

**RESEARCH
REPORT**

Identifying effective policy interventions to prevent gambling-related harm

June 2019

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Our vision: A Victoria free from gambling-related harm



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Identifying effective policy interventions to prevent gambling-related harm

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Table of contents

Acknowledgements	ii
About the authors	ii
Table of contents	iii
Glossary of terms	v
Executive summary	1
Purpose, research questions and methods	1
Issues, opportunities and interventions identified from each of the areas investigated	1
Purpose and focus of this project	18
Focus on specific forms of gambling	18
Methods	20
RQ1. Review of gambling evidence	24
Purpose of this review	24
Method	25
Results and discussion	26
Conclusions	51
RQ2.1 Evidence from other public health fields: Alcohol	54
Experience and research on alcohol policy interventions	54
Comparing drinking and gambling as behaviours and problems	59
Alcohol experience with policy interventions used in gambling	61
Opportunities and relevant issues	63
RQ2.2 Evidence from other public health fields: Tobacco	65
Similarities and differences between smoking and gambling	65
The nature of the tobacco problem	66
A comprehensive approach to engineering change	70
Summary: A comprehensive and strategic approach	78
Opportunities and relevant issues	78
RQ2.3 Evidence from other public health fields: Obesity & physical activity	82
Introduction	82
Methods	83
Results	84
Discussion	95
RQ2.4 Evidence from other public health fields: Blood-borne viruses & sexually transmitted infections	98
Public health lessons for gambling	98
Opportunities and relevant issues	107

Conclusions and recommendations.....	109
RQ3. What other areas of public health activity can tell us about preventing and minimising gambling harm?	109
Structural characteristics of gambling products	109
Pre-commitment and self-exclusion	110
Interactive and ‘pop-up’ messaging.....	112
Accessibility and exposure.....	113
In-venue or real-time identification of ‘problem gamblers’	114
Restrictions on advertising or marketing	115
Stigma reduction	116
Price	118
Framing of the issue	119
Affect, place of consumption, and the social world of the gambler	121
Product information.....	123
Structure of the industry.....	124
Regulatory fragmentation.....	126
Industry influence on research.....	127
Advertising, marketing, knowledge transfer and educational interventions	130
Standard of evidence.....	131
Multi-faceted and systematic interventions	132
References	134
Appendices.....	161
Appendix A: RQ1 literature review strategy	161
Appendix B: RQ1 gambling interventions	165

Glossary of terms

ACCC – Australian Competition and Consumer Commission

ACNC – Australian Charities and Not-For-Profits Commission

AGRC – Australian Gambling Research Centre

ANPHA – Australian National Preventive Health Agency

ANZSOG – Australian and New Zealand School of Government

ATM – Automatic Teller Machine

BBV – Blood Borne Viruses

CCV – Cancer Council Victoria

CDC – Centres for Disease Control and Prevention

CEOS – Context, Executive, and Operational Systems theory

COAG – Council of Australian Governments

CSW – Commercial Sex Workers

EFTPOS – Electronic Funds Transfer at Point of Sale

EGM – Electronic Gambling Machine

FOBT – Fixed Odds Betting Terminal

HILDA – Household Income and Labour Dynamics in Australia survey and/or report

HIV – Human Immunodeficiency Virus

IPV – Intimate Partner Violence

LDW – Loss Disguised as a Win

LTU – La Trobe University

MSM – Men who have Sex with Men

NