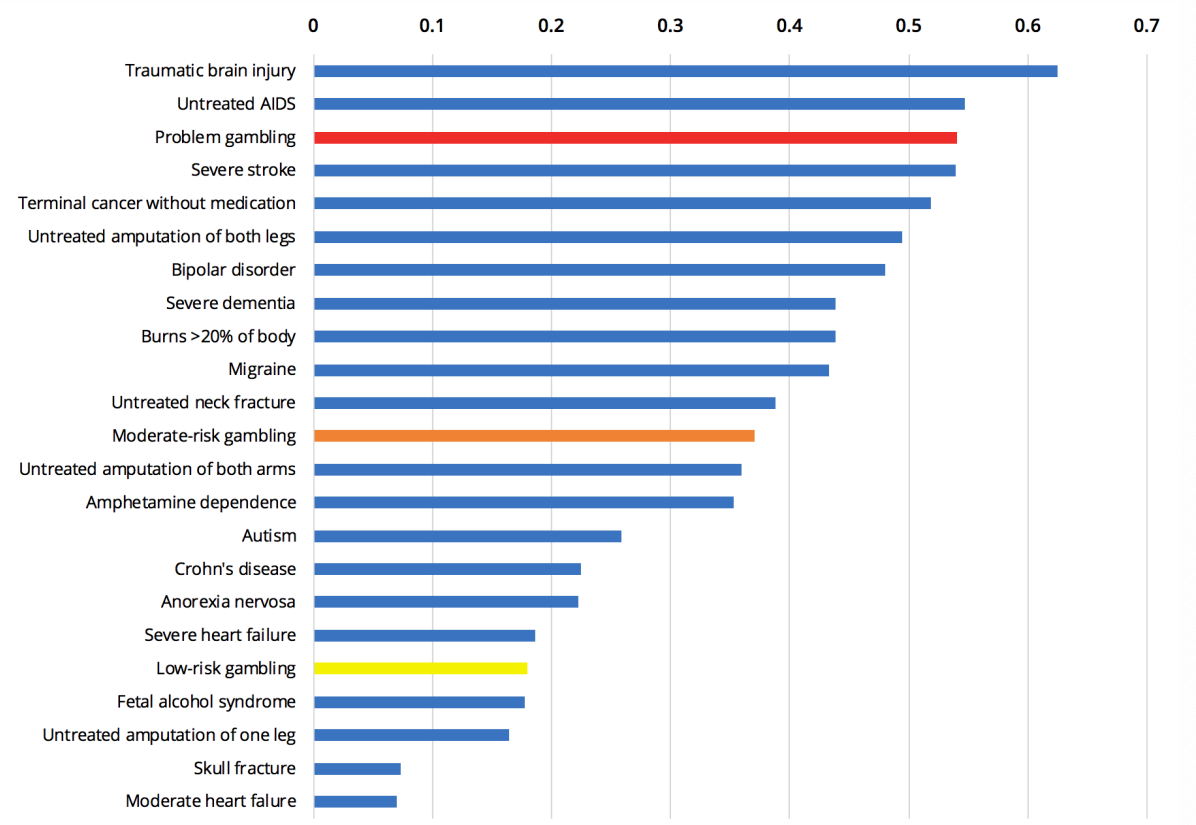
- low risk gambling is more detrimental to life quality than an untreated amputation of a leg;
- moderate risk gambling is worse than amphetamine dependence; and
- problem gambling is worse than terminal cancer or a severe stroke, and nearly as detrimental to life quality as untreated AIDS.

problems, including stress or anxiety?'). However, the harms were measured in both cases as a self-report from the person who experienced them (either gambler or affected other)." Our interpretation of this statement is that the "affected others" category combines two quite distinct sources of harm: a) the harms experienced by the survey participant as a result of another person's gambling; and b) the harms experienced by another person as a result of that other person's own gambling as reported by the survey participant. It is surprising the definition of "affected others" has been left unclear given that group contributes 60% of the aggregate harms from gambling estimated by CQU/AUT. If our interpretation of who counts as an "affected other" is correct, the results of the CQU/AUT study depend in part on reports of harms to other people, albeit someone with whom they are in a "close relationship". The inclusion of this type of evidence is rather surprising. Once again, we emphasise CQU/AUT's incomplete description of its methodology and the Ministry of Health's refusal to provide further information to us.

[15] Saloman (2012). Also see p.176-177 of the CQU/AUT study.

[16] We provide a wider range of results from the Global Burden of Disease Study 2010 study cited by CQU/AUT than was reported by CQU/AUT.

Figure 1: Estimated effects of gambling on life quality relative to other diseases



In the final step of its calculation, CQU/AUT calculates aggregate gambling harm by multiplying per-person estimates of gambling harm by the number of low, medium and high-risk gamblers in the population. CQU/AUT finds "gambling causes over twice the amount of harm than chronic conditions such as osteoarthritis (2.1x) and diabetes (2.5x)" (p.12).

CQU/AUT concluded its study by stating its findings are directly relevant for policy decisions (p. 199):

> *…**[the CQU/AUT study] provides an empirical basis for decisions** regarding an appropriate level of investment in public health measures to reduce gambling-related harm, harm reduction strategies, prevention, treatment and related services.*
>
> ***The results of this report make a potent argument for serious public investments from the government** into reducing the full extent of gambling-related harms, and provide important direction to guide where these efforts should be targeted. [**emphasis added**]*

2.2 How the CQU/AUT study has been used

The CQU/AUT study may well have achieved some influence in the two years since it was published. The study has been referred to in advice to Ministers on at least nine occasions including in a Cabinet paper, as well as in three other Government reports.[17]

[17] Ministry of Health (2019), "Response to your request for official information," 6 August. The three Government reports are: "Strategy to Prevent and Minimise Gambling Harm 2019/20-2021/22"; "Progress on Gambling Harm Reduction 2010 to 2017: Outcomes report – New Zealand Strategy to Prevent and Minimise Gambling Harm"; and "Gambling Harm Reduction Needs Assessment".

The CQU/AUT study has also been cited in support of policy action in numerous reports and studies. For example:

- Christchurch City Council's 2018 review of gambling and TAB venue policy referenced the CQU/AUT study in the Council's report on the social impacts of gambling in Christchurch. In particular that "gambling causes more ongoing harm than some chronic health conditions such as diabetes". [18]

- The Canterbury District Health Board references the CQU/AUT study in its submission opposing the Selwyn District Council Draft Gambling Venue Policy to increase availability of gambling machines using points such as: for gambling harm, "research suggests the majority of harm is experienced by those who are not necessarily problem gamblers" and "At a national level, the research found that gambling causes 2.5 times the amount of harm as a chronic condition like diabetes, and three times the amount of harm from drug use disorders".[19]

- The social impact assessment report for Whakatane's 2019 gambling policy review also cites the CQU/AUT study, stating that "A 2017 Ministry of Health study on the burden of gambling harm concluded that the largest proportion of the total harm resulting from gambling in New Zealand is associated with people who are not necessarily problem gamblers themselves".[20]

- Submissions on Waipa District Council's gambling policy also cite the CQU/AUT study. The Waikato District Health Board cites the study, in particular on the harm and public health effects from gambling, in its submission supporting more restrictions on gambling such as a "true sinking lid policy".[21] The Problem Gambling Foundation also cites the CQU/AUT study in its submission.[22]

- The Waikato District Health Board cited the CQU/AUT study's results of the potential harm of gambling in a submission to the Matamata-Piako District Council on the Gambling Venue and TAB Board Venue Policy Review 2019 to support its position of implementing a "true sinking lid policy".[23,24]

- In a recent review of gambling policy in the Wairarapa, the results of the CQU/AUT study including effects on employment and relationship breakdown were referenced to support the positions of the Wairarapa District Health Board.[25]

- The Problem Gambling Foundation also referred to the CQU/AUT study in its submission to the Hamilton City Council for its 2018 review on gambling policy. In particular, it outlined some of the findings of the study on the "burden of gambling harm".[26]

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[18] 27 September 2018. Source: https://christchurch.infocouncil.biz/Open/2018/09/CNCL_20180927_MIN_2367_AT.PDF

[19] 27 June 2018. Source: https://www.cph.co.nz/wp-content/uploads/SDCGamblingVenuePolicySubmission.pdf

[20] 2019. The CQU/AUT study is incorrectly attributed to the Ministry of Health in the report. Source: https://www.whakatane.govt.nz/sites/www.whakatane.govt.nz/files/documents/contact-us/have-your-say/Gambling%20Policy%20Review%202019%20-%20Draft%20Social%20Impact%20Assessment%202019.pdf

[21] A sinking lid policy is used to reduce the number of venues and machines. In practice it generally means that no new venues can be established and no venues can increase the number of gaming machines they operate.

[22] June 2019. Source: https://www.waipadc.govt.nz/AgendasAndMinutes/Strategic%20Planning%20and%20Policy%20Agenda%20-%20Report%20Appendix%20-%20Original%20Submissions%20Gambling%20Policy%20-%202%20July%202019.pdf

[23] 15 May 2019. Source: https://www.mpdc.govt.nz/pdf/CouncilDocuments/MinutesAndAgendas/Council/Minutes/15May2019MinutesCouncil.pdf

[24] A sinking lid policy is used to reduce the number of venues and machines. In practice it generally means that no new venues can be established and no venues can increase the number of gaming machines they operate.

[25] 15 May 2019. Source: http://www.rph.org.nz/resources/submissions/2019-05jointrph-wdhbsubmission-wairarapaclass4gambling.pdf

[26] February/March 2018. Source: https://haveyoursay.hamilton.govt.nz/strategy-research/proposed-class-4-gambling-venue-policy/consultation/view_respondent?_b_index=60&uuId=448783776

- In a May 2019 submission to the Gambling Commission opposing an application by SkyCity, the Ministry of Health cited the CQU/AUT study, stating the "harm experienced through high-risk gambling behaviour is of the same order of magnitude as high alcohol consumption and other health issues such [as] anxiety and depression."[27]

- The Wanganui District Council referenced the CQU/AUT study in a social impact assessment for gambling venue policy. It appears that the study was used to inform the final policy decision.[28]

- The Ministry of Health's report "Strategy to Prevent and Minimise Gambling Harm 2019/20 to 2021/22" references the CQU/AUT study. Key findings of the CQU/AUT study, such as the total impact of gambling on health-related quality of life years being greater than diabetes or arthritis, are cited. The Ministry's report states the CQU/AUT finding that almost half of the aggregate harm occurs with low risk gamblers is important.[29]

2.3 What we have been asked to do

The Gaming Machine Association of New Zealand has commissioned TDB to conduct a rigorous, balanced and comprehensive assessment of the CQU/AUT study using orthodox economic tools. Our goal is to test whether the CQU/AUT study is fit for purpose for use in policy and regulatory decision making. Our approach is to consider whether the methods used by CQU and AUT are capable of producing informative results in policy and regulatory decisions, and whether the application of those methods has been reasonable and competent. This review aims to assist decision makers, stakeholders and the New Zealand public in determining the weight they should place on the findings of the CQU/AUT study in decision making.

2.4 What this review is not about

This report says policy should be informed by both costs and benefits, an orthodox position that the authors of the CQU/AUT study appear to agree with (p. 197). The CQU/AUT study cannot determine policy because its conclusions and recommendations are based on costs only.

This review does not go beyond these fundamental points. We have not prepared a full cost-benefit analysis of gambling. We do not speculate on what that analysis would find. We take no position for, or against, further gambling regulation. This review is not based on any philosophical position for, or against, government interventions in gambling. We do not doubt that gambling is associated with or causes harm. This review does not raise questions about the burden of disease method itself, only with its improper use in social policy.

Throughout this report references to benefits means *gross*, not net, benefits (where net benefits are gross benefits less gross costs). Like virtually any human activity, gambling can deliver consumer benefits such as enjoyment, social interaction, and mental stimulation, while at the same time also lead to costs including harms. References to costs should be interpreted in the widest sense to include detrimental effects on a person's wellbeing including harms, as well as financial losses. Recognising gross benefits alongside gross costs does not entail any presumption of perfect rationality or perfect information among consumers, nor does it imply any view on whether costs net of benefits are positive or negative. The inclusion of gross

[27] Ministry of Health (2019), "Application by SKYCITY to substitute gaming machines for gaming tables at the Hamilton casino," email by the Gambling Commission, 16 May. Released under the Official Information Act.

[28] The AUT/CQU study is mentioned on pages 20,21,22,23 and 25 of the Social Impact Study: https://www.whanganui.govt.nz/our-district/have-your-say/past-consultations/proposed-gambling-venues-policy/Documents/3.pdf . Refer also the final policy at https://www.whanganui.govt.nz/our-council/publications/policies/Documents/Gambling%20Venue%20Policy%202018%20FINAL%201.pdf

[29] Refer to page 7 of the report available at: https://www.health.govt.nz/system/files/documents/publications/hp7137-strategy-minimise-gambling-harm-jun19.pdf

benefits does not depend on any kind of philosophical position on consumer sovereignty or the role of government (see CQU/AUT p.18). The case for including benefits is simply that policy be decided on all of its effects.

Some may dismiss this report solely because it is commissioned by the affected industry. However, at issue is a wider concern with the integrity of public policy that goes beyond gambling. For any matter, the case for policy must be made on its merits, tested rather than assumed. If one-sided analysis is allowed to justify regulation, policy ceases to be subject to any kind of effectiveness test and risks doing more harm than good.

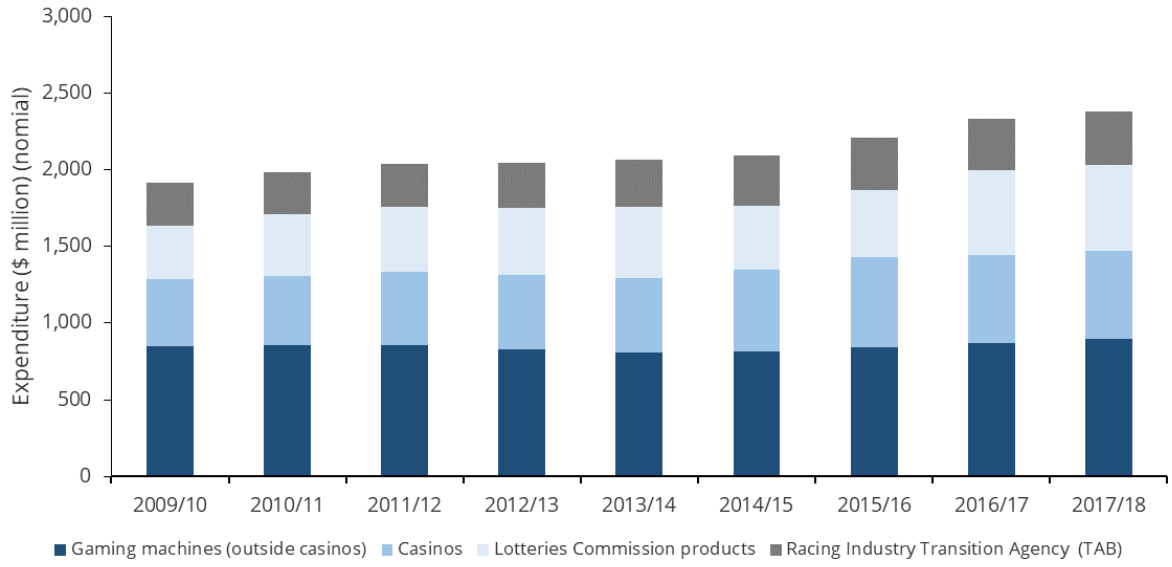
3. Gambling in New Zealand

The CQU/AUT study's conclusions and recommendations in favour of further policy action are made without any reference to or apparent awareness of existing gambling harm protections in regulation and legislation, or to the gambling-related responsibilities of various public agencies. This context is relevant to any case for policy, since the benefits of further action will be affected by existing policy and regulatory settings.[30]

This section provides a brief overview of gambling in New Zealand. We describe the mix of gambling activity in New Zealand, provide an overview of the current legislative and regulatory framework, and summarise existing harm prevention measures.

There are four main areas of measured gambling expenditure in New Zealand (Figure 2). These are, in order of expenditure: gaming machines, casinos, lotteries (run by the New Zealand Lotteries Commission (Lotto NZ)) and sports and racing betting (run by the Racing Industry Transition Agency). In addition, there is offshore online gambling which is difficult to measure and is not captured in the figures below.[31]

Figure 2: Gambling expenditure (nominal $ million) [32]



Source: The Department of Internal Affairs

The two main pieces of legislation governing gambling in New Zealand are:

1. the Gambling Act, 2003 which regulates gaming machines, lotteries and casinos; establishes the four gambling classes[33] as well as separate classes for casinos and the New Zealand Lotteries

[30] BERL (2009) applied a 50% discount to its estimate of alcohol harm to account for the effects of existing policies on the incremental benefits of additional policies.

[31] At present, Lotto NZ and the TAB are the only New Zealand organisations permitted to offer online gambling and it is illegal for overseas online gambling operators to advertise to New Zealanders. Betting online by New Zealanders with operators based offshore (eg, casino websites and sports-betting apps) is legal. When announcing a review of the online gambling regime in June 2019, the Internal Affairs Minister, Tracy Martin, stated that New Zealanders have spent about $380 million on offshore gambling sites in the last 18 months. https://www.beehive.govt.nz/release/check-online-gambling-regime

[32] "Gambling expenditure" is the net expenditure of gamblers, where net expenditure equals total bet less total winnings.

[33] Class 1 gambling covers gambling where the prize value is at most $500. Class 2 gambling covers gambling where the prize value is at most $5000. Class 3 gambling covers gambling where the prize value is greater than $5000. Class 4 gambling covers gaming machines outside casinos.

Commission; and governs licensing and the distribution of proceeds. The Act also covers private gambling, and prohibits online gambling except through the TAB or Lotto NZ; and

2. the Racing Act, 2003 establishes the Racing Industry Transition Agency (formerly the New Zealand Racing Board until the Racing Reform Act, 2019 was passed) as the monopoly provider of racing and sports betting in New Zealand and governs the distribution of proceeds.[34]

The Department of Internal Affairs (DIA) is responsible for administering gambling legislation, licencing gambling activities and compliance. Among other things, the Gambling Commission is responsible for casino licensing applications and appeals, as well as appeals from gambling machine operators in respect of DIA licensing decisions. Under the Gambling Act, the Ministry of Health is responsible for developing an 'integrated problem gambling strategy focused on public health'.

The Gambling Act and a wider regulatory framework govern the structural requirements and set rules for distributions by gambling operators. Class 2, 3 and 4 gambling, which includes non-casino gaming machines (NCGMs), must be provided by not-for-profit societies, although gaming machines may be provided by a commercial operator on behalf of a society. A portion of the gross proceeds from gambling must be distributed to an "authorised purpose", which in the Act means charity or non-commercial activities benefitting the community.[35] Applicants for operator licenses for class 3 (total prize money exceeds $5,000) and class 4 (NCGMs) gambling must state the authorised purposes to which the proceeds will be applied or distributed.

Corporate societies that conduct class 4 gambling must apply or distribute to authorised purposes all net proceeds[36], where the net proceeds must represent at least 40% of generated gross proceeds.[37,38] Around a quarter of gross proceeds are spent on government fees, licencing and levies. Where machines are sited in non-club (commercial) venues, payments to the venues are capped at 1.28% of weekly turnover with an annual cap of 16% of gross proceeds. Each of the four gambling classes fund the Problem Gambling Levy, as discussed below.

New Zealand has six casinos. Section 10 of the Gambling Act provides that no new casino venue licences may be granted. Casinos are for-profit, private entities which can offer a variety of gambling activities including gaming machines. Casinos must hold an operator license and a venue license. Casinos are not required to distribute net proceeds to an authorised purpose. However, the Gambling Act requires casino venue licenses not be renewed unless, among other things, the Gambling Commission is satisfied that "renewing the licence will result in a net benefit to the local and regional communities… and to New Zealand generally." As a result, casinos have charitable wings to assist in meeting this test. Casinos also pay a 4% duty on casino net proceeds.

[34] The Racing Act also authorises racing clubs to run equalisator betting.

[35] Section 4 of the Gambling Act defines "authorised purposes" as a charitable or non-commercial purpose, purposes covered by the Racing Act 2003, and election to public office (classes 1-3 only).

[36] Net proceeds are calculated as the sum of turnover from gaming machines, less prizes, plus gains from interest or the sale of assets, less the costs of conducting the gambling operation, including government fees, levies and duties, machine costs and payment to venues.

[37] Gambling (Class 4 Net Proceeds) Regulations 2004, section 10. Available from: http://www.legislation.govt.nz/regulation/public/2004/0365/latest/DLM294044.html Also see Department of Internal Affairs (2016), "Guide: Pokies in New Zealand,", October, p. 4. Available from https://www.dia.govt.nz/diawebsite.nsf/Files/Pokie-system-101-untracked/$file/Pokie-system-101-untracked.pdf

[38] The outcome of each wager can be broken down into the Return to Player (RTP), the player's share, and the Hold or gross proceeds, the provider's share.

The New Zealand Lotteries Commission, a Crown entity, operates New Zealand lotteries including Lotto, Powerball and Instant Kiwi. Profits of the Lotteries Commission are distributed by the New Zealand Lottery Grants Board to cultural and sporting agencies and to other community recipients.[39]

The Gambling Act also regulates private gambling, defined as gambling which occurs at a private residence primarily for entertainment. The Act sets various rules for private gambling, including: all stakes must be distributed to winners; players must have an equal chance of winning; and no entry fee or host renumeration is permitted.

The Racing Industry Transition Agency, which recently replaced the New Zealand Racing Board, is a statutory monopoly responsible for all racing and sports betting in New Zealand. Sports and racing betting are conducted by the TAB. TAB venues are permitted to operate gaming machines. Profits from racing and sports betting are distributed to the racing industry while profits from TAB gaming machines are distributed to amateur sports organisations.

Distributions from gambling to community and charitable activities are significant as are annual payments to the government through taxes, duties and the Problem Gaming Levy. On top of this, the industry supports local employment and business growth. A report to the Ministry of Health by Sapere (2018) says "there is little doubt about the community benefits associated with funding of the charitable sector from gambling".[40]

3.1.1 Problem gambling and current protections against gambling harm

The Gambling Act 2003 defines a problem gambler as "a person whose gambling causes harm or may cause harm".[41] Harm is defined as "distress of any kind arising from, or caused or exacerbated by, a person's gambling" to the person, the person's family, whānau, workplace, or society.[42] The Ministry of Health publishes statistics on the number of people who received at least one intervention for gambling, categorised by the type of gambling that primarily caused the harm.[43]

[39] Further information on lottery grants is available from: https://www.communitymatters.govt.nz/lottery-grants-board/

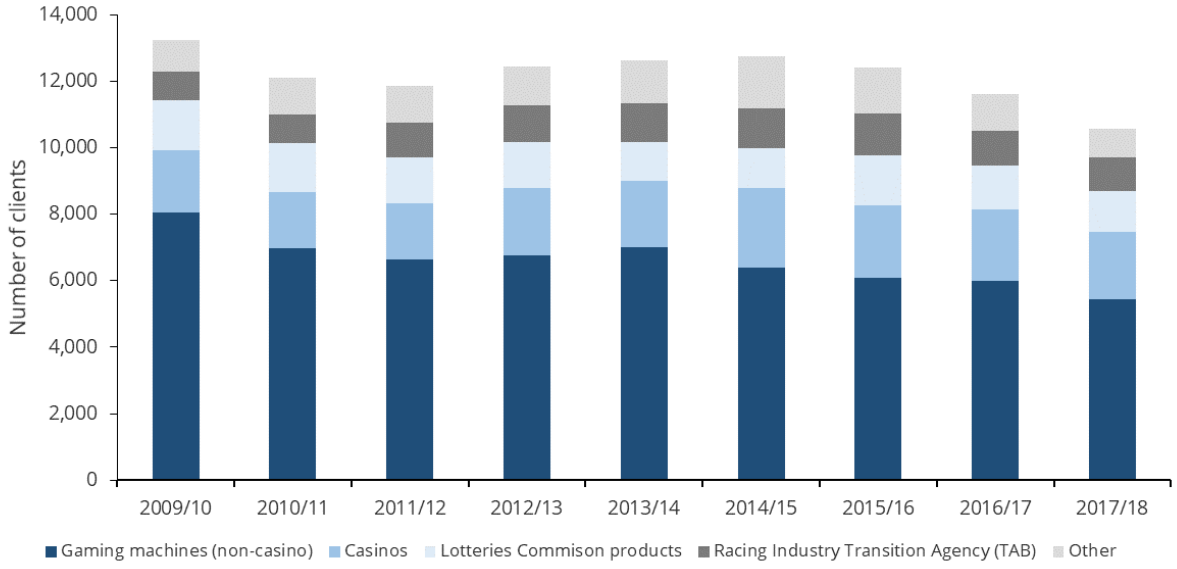
[40] Sapere (2018) estimates $654 million was distributed to community purposes in 2015/16 on gambling expenditure of $2.2 billion.

[41] Gambling Act, 2003 section 4.

[42] Ibid.

[43] Interventions: people who have received problem gambling treatment services and have identified to the service provider the primary type of gambling causing them harm.

Figure 3: Problem gambling in New Zealand 2010-2018



Source: Ministry of Health "Clients Assisted by Primary Problem Gambling Mode," Table 11, available from https://www.health.govt.nz/our-work/mental-health-and-addictions/gambling/service-user-data/intervention-client-data

Figure 3 shows the number of clients who received at least one intervention from a service provider in a given year, who identified to that service provider the primary mode of gambling that caused that person harm. Data counts people who have received support for their own or for someone else's gambling. The Ministry of Health's data shows that about 0.3% of New Zealand adults (18 years and over) received at least one gambling intervention in 2017/18. Between 2010 and 2018, the per-capita rate of adults experiencing gambling harm fell by 26%.[44] The distribution of problem gambling clients across these gambling types shown in Figure 3 is broadly similar to the distribution of gambling expenditure across these types.

New Zealand has a range of existing protections against harm.[45] Part 4 of the Gambling Act 2003 covers problem gambling and harm prevention. Measures for preventing harm include: age restrictions; operators are prohibited from allowing under-age persons to participate in gambling; gaming machine venues and casinos must have a policy for identifying problem gamblers, and must issue an exclusion order to anyone who self-identifies as a problem gambler; licensing requires the applicant to state how they will minimise problem gambling, and the licenses must not be granted unless the DIA is satisfied the applicant will minimise problem gambling. The Act also requires the development of a problem gambling strategy. The first two purpose statements in the Gambling Act are to "control the growth of gambling… and prevent and minimise harm from gambling, including problem gambling" (section 3).

Measures in the Gambling (Harm Prevention and Minimisation) regulations include:

- ATMs are not allowed in gambling areas of venues;
- restrictions on venue types; maximum stakes and prize limits;
- an automated interruption on gaming machines after 30 minutes of play which displays information including time played and money gained/lost;

[44] The Ministry of Health says "these static rates [of reported gambling interventions] belie the fact that the actual number of people affected by problem gambling is increasing in line with population growth, and intervention services are not keeping up." The Ministry mentions static gambling prevalence rates without citation. See Ministry of Health (2018), pp. 33, 36.

[45] A list of harm prevention measures is available from DIA: https://www.dia.govt.nz/diawebsite.nsf/Files/Gambling-Fact-Sheets-Aug2015/$file/FactSheet6-August2015.pdf

- required awareness training for staff; and
- requirements to make information about problem gambling available to patrons.

Venues may issue exclusion orders to patrons. Gamblers can also request for themselves to be given multi-venue exclusion orders. Venues with gaming machines have a legal duty to minimise gambling harm and have certain responsibilities to keep gamblers safe.

The Act also provides for the Problem Gambling Levy with a goal of minimising harm from gambling (sections 317-324). Each of the four main sources of gambling expenditure pay the levy.[46] The Ministry of Health, which is tasked under the Gambling Act 2003 with implementing a problem gambling strategy, uses these funds for problem gambling services, public health measures, and research.[47] Services include the Gambling Helpline alongside specific gambling helplines for Maori, Pasifika, youth and Asians. Public health services and intervention centres are located across the country. It is expected the levy will raise more than $60 million over the next three years, about $1,800 per problem gambler per year.[48] Over that period, the Ministry of Health will spend $20.5 million on public health initiatives "to educate about the signs and risks of harmful gambling, in order to effect positive behavioural change".[49] The levy also supports the Problem Gambling Foundation which provides advice and counselling services.[50]

Other measures include:

- the Health Promotion Agency (HPA) works on minimising gambling harm, including its Choice Not Chance initiative;
- the Gambling Harm Awareness Week, organised each year since 2016 by the HPA;[51] and
- the Department of Internal Affairs provision of public information and education on gambling harm and minimisation.[52]

In conclusion, this chapter has provided the legislative and policy context that is missing from CQU/AUT's analysis. Its absence should have prevented CQU/AUT from making any recommendation for (or against) further policy action on gambling, as such a context is necessary to understand what policy gains have been exhausted under existing settings. The failure to account for existing policy means no weight should be placed on CQU/AUT recommendations.

In addition, this chapter has shown that gambling's benefits include significant annual distributions to clubs and charities across New Zealand contributions to small businesses, and to government revenues.

In the next chapter we show the analysis and conclusions of the CQU/AUT study take no account of these distributions, or any other (gross) benefits of gambling such as enjoyment. These are major omissions that mean the CQU/AUT study is incapable of making any case for or against further policy.

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[46] In June 2019, the Minister of Internal Affairs announced Problem Gambling Levy rates from July 2019. The rates are: gaming machine operators (0.78% of player expenditure); casinos (0.56% of player expenditure); NZ Lotteries Commission (0.43% of player expenditure); and New Zealand Racing Board (0.52% of player expenditure).

[47] See Ministry of Health (2019), "Stage 2 Cost Recovery Impact Statement," July. Available from https://treasury.govt.nz/sites/default/files/2019-07/ria-moh-cri-jul19.pdf

[48] Ministry of Health (2019a), p. 6.

[49] Ibid, p. 8.

[50] See https://www.pgf.nz/

[51] See https://www.hpa.org.nz/programme/minimising-gambling-harm, and New Zealand Government (2016), "Families the focus of Gambling Harm Awareness Week," press release, 5 September, available from https://www.beehive.govt.nz/release/families-focus-gambling-harm-awareness-week

[52] See https://www.dia.govt.nz/Gambling

4. Review of the methodology and analysis used to assess gambling

Our task in this review is to consider whether the methodology and analysis of the CQU/AUT study is capable of supporting its conclusions and recommendations. CQU/AUT supports further policy action and re-targeting of policy towards low-risk gamblers. These recommendations are based on the findings from CQU/AUT's quantitative analysis.

We conclude CQU/AUT's one-sided approach which considers costs but not benefits is incapable of supporting any recommendation for or against further policy. Moreover, we find CQU/AUT's analysis is compromised by other biases, technical deficiencies and inadequate reporting to such an extent that in our opinion no part of CQU/AUT quantitative findings should be relied upon. This chapter summarises the problems uncovered by our review. Our review of the CQU/AUT study was made without the assistance of the Ministry of Health, which refused our request for further information on the study's methods and calculations.

4.1 The three major biases

4.1.1 Study considers costs but not benefits

A basic principle of policy analysis is that policies are evaluated on their incremental costs and benefits, that is, the additional costs and benefits caused by a policy. This is a principle that is applied nearly universally in the analysis of public policy.[53]

The CQU/AUT study violates this principle in its analysis of gambling, an activity that has both costs and benefits, by only considering costs. One-sided analysis may be appropriate for issues which have no benefits, disease for example, or where the scope of a policy isolates costs and leaves benefits unaffected. However, neither of these special cases apply to the CQU/AUT study. By CQU/AUT's own admission, gambling has benefits, benefits offset costs, and benefits are relevant to policy (pp. 197, 199): [54]

> *this knowledge of harms from gambling can be weighed against the recreational and social benefits of gambling, to determine appropriate policy, regulation, prevention initiatives, and treatment… [The] social cost of gambling is offset by benefits in terms of entertainment, industry and government revenue.*

The case for policy must take both costs and benefits into account. Basing policy on the one-sided analysis of a two-sided issue like gambling risks policy overreaching or policy being mistargeted, and with these comes the potential to exacerbate rather than reduce consumer harms.

The one-sided nature of the CQU/AUT study is clearly illustrated by the poster used for recruitment of survey participants (Figure 4). Survey questions reproduced in the Appendix similarly show an exclusive focus on gambling's costs including harms. However small the harm, it was counted. However great the benefits, it was ignored. This is no way to make public policy.

[53] See for example Treasury (2015), and Department of Prime Minister and Cabinet (2017). The review of gambling by the Australian Productivity Commission (2010) evaluated policy options on a cost-benefit basis.

[54] CQU/AUT also acknowledges the existence of gambling benefits at pages 21-23, 44-45, 67 and 86.

Figure 4: Recruitment poster used in the CQU/AUT study

Source: CQU/AUT

That gambling has benefits and these are relevant to policy is not controversial in the academic literature. Korn and Shaffer (1999), a paper cited eight times by CQU/AUT and referred to as seminal by co-authors of the CQU/AUT study in another paper,[55] provides a list of gambling's potential benefits including connectedness, mental health, and community benefits:

> *…there are potential health benefits for both the individual and the community that gambling may stimulate… the possibility of "healthy" gambling may help to explain the attraction of gambling, since people in general are inclined to make healthy adaptations in their lives.*
>
> *…gambling can provide a sense of connectedness and socialization through discretionary leisure time entertainment. Like going to a movie, being at a pub or participating in physical activity, going to a casino or horse race may provide a healthy change and respite from the demands of everyday life or social isolation.*
>
> *This may be particularly important for older adults. Gambling can be viewed as a form of adult play (Smith & Abt, 1984). While scientists have long recognized the importance of play for the healthy development of children (Weiss, 1995), play also may be particularly important for adults (Ackerman, 1999; Driver, Brown, & Peterson, 1991; Kelly, 1982). …In addition to providing fun and excitement, some forms of gambling can enhance coping strategies by building skills and competencies such as memory enhancement, problem solving through game tactics, mathematical proficiency, concentration and hand to eye physical coordination.*

[55] Browne et al (2016) p. 8.

> *Perhaps best illustrated by lottery play, many gamblers have a sense of hopefulness that they can "beat the odds" over time and acquire fabulous new wealth. Although the probabilities of winning are extremely unfavorable, players are engaged and reinforced at the possibility of winning by regularly seeing real people like themselves in the media who win.*
>
> *The mental health literature demonstrates that physical activity such as cycling, jogging, yoga, fencing or weight lifting can reduce stress, anxiety and depression (Benson, 1984; Hays, 1999; Martinsen, 1990; Raglin, 1997). We hypothesize that some individuals may derive similar effects from certain forms of gambling—though we cannot yet predict which people will benefit and which will not. Like exercise, certain gambling activities through recreational diversion may be associated with the ability to manage stress, which can affect a person's vulnerability to disease.*
>
> *Health benefits can accrue to communities through gambling-related economic development. Empirical data from population health studies demonstrates a direct relationship between income, employment and health status, as described earlier in the article. Local communities, particularly those with economic problems, can gain significant economic benefit through gambling (National Research Council, 1999). Casinos, for example, can act as a community catalyst for economic development. The benefits generally include the creation of jobs in the gaming industry, and stimulus to other sectors such as tourism and hospitality… Where charity gaming exists, for example bingo, gambling-generated monies can go directly to support local non-profit and charitable organizations in areas such as education, environment, and youth sport organizations. This additional source of revenue can strengthen community capacity by enhancing the health, social service, recreational and cultural infrastructure. Importantly, gaming generates revenue for state, provincial and municipal governments, which can mitigate the pressure to raise funds through increased taxation.*

The Department of Internal Affairs also recognises both benefits and adverse effects of gambling:[56]

> *Gambling can be a harmless entertainment activity from which people derive personal enjoyment and which provides other positive social effects. The proceeds from non-commercial gambling provide significant funding for a wide variety of community purposes. If well directed, these funds can enhance empowerment, participation and the quality of life across all types of communities. However, gambling also has adverse effects on many individuals, their families and their communities.*

The Australian Productivity Commission (2010) explained why policy requires both costs and benefits of gambling be recognised if policy is to be well-targeted and avoid doing more harm than good:

> *Like most other industries, the real benefits of the gambling industry depend on the extent to which consumers enjoy its products. Gambling is enjoyable for most, but harms some people. The majority of people gamble with enjoyment and without harm, and many gambling forms are benign. As the Australasian Gaming Council puts it, gambling can be just part of a 'cheerful night out'. Leaving aside the externalities associated with gambling, the net benefits consumers derive from gambling are the difference between what consumers pay and the enjoyment they get from gambling. Economists refer to this net welfare gain as "consumer surplus". That value is likely to amount to many millions of dollars — and* ***a major challenge for policy is to avoid putting it at risk through poorly targeted regulatory measures.***

[56] Source: https://www.dia.govt.nz/diawebsite.nsf/wpg_URL/Services-Casino-and-Non-Casino-Gaming-Problem-Gambling-in-New-Zealand-A-Brief-Summary

> *The benefits society derives from the profits suppliers of gambling activities make over and above the costs (including the cost of capital) that suppliers incur. Economists refer to this net welfare gain as "producer surplus". The profits arising from gambling are used to pay taxes and levies and can include distributions to sports and other community activities. The social contributions made by suppliers of gambling activities to sports clubs and other community activities are highly valued by many in society. [**emphasis added**]*

The decision to count costs but exclude all benefits from CQU/AUT's analysis is almost certainly decisive for its findings. One of the more striking results of the CQU/AUT study is that the aggregate harms of gambling are greatest among low-risk gamblers, a finding that leads CQU/AUT to recommend policy is retargeted away from problem gambling (p.195):

> *…even allowing for a wide margin of error in estimating the relative harm caused to the low-risk group, the clear conclusion would be that they contribute the majority of gambling-related harm. Our study shows that attention should not just be focused on problem gamblers but to all people affected by gambling harms.*

Two of the authors of the CQU/AUT study have recently called this finding "somewhat controversial" (Browne et. al. 2019), in a paper that considers gambling benefits to consumers, Brown et. al. 2019 reveal the dramatic impact the benefits of gambling can have on findings when they are recognised alongside costs. On the wellbeing effects of low and moderate-risk gambling, Browne et. al. 2019 finds:[57, 58]

> *Both studies… provide a consistent picture suggesting that gambling consumption, in the absence of—or controlling for—gambling problems, showed a **positive** association with personal wellbeing. These results also remained consistent after controlling for the effects of age, gender, marital status, education, employment, and income. [**emphasis added**]*

In other words, benefits are important, which raises doubts about CQU/AUT's findings that aggregate gamblers' harms are greatest for low-risk gamblers and low-risk gambling is more detrimental to life quality than the untreated amputation of a limb. It is not clear these findings by CQU/AUT would survive the introduction of benefits into the analysis.

The effects of the decision to exclude benefits are exacerbated by the absence of any minimum threshold in the CQU/AUT study. In BERL (2009), a burden of harm study also commissioned by the Ministry of Health but directed at alcohol consumption, costs associated with alcohol consumption below a threshold of 1.8 standard drinks per day were excluded from BERL's analysis on the grounds that such costs were likely justified by consumer benefits, including health benefits. Without any equivalent threshold in the CQU/AUT study, benefits are ignored entirely and all gambling harm, however small, is counted. The lack of a threshold in the CQU/AUT study is surprising given the authors expressly acknowledge gambling can occur at safe levels:

[57] Browne et al (2019) concludes, "[n]evertheless, the deleterious effect of gambling problems on wellbeing was larger than the effect of consumption."

[58] Browne et al (2019) concludes, "[g]ambling generates only small or negative net consumer surpluses". This conclusion, in contrast to the large consumer losses reported by CQU/AUT, tends to confirm the significant impact that the inclusion of benefits alongside costs would have for the findings of the CQU/AUT study. The CQU/AUT study's conclusion in favour of public policy targeting low and moderate-risk gambling is likely, if not almost certainly, the product of the study's decision to count costs but not benefits.

> *The New Zealand definition of problem gambling considers gambling behaviour to be problematic when it generates or exacerbates experiences of harm.* ***Implicit within this definition is the assumption that gambling can occur at a safe level.*** *Gambling is, therefore, often compared with other public health issues such as alcohol consumption or exposure to the sun (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999) where safe levels can be identified, and where there is a clear risk of harm occurring due to over-consumption/exposure (p.20).*
>
> *As mentioned throughout this review,* ***gambling is conceptually most similar to alcohol as there are deemed to be safe levels of consumption*** *(p. 53) [****emphasis added****].*[59]

Inconsistencies like this between CQU/AUT's qualitative statements on a matter and their treatment of that matter in analysis is something of a theme in the CQU/AUT study, an issue we will return to later.

CQU/AUT never reconciles its statements that gambling has benefits and these benefits are relevant to policy with its willingness to recommend further policy based on an analysis only of costs. Presumably, benefits are not considered because the study's terms of reference precluded it. Whatever questions of professional responsibility and ethics this raises, that approach has no policy value and a strong potential to be misleading.

In conclusion, the decision by the Ministry of Health and CQU/AUT to count costs but exclude gross benefits is a fundamental departure from established practices for policy analysis that makes the conclusions and recommendations of the CQU/AUT study unreliable for policy makers. The approach taken by Australian Productivity Commission (2010) in its analysis of gambling reflects the standard treatment of costs and benefits in policy analysis. Recognising the full effects of policy allows policy to be calibrated and targeted to achieve the greatest overall benefits for consumers. CQU/AUT's findings that gambling has costs is simply the inevitable conclusion of a one-sided analysis, and is therefore trivial. Other work by co-authors of the CQU/AUT study strongly suggests the conclusions of the CQU/AUT study would be materially changed and possibly reversed by the inclusion of gambling's benefits alongside costs. CQU/AUT expressly acknowledges gambling has benefits and these are relevant to policy. Thus by their own admission, CQU/AUT's analysis excludes important information. CQU/AUT's conclusions are therefore unreliable and its recommendations should be given no weight by decision makers.

4.1.2 Study attributes 100% of harms to gambling, none to associated behaviours

This review has also uncovered serious problems in CQU/AUT's execution of its one-sided approach, meaning the CQU/AUT study should not be considered reliable. Among the more important of these problems is CQU/AUT's treatment of attribution, which directly affects the quantitative findings and conclusions of the CQU/AUT study.

The academic literature establishes gambling does not occur in isolation but is associated with harmful behaviours and outcomes called "comorbidities". Gambling comorbidities receive extensive coverage by CQU/AUT (pp. 25-28) who find gambling comorbidities include social impairment, age-related health impairments, physical health, mental health including depression, psychological disorders, suicide and suicidal ideation, and anxiety, tobacco use, cannabis use, sedentary behaviour, employment, income, family, neighbourhood, social cohesion, financial problems, and other addictions.[60] To its credit, CQU/AUT is careful to emphasise association does not imply causation when discussing comorbidities. The problem raised by comorbidities and which attribution aims to solve is to identify the share of harms experienced by a person that can be assigned to the behaviour in question, in this case gambling, versus other

[59] However, CQU/AUT seems to take the opposite view at p. 197: "Our results suggest that, like alcohol, gambling generates significant harms to individuals below the threshold of clinical addiction." Perhaps the statements quoted in the main text refer to net harms whereas the text quoted in this footnote refers to gross harms.
[60] CQU/AUT says gambling is associated with harmful behaviours at pp. 18, 21, 25-28, 34, 44, 52, 103, 180, 196.

comorbidities. This assignment is important in policy decisions because the case for gambling policy depends on the harms that can be attributed to gambling.

Having comprehensively established gambling's comorbidities in its qualitative assessment, and having criticised approaches to the assessment of gambling harm that ignore comorbidities (p.18), we were surprised to discover the CQU/AUT study had only limited treatment of attribution. This check was in the wording of survey questions in phase 3. CQU/AUT provides an example of phase 3 survey wording at p. 131:

> *At this time, did gambling cause you any health problems, including stress or anxiety?*

This is not a trivial check for attribution, in our view. Beyond this, however, CQU/AUT does not adjust its calculations to allow for the attribution of harms to any comorbidities.[61] Where harm was found, CQU/AUT attributed all of that harm to gambling, and none to the long list of harmful behaviours CQU/AUT identifies is associated with gambling.

CQU/AUT's explains this treatment of comorbidities at p.180:

> *The present study… makes not [sic] adjustment for comorbidities due to the difficulty of implementing such an adjustment for gambling-related harm… estimates will be somewhat inflated*

We acknowledge the difficulties of attribution. However, even when gambling causes harms it does not do so in isolation. In our view, CQU/AUT's decision to make no adjustment to its calculations for comorbidities is neither reasonable or conservative. In effect, CQU/AUT has chosen the largest possible attribution to gambling. On this hangs the conclusions of the study, since CQU/AUT's treatment of attribution directly affects its quantitative findings. A more reasonable treatment of attribution may have produced a far smaller burden of gambling harm.[62]

It is worth noting a contrasting view of attribution of gambling *benefits* by two of the co-authors of the CQU/AUT study in Browne et. al. (2019). Here the co-authors of the CQU/AUT study are more willing to attribute less than 100% of benefits to gambling:

> *…'third variables'… may positively influence both gambling consumption and wellbeing. Individuals who consume gambling products may tend to have more financial and social resources, better general health, or possess more outgoing, hedonic traits. These properties would also tend to result in higher self-reported wellbeing… Future research should aim to…* ***estimate what fraction of the [positive wellbeing effect] is directly attributable to gambling****. [****emphasis added****]*

We agree, but for the sake of consistency suggest the authors consider similar and more reasonable treatment of attribution of gambling's costs.

In summary, attribution is complex but CQU/AUT has chosen to treat it with only limited checks in the wording of its survey questions and makes no adjustment in its calculations. This is neither reasonable nor conservative. This one-sided treatment of attribution directly affects the study's quantitative findings. The conclusions of the CQU/AUT study hang on this rather arbitrary and biased treatment of attribution.

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[61] This is acknowledged by CQU/AUT at p. 199: "the present method did not apply discounting due to comorbidities among conditions." At p.184 CQU/AUT acknowledge another source of uncorrected comorbidity.

[62] Depending on how attribution is treated for "affected others". It is not clear whether affected others also suffer comorbidities.

4.1.3 Study treats causation as 100% running from gambling to harm

Causation between gambling and harms can run in more than one direction, something that is well recognised in the CQU/AUT study. For some people, gambling is a coping mechanism, a symptom of harm rather than a cause. Causation can also operate through a third variable that leads gambling to be correlated with harm but with neither causing the other. These various causal relationships can all exist at the same time.

Causation has consequences for policy decisions because to the extent that gambling is a symptom of other problems, policy that reduces gambling activity has the potential to exacerbate rather than resolve harms for some people.[63]

CQU/AUT considers causation at length in its report.[64] Gambling can be a way of coping and there is the potential for unintended consequences without gambling (p. 44):

> *Older New Zealanders may gamble more often due to a desire for companionship in a safe public space – a potentially influential coping mechanism for loneliness when the spouse is deceased. When considered as a coping mechanism, in the absence of gambling, other means of escapism may be adopted or alternatively used in conjunction with gambling (i.e. leading to comorbidities arising from a third variable, as described above). Thus, in some cases gambling is not necessarily the driving factor for the experience of harm, and should not be treated as the sole cause for subsequent experiences of harm.*

CQU/AUT summarises its findings at p. 44:

> *…**it has become clear that there is limited evidence to suggest uni-directional causation**; as both gambling and the comorbid condition can be a result of one another, or reflect two outcomes of a third condition (e.g. unemployment or social disadvantage). Distinguishing the relative importance of the causal mechanisms requires expensive and methodologically challenging longitudinal studies - making it difficult to determine the degree to which gambling is the instrumental factor **[emphasis added]***

To summarise, CQU/AUT recognises causation can run in multiple directions, acknowledges unpicking causation is difficult, says there is evidence that gambling *can* cause harms including to health (p. 26) but, as the quote above makes clear, CQU/AUT expressly states the evidence does *not* favour uni-directional causation.

In view of this, and recognising causation can simultaneously run in more than one direction,[65] we were surprised to find that in its quantitative analysis CQU/AUT treats the relationship between gambling and harm as 100% causal and 0% symptomatic, directly contradicting its own advice.[66] CQU/AUT has chosen to treat causation in the least conservative and least reasonable way possible. With no less justification, CQU/AUT could have treated gambling's relationship with harm as 0% causal and reported much lower and possibly zero burden of gambling harm. CQU/AUT has effectively assumed its answer.

Worse, this one-sided treatment of causation is by omission: CQU/AUT does not expressly state its decision to treat causation in a one-sided way, against its own advice. CQU/AUT's decision not to adjust its empirical

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[63] Detecting unintended consequences of policy like this is a reason for recognising both costs and benefits in analysis.

[64] CQU/AUT discussed causation issues on pp. 17, 25,31,33,34,44,45,46,53,56,118. CQU/AUT notes gambling can be a coping mechanism (p.23,44-45). Drivers of gambling are not understood due to a lack of longitudinal studies (p53).

[65] As we noted in the previous section, in its phase 3 survey CQU/AUT asked questions like whether gambling "caused any health problems", for example. But this approach does not rule out gambling also being a symptom of harm or the product of a third variable.

[66] Or as the product of interaction with a third factor affecting both gambling and comorbidities.

findings to reflect something less than 100% causation is never stated. It is only by reading all 245 pages of the study that CQU/AUT's one-sided treatment of causation is revealed.

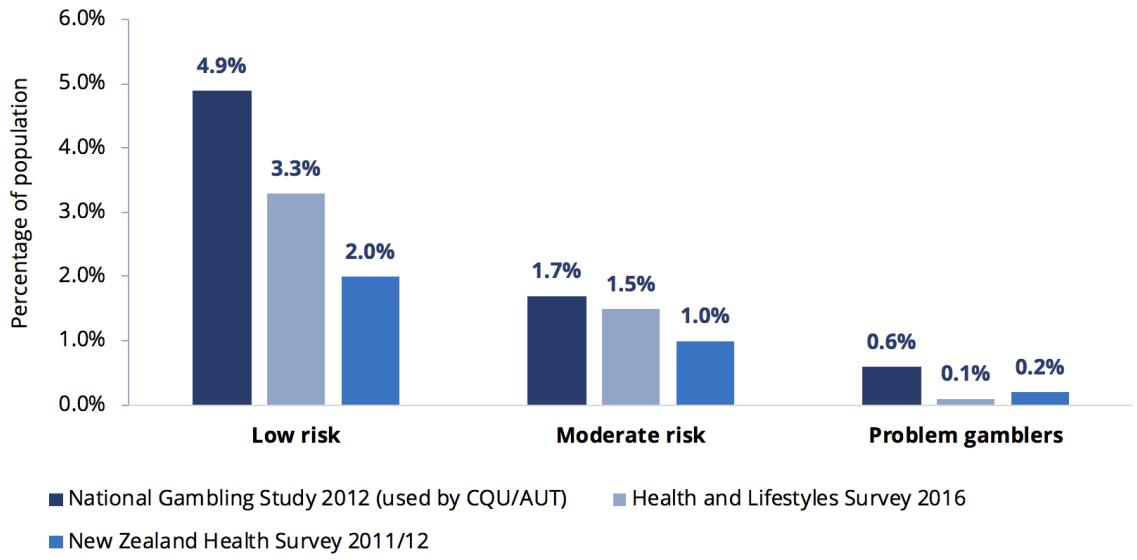
4.2 Other estimation problems

4.2.1 Gambling prevalence may be overstated

CQU/AUT's analysis quantifies the per person and total harm from gambling. CQU/AUT estimates a total of 161,928 years of healthy life was lost to gambling in New Zealand in 2012 (p. 185). CQU/AUT calculates this number by taking the estimated gambling harm per person and multiplying it by gambling prevalence, that is the number of people in the population suffering gambling harms. Estimates of both per person harm and prevalence are separately prepared for low-risk gambling, moderate-risk gambling and problem gambling and are prepared for both per-person harm and gambling prevalence. Estimates of gambling prevalence feed directly into estimated total harm – double the gambling prevalence, double the gambling harm.[67]

CQU/AUT sources its gambling prevalence values from the first wave of the National Gambling Study (NGS) by AUT in 2012.[68] However, this is not the only recent study of gambling prevalence in New Zealand. Other studies of gambling prevalence include the New Zealand Health Survey 2011/2012 (NZHS), and the 2016 Health and Lifestyles Survey (HLS).[69] All three studies use the Problem Gambling Severity Index to define gambling risk.[70] Results of the three studies of gambling prevalence are shown in Figure 5 and Table 1.

Figure 5: Comparison of estimates of gambling prevalence[71]



[67] Prevalence estimates are also separately prepared for harms to gamblers themselves and harms from someone else's gambling. See Tables 23 and 24 in CQU/AUT.

[68] Available from: https://www.health.govt.nz/our-work/mental-health-and-addictions/gambling/gambling-research-and-evaluation/key-information-sources-gambling-harm-and-service-utilisation/national-gambling-study-understanding-gambling-behaviour

[69] NZHS is available from https://www.health.govt.nz/system/files/documents/publications/gambling-results-of-the-201112-nzhs.pdf (see Table 12 p. 62). HLS 2016 is available from https://www.hpa.org.nz/sites/default/files/documents/Final-Report_Results-from-2016-Health-And-Lifestyles-Survey_Gambling-Feb2018.pdf (see Table 3-1 p.32).

[70] Wynne (2003).

[71] Percentages refer to the proportion of survey participants. In the NGS, participants are a New Zealand-wide random sample of persons 18 years or older. The NGS study (wave 1) found 72.5% of participants were "non-problem gamblers" and 20.2% of participants did not gamble in the past year.

Figure 5 shows the prevalence figures estimated by the NGS, the study used by CQU/AUT, are well above rates estimated by the other two studies. For problem gamblers, where overall results are likely to be most sensitive to prevalence because per-person harm is greatest, the NGS exceeds the NZHS by three times and the HLS by six times. What explains the differences in these findings? Table 1 illustrates elements that varied across the three surveys including sample size and age range.

Table 1: Comparison of estimates of gambling prevalence

	Low risk	Moderate Risk	High Risk	Sample size	Age
National Gambling Study Wave 1, 2012 (used by CQU/AUT)	4.9%	1.7%	0.6%	6,251	18+
Health and Lifestyles Survey, 2016	3.3%	1.5%	0.1%	3,854	15+
New Zealand Health Survey, 2011/12	2.0%	1.0%	0.2%	12,549	15+

Uniservices (2015), a report for the Ministry of Heath, compares the three surveys. UniServices notes similar research methods across the studies, including sampling methods, data collection methods, and analytical techniques.

However, UniServices also notes notes differences amongst the studies[72] including:

- the NGS was presented as a gambling study whereas the HLS and NZHS were presented as health studies;
- the response rate of the NGS (64%) was well below those of the HLS (83%) and the NZHS (79%) UniServices says, "[g]iven these response rates, it could be expected that results from the NZHS and the HLS would be more comparable";
- the NGS investigated a wider range of gambling activities; and
- age range used by the NGS (18+) was different from the HLS and NZHS (15+).

Uniservices says the low response rate for NGS, and the fact that it presented to participants as a gambling rather than health study, means self-selection problems in the NGS study may explain the far higher prevalence rate found by that study compared to the other two studies (p. 110):

> *Importantly, the National Gambling Study also maintained a primary focus on gambling (and was introduced to participants in this way), as opposed to the inclusion of a gambling module within a broader survey of health and wellbeing issues (as employed by the NZHS and the Health and Lifestyles Survey)* ***This may have resulted in more interest in the National Gambling Study by people who are involved in gambling and therefore a higher rate of participation amongst this target population. [emphasis added]***

Another possible explanation is that gambling was defined more broadly in the NGS than in the HLS or NZHS surveys. However, it is not clear this could explain such wide differences in estimated prevalence.

The unresolved question is what justifies CQU/AUT using the survey with far higher estimates of gambling prevalence. Unfortunately, CQU/AUT does not refer to the HLS or the NZHS, or explain their exclusion from the CQU/AUT study. Without this explanation, we cannot rule out the possibility that the results of the

[72] Abbott (2015:22) also compares these studies, reporting similar differences between the studies though quite different response rates.

CQU/AUT are exaggerated by selective use of prevalence estimates. It is simply left unexplained why lesser values were not considered.

CQU/AUT's treatment of prevalence substantially affects the final result. CQU/AUT's decision to use NGS prevalence rates increases their estimate of gambling-related harm by between 55% (relative to HLS prevalence rates) and 123% (relative to NZHS prevalence rates).[73] Had CQU/AUT averaged prevalence rates across the three studies, rather than reporting the highest prevalence rates of the three, CQU/AUT's estimate of gambling-related harm would have been 30% lower.[74]

4.2.2 No distinction between private and external costs

Public policy tends to concentrate on externalities, that is, costs borne by third parties not directly or indirectly linked by a contract or agreement, rather than on private costs. A classic example of an externality is the downstream effects on river users from a pollution-dumping factory.

The essential difference between private and external costs is that private costs are fully-borne by the person or firm responsible. Because those responsible for an externality are not fully confronted with its cost, the actions that lead to the externality occur at quantities above some social optimum. Policy can raise society's wellbeing by intervening to reduce the quantity of the externality towards that optimum. The optimum is defined by the quantity that would emerge if those responsible for the externality were fully confronted with its costs. In many cases, the socially optimal (wellbeing maximising) quantity of an externality is above zero.

Private costs, by contrast, are generally though not always disregarded in policy analysis, an approach that substantially simplifies the case for policy. The logic for ignoring private costs is that when costs are voluntarily and fully borne by a person or firm, those costs will be justified by some private and perhaps unseen benefit.

However, private costs may be appropriately recognised in policy analysis where it is suspected consumer decision making is impaired in some way that could cause costs to be borne by a consumer when they are not justified by benefits. For example, gambling's documented association with consumer harm has caused some to consider whether consumer imperfections may play an important role in explaining their decision making. [75] If the decision to gamble is the product of addiction or some misunderstanding of the consequences, with the result being that a person bears gambling costs not justified by benefits like enjoyment, or to mental health and so on, then policy can raise wellbeing by intervening. In the jargon of economics, when private costs are not justified by private benefits, private costs become social costs and relevant to policy.

However, private costs become policy-relevant *only to the extent that they are not justified by private benefits*. It is only the *difference* between private costs and private benefits that are relevant to policy. This makes the distinction between private and external costs important. While all external costs are relevant to policy, it is only that part of private costs that is not offset by benefits that policy makers should consider. For private costs, analysis must form a view on what share of those costs are offset by benefits.

In its analysis of gambling, CQU/AUT draws no distinction between private and external costs. In effect, CQU/AUT treats all private costs as if they are externalities. This is the result of the decision to disregard gambling's benefits entirely. Table 2 suggests CQU/AUT's failure to make any distinction between private

[73] Percentages relate only to gambling harm to self, and excluding harm to affected others. We do not include affected others because it is not clear HLS or NZHS contain comparable prevalence estimates for affected others, and CQU/AUT does not make clear how affect others prevalence is calculated. The Ministry of Health declined our request for further information. Percentages were calculated by substituting HLS and NZHS prevalence rates into Table 23 of CQU/AUT (p. 183).

[74] Again, based on gambling harm to self and excluding harm to affected others.

[75] See CQU/AUT p. 18.

and external costs may have had a profound impact on the quantitative findings and conclusions of the CQU/AUT study.

Table 2: Indicative private versus external cost categorisation

CQU/AUT harm category	Cost is private or external
Harm to the individual	
Health	Private[76]
Emotional or psychological impact	Private
Financial	Private
Reduced work performance	Private
Relationship disruption	Private
Criminality	External
Harm to family and significant others	
Immediate family	Private
Spouse of partner	Private
Children	Private
Extended family, friends, and whanau	Private
Harms to broader community	
Direct harms: crime; health and welfare costs; psychological and emotional; family breakdown; health; burden of responsibility on family/friends	Mix
Indirect harms: crime; social capital; volunteering; lower trust/community cohesion; worse relationships with others; crime could affect insurance premiums and cost of goods and services.	Mix

By disregarding the distinction between private and external costs, CQU/AUT has produced an analysis of gross harms that has no systematic connection to wellbeing and contains no guidance for policy makers.

4.2.3 The straw man of the perfect consumer

As noted above, burden of harm studies like the CQU/AUT study are decided by the one-sided treatment of costs and benefits. The logic supporting this one-sided treatment appears to be this: consumers make mistakes, so benefits can be ignored entirely. Unfortunately, this does not exaggerate the position. Here, BERL (2009:105, 173) explains why all benefits of alcohol consumption beyond a threshold were ignored:

> *Expenditure on alcohol used in a harmful fashion, including these later taxes, is arguably not matched by an equivalent private benefit… We assume that it is irrational to drink alcohol to a harmful level and that harmful alcohol use has zero private benefit.*

[76] Health care receives public funding, giving rise to a fiscal externality. Burgess and Crampton (2009) note the distinction between pecuniary and technological externalities made in the literature and argue for the exclusion of external effects that are pecuniary, including fiscal externalities, on the basis that only technological externalities have consequences for efficiency.

Likewise, in its recent analysis of a low emissions vehicles policy, the Ministry of Transport (2018a:20) says:[77]

> *Economic theory states that a 'rational' individual would consider the full operating cost of all vehicle types available on the market and will subsequently purchase the one that maximises his/her utility over the whole lifetime of the vehicle… various studies show that individuals do not internalise the full operating cost of their preferred type and will only consider the total cost of operating the vehicle over one or two years.*

Based on this logic, the Ministry of Transport includes the avoided costs of fuel in its analysis but none of whatever benefits led consumers to purchase fuel inefficient vehicles in the first place. The Ministry's treatment of costs and benefits decided its conclusions.

CQU/AUT similarly attacks a model (or models, it is unclear) it variously labels the "free market model", "self-responsibility model", "consumer" model and "economic" model. CQU/AUT says:[78]

> *This [consumer] model assumes that individuals are well-informed, rational beings with full access to information and product options*

CQU/AUT's approach of ignoring gambling benefits entirely without ever expressly stating why is extraordinary given this treatment of benefits determines the conclusions of its study. Despite never expressly linking consumer imperfection with the exclusion of benefits, CQU/AUT's treatment of benefits mirrors that of the studies by BERL and Ministry of Transport that do make this connection. In all three reports, the decision to count costs but few or no benefits determines the results of the report.

The logic supporting this one-sided treatment of costs and benefits is plainly a non-sequitur. It simply does not follow from the fact that consumers are imperfect and that gross benefits do not exist. The mere fact that consumers make mistakes does not make a case for policy. If consumers overestimate the net benefits of an activity about as often as they underestimate, then private costs can be ignored without substantially damaging the analysis. Even if consumer mistakes mean their decisions are unfavourably slanted, private costs and benefits could still be excluded because generally private benefits do not just equal costs, but exceed them – this is consumer surplus.

That said, where it is decided private costs do exceed benefits and this justifies their inclusion in policy analysis, *both* private costs and benefits must be recognised. A decision to count one but not the other is inconsistent and arbitrary, and decisive for the conclusions of the analysis, at least in the studies quoted above. As we noted earlier, it is the difference between private costs and benefits that is relevant to policy, meaning both must be included. It is only by recognising both costs and benefits that consumers in need of help can be identified.

4.2.4 Further issues

Our review of CQU/AUT raised a number of other issues.

Possible sample selection bias: CQU/AUT reuses a population sampling procedure to conduct surveys on two different topics, one in phase 3, and one in phase 4 (it is not clear whether or how many people

[77] This quote is from the November 2018 version of the Ministry of Transport's paper. Ministry of Transport (2018b:19) includes a nearly identical statement on the rational individual. Updated versions of both 2018a and 2018b papers, dated July 2019, both exclude this rational individual argument but reach similar conclusions to the November versions. Links to the quoted papers are included in the reference section.

[78] As the Australian Productivity Commission (2010) points out, "Some parties assert the primacy of personal responsibility when people gamble, claiming that this significantly reduces the need for regulation. However, while self-responsibility can reduce the basis for litigation, it is not inconsistent with regulatory intervention."

participated in both phases).[79] In Phase 3, recruitment targeted current or past gamblers and included a high proportion of problem gamblers relative to the general population. The phase 3 analysis was designed to develop a taxonomy of gambling harms and measure how their frequency varies with gambling harm. In view of this purpose, sampling a population of gamblers using a control variable for gambling severity appears appropriate on its face.

In phase 4, the survey aimed to quantify the effect of harms on life quality. Participant responses were ultimately used to compare the life quality effect of gambling to the life impact of other diseases. Phase 4 recruitment reused Phase 3 criteria to recruit gamblers and affected others, but added treatment professionals and "general population" participants, defined as people who had not experienced gambling harm. Despite the inclusion of general population, about two-thirds of the Phase 4 sample had a connection to gambling harm. For comparison, CQU/AUT reports 7% of the adult population in New Zealand experiences own-gambling harm (Table 23) and 14% is affected by the gambling of others.[80] Ministry of Health data shows 0.3% of New Zealand adults are subject to at least one gambling-related intervention each year (Figure 3 on page 16).

In our view, the use of a sample in which people who have suffered gambling harms are substantially over-represented relative to the general population carries a significant risk of biasing findings when the aim is to compare gambling harms to harms from disease.[81] As CQU/AUT says (p. 178), "definitions of [life quality effects] involve a social consensus judgement regarding the desirability or undesirability of a condition. From this point of view, it is the perception of the public that 'counts' in valuing health states." The question then follows, why is CQU/AUT using a population sample that has gambling so seriously over-represented? CQU/AUT reports conducting no tests for bias, and we note the use of a large sample does not resolve this type of bias. In short, it is impossible to know to what extent the estimates of harm in the CQU/AUT study are the product of sample selection bias.

Do the VAS and TTO polling methods have a significant influence on estimates of harm? The influence of survey methods on results is hinted at in Figure 11 of CQU/AUT which shows the VAS and TTO methods produce results so different that their 95% confidence intervals do not overlap. CQU/AUT acknowledges instrument bias as a "well-recognised concern in utility elicitation studies" (p. 178).

Findings use novel methods that do not appear to have been verified: The report's empirical conclusions are a product of a long sequence of steps, some of them novel. Despite the dependency of the findings of the CQU/AUT report on novel analytical steps, there is no report of testing that could give comfort in their veracity.

Omitted variable bias: Phase 3 of the CQU/AUT study focuses on the econometric relationship between severity of problem gambling, measured by the Problem Gambling Severity Index (PGSI), and the frequency of identified harms. CQU/AUT uses regressions[82] to estimate this relationship. CQU/AUT reports these regressions include demographic control variables (age, ethnicity, gender, and so on), which is normal practice for empirical evaluation of social issues, but does not indicate any control variables for gambling comorbidities. Given the well-established association between gambling and other harmful behaviours, acknowledged by CQU/AUT, this appears to be a classic example of what is known as "omitted variable bias".[83] When variables that explain some of the variation of the dependent variable, in this case harm, are

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[79] Phase 3 recruitment of participants is described by CQU/AUT at p. 132. In phase 4, CQU/AUT says (at p. 165) gamblers and affected others were sourced using the criteria on p. 132.

[80] It is unclear to what extent these two populations overlap. The overall proportion of the adult population affected by either form of gambling harm is therefore unknown.

[81] CQU/AUT appears to use different definitions of the term "general population". Table 17 on p. 165 counts "general population" as not including gamblers and affected others. However, the "general population" category in Table 19 on p. 168 appears to be the sum of the Table 17 categories of general population, gamblers and affected others.

[82] An econometric method used to estimate the statistical association between variables.

[83] See, for example, Studenmunde (1997), pp. 176-179. Most econometrics textbooks cover omitted variable bias. Kennedy (1998) discusses tests for omitted variables at pp. 78-79, 150-151.

excluded from a regression, this increases the apparent explanatory power of the remaining variables, including, in this case, the PGSI variable. The apparent increase in explanatory power brought about by the exclusion of other variables is the omitted variable bias. CQU/AUT may have overstated the association between harm and gambling severity, possibly substantially, by excluding other explanatory variables.

Poor reporting of calculations and results: Many results including key findings are reported without confidence intervals. Regressions are mostly reported without standard diagnostics. There is almost no reporting of standard econometric tests for robustness or evidence that such tests were conducted. Some numbers (e.g. the 1,374 lives that were "barely worth living" on p. 199, the bottom-line adjustment in Table 24 on p. 185) are stated without any explanation or clarity on how they were calculated.

Exclusion of data points potentially biases results: In phase 4, CQU/AUT estimate the relationship between PGSI and harm. CQU/AUT obtained a total of 3,888 observations (Table 19). CQU/AUT then apply at least three filters to this data: 1) all observations reporting zero harm are excluded because estimation transformed data using logarithms and the logarithm of zero is mathematically undefined; [84] 2) observations reporting harm below (but not above) a level predicted by PGSI are excluded;[85] and 3) non-varying and inconsistent responses are excluded (p. 169). Based on points 2 and 3 only, *half* of the CQU/AUT observations were excluded (p. 169). CQU/AUT's description of its procedure is so incomplete we can do no more than point to the risk that these exclusions bias the result, possibly severely. The decision to use econometric techniques that exclude certain types of observations, without checking for bias and apparently without considering alternative techniques that would avoid discarding information, is questionable. CQU/AUT's decisions to exclude data has direct consequences for their overall findings.

Potentially significant bias through data mismatch: We have concerns about the mapping procedure described on p. 181. CQU/AUT states:

> *In calculating years of life lost, it is necessary to ensure the utility weight and the population prevalence data match in definition. Errors in this matching can result in a substantial error in the estimate. An extensive search was conducted to source matching prevalence figures for the health states of interest to compare against gambling-related harms.* ***This exercise proved challenging****, due to the fact that many population health studies are not designed to collect data on various levels or stages of health states; they are normally reported as present or absent for the condition. In some cases, matching condition definitions for prevalence and utility weights could not be identified. As a result, some health states of interest (such as cardiovascular diseases) were excluded from the analysis due to the inability to source matching prevalence figures. In other cases,* ***reasonable approximations were assumed****, and this is noted where appropriate. [****emphasis added****]*

CQU/AUT provides no further information about this mapping procedure. We are concerned about the effect that mapping of incompatible data and the exclusion of other data could have on the overall results of the CQU/AUT study. Mapping strongly incompatible data could embed implicit assumptions so unreasonable as to invalidate estimates of aggregate harms. CQU/AUT has not provided information sufficient to form any view on the effects of this mapping on its results and the Ministry of Health declined our request for further information. CQU/AUT reports no checks for robustness. We cannot rule out the possibility that the results of the CQU/AUT analysis rest on unrelated data being combined. This alone would render CQU/AUT's comparisons of aggregate harms as meaningless.

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[84] CQU/AUT's description of their procedure is extremely confusing. The Ministry of Health declined our request for further information on CQU/AUT's methodology and calculations. We therefore quote CQU/AUT in full (p. 168): "The estimated function of harm with respect to PGSI was then inverse-transformed to the original scale. Elicited values of zero or one yield infinite scores on the logit scale and, accordingly, these were excluded from the transformation, and their counts integrated into the final mean."

[85] Again, CQU/AUT's description of possibly crucial details is extremely confusing. We quote CQU/AUT in full (p. 169): "Based on the assumption that a true negative correlation between PGSI and valuations should be very unlikely, we excluded raters whose ratings failed to correlate positively with the PGSI."

Is PGSI reliable for low-risk and moderate-risk gamblers? The PGSI variable is central to the quantitative analysis and conclusions of the CQU/AUT study, including the key finding that aggregate harm is greatest for low-risk gamblers. Currie et al (2013), a well-cited study, tests the PGSI, finding that although it reliably detects non-gambling and problem gamblers, it discriminates weakly among low and moderate-risk gamblers. Although CQU/AUT refers to other studies by Currie et al, unfortunately CQU/AUT did not refer to the paper by Currie et al that raises concerns about the cornerstone measure in the CQU/AUT analysis.

4.3 Conclusions – review of methodology

> *"The fact that the [Australian] gambling industry has net social benefits, therefore, is neither surprising nor necessarily policy relevant. The key issue is whether policy changes could achieve better outcomes… Regulations should pass cost-benefit tests and target problems where they are greatest."*
>
> *Australian Productivity Commission (2010)*

CQU/AUT recommends further policy action based on an analysis that takes no explicit account of existing policy or the fact that gambling has benefits. Even BERL recognised benefits in its 2009 analysis of alcohol – but not CQU/AUT. By using a one-sided analysis of costs CQU/AUT violates the basic principle that policies are evaluated on their full effects – both costs and benefits. Had CQU/AUT directed its one-sided analysis at a particular policy capable of isolating gambling harms while leaving gambling's benefits unaffected, we could have no complaint, at least with respect to its methodology. However, that is not what CQU/AUT does: its study covers all gambling.

One-sided analysis like that of CQU/AUT creates a clear risk of policy being mistargeted. CQU/AUT invites the Ministry of Health to use its findings to target policy (p. 195):

> *Although problem gamblers' quality of life is affected 3 times more than for low-risk gamblers, this is outweighed by the much larger prevalence of individuals in the low-risk category… **Our study shows that attention should not just be focused on problem gamblers but to all people affected by gambling harms**… [**emphasis added**]*

Yet CQU/AUT's conclusion that aggregate harm is greatest among low-risk gamblers is almost certainly the product of its one-sided method. CQU/AUT's recommendations carry the clear risk of exacerbating harms by diluting support for people who are in the greatest need of public assistance, and by suppressing participation in an activity that for many people is a source of enjoyment, social interaction and mental health benefits greater than costs. The use of one-sided analysis unnecessarily puts these upsides in jeopardy.

Recognising benefits is no per se barrier to policy intervention, nor does their inclusion depend on any assumption of perfect consumer rationality. Indeed, the total exclusion of benefits from CQU/AUT analysis amounts to an assumption of perfect consumer irrationality. It is CQU/AUT and the Ministry of Health who commissioned the study that have departed from established and nearly universal norms for policy analysis by counting costs but not benefits. Directing policy to where it can do the most to improve consumer wellbeing is a question of where policy can have the greatest impact on costs for the smallest loss of benefits. The one-sided CQU/AUT study has no bearing on that question.

5. Concerns with the Ministry of Health's approach

5.1 Ministry commissioned one-sided analysis after being warned of its limitations

In March 2009, a study on the harms of alcohol and drug consumption was published by Business and Economic Research Limited (BERL). The study was commissioned by the Ministry of Health and the Accident Compensation Corporation (ACC). BERL estimated social costs of alcohol consumption amounted to $4.8 billion per year. The study was cited by the Law Commission in favour of further regulation of alcohol. Like the CQU/AUT study, BERL arrived at this figure by counting the costs of alcohol consumption but disregarding most, though not all, of its benefits including enjoyment and beneficial health effects. A review by Burgess and Crampton (2009) using an orthodox policy framework found BERL had overstated costs by a factor of more than 30 times, mostly due to the arbitrary and unjustified decision to count consumption costs but ignore most consumption benefits.[86]

Burgess and Crampton (2009:39) summarise the fundamental problem with one-sided analysis of two-sided social issues:

> *…as BERL acknowledges in its report (at p. 70), policy analysis requires an assessment of both costs and benefits; and harm minimization is easily recognized as inappropriate for policymakers by the untenable policy positions that objective would recommend. As a call to action, the BERL study fails – it cannot even indicate whether more or less regulation of alcohol and illicit drugs is desirable, because that requires an assessment of benefits as well as costs.*

Five years later, the Ministry of Health commissioned the CQU/AUT study.

Both the BERL report and the review by Burgess and Crampton received significant media coverage at the time. An Official Information Act request to the Ministry at that time showed it was aware of the challenge to its commissioned report. BERL defended its report in part by saying its study's method was determined by the terms of reference set by the Ministry and ACC. The Ministry has not, to our knowledge, ever responded to the concerns raised by Burgess and Crampton.

The Ministry of Health has spent over $450,000 on studies by BERL and CQU/AUT, with the majority of these funds committed after the Ministry was warned of the severe limitations of applying one-sided methods to two-sided issues. This raises questions about whether the Ministry of Health is delivering value for money on the $60 million it will spend on gambling-related activities over the next three years.[87]

5.2 Ministry should advise the government of the limitations of the study

TDB submitted a request under the Official Information Act to the Ministry of Health for all advice to Ministers that referenced the CQU/AUT study. The response returned nine pieces of advice including a Cabinet paper, and a further three documents likely to have been put before Ministers. Ministers were told that "a low-risk gambler typically has about 20% of their quality of life 'subtracted' by gambling";[88] a problem gambler loses about half their quality of life;[89] and a "surprisingly large contribution of harm from

[86] See also a subsequent paper by Eric Crampton, Matt Burgess and Brad Taylor (2011), "The Cost Of Cost Studies," University of Canterbury working paper 29/2011, July. Available from https://ir.canterbury.ac.nz/handle/10092/5414
[87] See Ministry of Health (2019a), p. 6.
[88] Ministry of Health (2017a).
[89] Ibid.

gambling was attributable to 'low risk' gamblers".[90] The Ministry of Health told Ministers the findings of the CQU/AUT study "strengthen the rationale for a public health approach to gambling harm".[91]

Nowhere, at least in the advice provided to us by the Ministry, does the Ministry warn Ministers of the limitations of the CQU/AUT study. Ministers were given no warning that harm is treated in isolation of benefits, or that because CQU/AUT's estimates of harm exclude benefits they do not measure consumer wellbeing. Ministers were not warned that the CQU/AUT measure of harm could vastly overstate the wellbeing effects of gambling on consumers. The Ministry of Health invites Ministers to gain the opposite impression when it says "the study's estimate of harm is likely to be conservative".[92] Similarly, there are no warnings on the home page of the study on the Ministry of Health web site.[93] Over the last two years we count at least eight references to the study in public submissions.

In our view, the Ministry is misleading Ministers and the public by failing to give these warnings and by inviting the impression that the CQU/AUT study of harm is a study of consumer wellbeing. It is not: the study excludes consumer benefits that are widely acknowledged, including by CQU/AUT, to exist, to offset consumer costs, and as relevant to wellbeing and to policy. We believe the Ministry of Health has an ethical and professional responsibility to disclose the limitations of the CQU/AUT study to Ministers and to the public.

[90] Ministry of Health (2017c).

[91] Ministry of Health (2017b).

[92] Ibid.

[93] Ministry of Health home page for the CQU/AUT study is available at: https://www.health.govt.nz/publication/measuring-burden-gambling-harm-new-zealand

6. Conclusions

> *There is growing evidence, such as the 2017 [CQU/AUT study] that presentations to clinical services do not reflect the full extent of harm.* ***Many people do not recognise that they are experiencing low or moderate harm. [emphasis added]***
>
> – Ministry of Health, 2019[94]

What is the value of CQU/AUT's study? [95] As a call to action for "serious public investments" (p. 199), the CQU/AUT study fails – it cannot even indicate whether more or less regulation of gambling is desirable, because that requires an assessment of benefits as well as costs. CQU/AUT expressly acknowledges the policy relevance of benefits (p. 197) yet concludes its report with a call for further policy action based only on costs and without taking existing measures into account. On its own, the CQU/AUT study cannot be relied upon by policymakers if the goal of policy is to improve overall wellbeing. Using one-sided analysis of a two-sided issue like gambling risks policy overreach and mistargeting, with the potential to exacerbate rather than resolving gambling harms. There are also serious problems in the analysis by CQU/AUT that mean its cost estimates should be considered unreliable.

This review raises concerns with the conduct of the Ministry of Health, first with its decision to spend over $300,000 – paid for by gamblers through the Problem Gambling Levy – to commission the CQU/AUT study after being warned of the serious shortcomings of a one-sided approach in 2009. In view of the findings of this report, it is not clear the Ministry received or could have anticipated value for money from this spending. We are also concerned at the Ministry's apparent failure to warn Ministers and the public about the limitations of the CQU/AUT study. The CQU/AUT study has been repeatedly cited in advice to Ministers and in submissions to regulatory processes without the Ministry making clear that harm should not be interpreted to measure effects on wellbeing and, without benefits being included, should not be used to determine policy.

One-sided analysis threatens the integrity of public policy. Despite their superficial similarity to cost-benefit analysis, one-sided burden of harm studies when directed at social issues like gambling are not a test of any policy proposition: their conclusions are inevitable. One-sided analysis used in isolation or not suitably caveated can justify almost any policy. Policy should be tested, rather than assumed.

[94] Ministry of Health (2019b). CQU/AUT's results show low-risk gambling has a worse effect on life quality than the untreated amputation of a leg. It is unclear whether the Ministry of Health believes people who do not recognise they are suffering harms from low risk gambling would also fail to recognise the effects of a lost limb on life quality.

[95] Parts of this conclusion follows Burgess and Crampton (2009). Our purpose is to emphasise the close parallels between the issues raised in that 2009 report and the issues covered here.

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Appendix A: CQU/AUT burden of gambling harm estimates versus burden of disease estimates

Full list of gambling vs burden of disease estimates

CQU/AUT compares its burden of gambling harms with selected results from Salomon (2012). This Appendix reproduces the findings of Salomon (2012) in full (excluding confidence intervals). Asterisks* denote the findings from Salomon (2012) reported by CQU/AUT in Figure 13 at p. 177. Bold denotes the findings from Salomon (2012) included in this review.

Sources: Salomon (2012:2135-2137); Browne et al (2017:172, 177).

Disease or gambling condition	Estimated Burden
Schizophrenia: acute state*	0.756
Multiple sclerosis: severe*	0.707
Spinal cord lesion at neck: untreated	0.673
Epilepsy: severe	0.657
Major depressive disorder: severe episode	0.655
Heroin and other opioid dependence*	0.641
Traumatic brain injury: long-term consequences, severe, with or without treatment	0.625
Musculoskeletal problems: generalised, severe	0.606
Schizophrenia: residual state*	0.576
End-stage renal disease: on dialysis	0.573
Stroke: long-term consequences, severe plus cognition problems	0.567
Disfigurement: level 3, with itch or pain	0.562
Parkinson's disease: severe	0.549
Alcohol use disorder: severe*	0.549
AIDS: not receiving antiretroviral treatment	**0.547**
CQU/AUT: PROBLEM GAMBLER HARM (Figure 13, p. 177)	**0.54**
Stroke: long-term consequences, severe	**0.539**
Anxiety disorders: severe	0.523
Terminal phase: without medication (for cancers, end-stage kidney or liver disease)	**0.519**
Terminal phase: with medication (for cancers, end-stage kidney or liver disease)	**0.508**
Amputation of both legs: long term, without treatment	0.494
Rectovaginal fistula	0.492
Cancer: metastatic	0.484
Bipolar disorder: manic episode*	0.480
Multiple sclerosis: moderate	0.445
Spinal cord lesion below neck: untreated	0.440

Disease or gambling condition	Estimated Burden
Dementia: severe	0.438
Burns of ≥20% total surface area or ≥10% total surface area if head or neck, or hands or wrist involved: long term, without treatment	0.438
Headache: migraine*	0.433
Motor plus cognitive impairments: severe	0.425
Acute myocardial infarction: days 1–2	0.422
Epilepsy: untreated	0.420
Major depressive disorder: moderate episode	0.406
Tuberculosis: with HIV infection	0.399
Disfigurement: level 3	0.398
Fracture of pelvis: short term	0.390
Alcohol use disorder: moderate*	0.388
Fracture of neck of femur: long term, without treatment	0.388
COPD and other chronic respiratory diseases: severe	0.383
Motor impairment: severe	0.377
Cocaine dependence	0.376
Low back pain: chronic, with leg pain	0.374
Lower airway burns: with or without treatment	0.373
CQU/AUT: MODERATE RISK GAMBLING HARM (Figure 13, p. 177)	**0.37**
Spinal cord lesion at neck: treated	0.369
Low back pain: chronic, without leg pain	0.366
Amputation of both arms: long term, without treatment	0.359
Amphetamine dependence*	**0.353**
Severe chest injury: short term, with or without treatment	0.352
Dementia: moderate	0.346
Vesicovaginal fistula	0.338
Burns of ≥20% total surface area: short term, with or without treatment	0.333

Disease or gambling condition	Estimated Burden
Tuberculosis: without HIV infection	0.331
Cannabis dependence	0.329
Abdominopelvic problem: severe	0.326
Gastric bleeding	0.323
Low back pain: acute, with leg pain	0.322
Epilepsy: treated, with recent seizures	0.319
Stroke: long-term consequences, moderate plus cognition problems*	0.312
Fracture of neck of femur: short term, with or without treatment	0.308
Cancer: diagnosis and primary therapy	0.294
Gout: acute	0.293
Musculoskeletal problems: generalised, moderate	0.292
Drowning and non-fatal submersion: short or long term, with or without treatment	0.288
Neck pain: chronic, severe	0.286
Diarrhoea: severe	0.281
Low back pain: acute, without leg pain	0.269
Parkinson's disease: moderate	0.263
Alcohol use disorder: mild*	0.259
Autism	0.259
Infectious disease: post-acute consequences (fatigue, emotional lability, insomnia)	0.254
Conduct disorder	0.236
Severe traumatic brain injury: short term, with or without treatment*	0.235
Crohn's disease or ulcerative colitis	0.225
Traumatic brain injury: long-term consequences, moderate, with or without treatment	0.224
Anorexia nervosa	0.223
Bulimia nervosa	0.223
HIV: symptomatic, pre-AIDS	0.221
Neck pain: acute, severe	0.221
Motor plus cognitive impairments: moderate	0.221
Infectious disease: acute episode, severe	0.210
Diarrhoea: moderate	0.202
Iodine-deficiency goitre	0.200
Multiple sclerosis: mild	0.198
Distance vision blindness	0.195
Decompensated cirrhosis of the liver	0.194
Fracture of pelvis: long term	0.194
COPD and other chronic respiratory diseases: moderate*	0.192
Fracture other than neck of femur: short term, with or without treatment	0.192
Distance vision: severe impairment	0.191
Disfigurement: level 2, with itch or pain	0.187
Heart failure: severe	0.186
CQU/AUT: LOW RISK GAMBLING HARM (Figure 13, p. 177)	**0.18**
Fetal alcohol syndrome: severe	0.177
Fracture of face bone: short or long term, with or without treatment	0.173
Musculoskeletal problems: legs, severe*	0.171
Poisoning: short term, with or without treatment	0.171
Angina pectoris: severe	0.167
Amputation of one leg: long term, without treatment	**0.164**
Anaemia: severe	0.164
Major depressive disorder: mild episode	0.159
Intellectual disability: profound	0.157
Fracture of sternum or fracture of one or two ribs: short term, with or without treatment	0.150
Anxiety disorders: moderate*	0.149
Cardiac conduction disorders and cardiac dysrhythmias	0.145
Urinary incontinence*	0.142
Injured nerves: long term	0.136
Asthma: uncontrolled	0.132
Fracture of vertebral column: short or long term, with or without treatment	0.132
Amputation of one arm: long term, with or without treatment*	0.130
Dislocation of knee: long term, with or without treatment	0.129
Burns of ≥20% total surface area or ≥10% total surface area if head or neck, or hands or wrist involved: long term, with treatment	0.127
Severe wasting	0.127
Intellectual disability: severe	0.126
Abdominopelvic problem: moderate	0.123
Musculoskeletal problems: arms, moderate*	0.114
Lymphatic filariasis: symptomatic	0.110
Asperger's syndrome	0.110
Traumatic brain injury: long-term consequences, minor, with or without treatment	0.106
Chronic kidney disease (stage IV)	0.105
Neck pain: chronic, mild	0.101
Diabetic neuropathy	0.099
Epididymo-orchitis	0.097

Disease or gambling condition	Estimated Burden
Burns of <20% total surface area without lower airway burns: short term, with or without treatment	0.096
Hearing loss: complete, with ringing*	0.092
Hearing loss: profound, with ringing	0.088
Fracture of patella, tibia or fibula, or ankle: short term, with or without treatment	0.087
Stoma*	0.086
Dementia: mild	0.082
Intellectual disability: moderate	0.080
Dislocation of shoulder: long term, with or without treatment	0.080
Musculoskeletal problems: legs, moderate*	0.079
Injury to eyes: short term	0.079
Stroke: long-term consequences, moderate	0.076
Motor impairment: moderate	0.076
Fracture of skull: short or long term, with or without treatment	0.073
Epilepsy: treated, seizure free	0.072
Fracture of neck of femur: long term, with treatment	0.072
Severe tooth loss	0.072
Disfigurement: level 2	0.072
Heart failure: moderate	0.070
Benign prostatic hypertrophy: symptomatic	0.070
Fracture of patella, tibia or fibula, or ankle: long term, with or without treatment	0.070
Angina pectoris: moderate	0.066
Hearing loss: severe, with ringing	0.065
Fracture of radius or ulna: short term, with or without treatment	0.065
Injured nerves: short term	0.065
Diarrhoea: mild	0.061
Herpes zoster	0.061
Hearing loss: moderate, with ringing	0.058
Anaemia: moderate	0.058
Fetal alcohol syndrome: moderate	0.057
Acute myocardial infarction: days 3–28	0.056
Severe chest injury: long term, with or without treatment	0.056
Kwashiorkor	0.055
Generic uncomplicated disease: anxiety about diagnosis	0.054
Speech problems	0.054
Motor plus cognitive impairments: mild	0.054
Infectious disease: acute episode, moderate	0.053

Disease or gambling condition	Estimated Burden
HIV/AIDS: receiving antiretroviral treatment	0.053
Fracture of clavicle, scapula, or humerus: short or long term, with or without treatment	0.053
Fracture other than neck of femur: long term, without treatment	0.053
Amputation of both legs: long term, with treatment	0.051
Fracture of radius or ulna: long term, without treatment	0.050
Attention-deficit hyperactivity disorder*	0.049
Spinal cord lesion below neck: treated	0.047
Amputation of both arms: long term, with treatment	0.044
Headache: tension-type	0.040
Neck pain: acute, mild	0.040
Mastectomy	0.038
Hearing loss: mild, with ringing*	0.038
Angina pectoris: mild	0.037
Heart failure: mild	0.037
Bipolar disorder: residual state	0.035
Hearing loss: complete	0.033
Distance vision: moderate impairment	0.033
Fracture of foot bones: short term, with or without treatment	0.033
Fracture of foot bones: long term, without treatment	0.033
Hearing loss: severe	0.032
Intellectual disability: mild	0.031
Hearing loss: profound	0.031
Generic uncomplicated disease: worry and daily medication	0.031
Intestinal nematode infections: symptomatic	0.030
Anxiety disorders: mild*	0.030
Amputation of finger(s), excluding thumb: long term, with treatment	0.030
Disfigurement: level 1 with itch or pain	0.029
End-stage renal disease: with kidney transplant	0.027
Asthma: partially controlled	0.027
Fracture of hand: short term, with or without treatment	0.025
Musculoskeletal problems: arms, mild	0.024
Diabetic foot	0.023
Hearing loss: moderate	0.023
Musculoskeletal problems: legs, mild	0.023
Stroke: long-term consequences, mild	0.021
Amputation of one leg: long term, with treatment	0.021
Impotence	0.019

Disease or gambling condition	Estimated Burden
Ear pain	0.018
Burns of <20% total surface area or <10% total surface area if head or neck, or hands or wrist involved: long term, with or without treatment	0.018
Fetal alcohol syndrome: mild	0.017
Dislocation of hip: long term, with or without treatment	0.017
Claudication	0.016
Fracture of hand: long term, without treatment	0.016
COPD and other chronic respiratory diseases: mild	0.015
Near vision impairment	0.013
Amputation of thumb: long term	0.013
Disfigurement: level 1	0.013
Abdominopelvic problem: mild	0.012
Dental caries: symptomatic	0.012
Motor impairment: mild	0.012

Disease or gambling condition	Estimated Burden
Infertility: primary*	0.011
Parkinson's disease: mild	0.011
Asthma: controlled*	0.009
Other injuries of muscle and tendon (includes sprains, strains, and dislocations other than shoulder, knee, or hip)	0.009
Amputation of toe	0.008
Periodontitis	0.008
Infertility: secondary	0.006
Infectious disease: acute episode, mild	0.005
Hearing loss: mild	0.005
Open wound: short term, with or without treatment	0.005
Anaemia: mild	0.005
Distance vision: mild impairment	0.004
Fractures: treated, long term	0.003

Appendix B: Research questions at stage 2 of the CQU/AUT study

Source: CQU/AUT pp. 229-230.

1. Have you experienced any negative consequences from gambling that you would be happy to share?

2. We have identified a lot of different types of negative consequences that people experience from gambling, and they would tend to fall within these broad categories (such as time and money). But we wonder if the source of these harms goes beyond the time or money spent on gambling?

- If you were to spend that same amount of time and money on another activity, say for example fishing, would you experience the same negative consequence at the same level? Would it cause the same level of conflict in your relationship? [ANSWER MOST LIKELY NO]. Fishing takes up a lot of time, but why are the effects different?
- What if you had spent money and time trying to start a business, and then lost it all. Would the negative effects still be the same?
- If you were spending money that you could afford to lose and the time was not keeping you from other responsibilities, could there still be harm / negative consequences?

If discussions don't progress beyond time and money – use following stories from other discussions:

- "A retired lady who had plenty of disposable income, wasn't spending that much money, and it wasn't keeping her away from other activities, but she still hated that she was doing it."
- "Some people have lied about what they are doing because they know family and friends don't like gambling."

3. What were the earliest negative consequences you can recall? What were some of the early signs of harm?

4. How have the negative consequences changed over time?

5. What negative consequences are still experienced because of past gambling?

6. What negative consequences will continue being experiencing in the future, even after gambling has stopped?

7. What negative consequences has gambling had for others? (e.g. partners, children, family, whānau)

8. What negative consequences has gambling had for the community?

9. Have you experienced or noticed unlawful activities resulting from gambling? For example, taking spare cash from a family member's wallet?

[**Emphasis** in original]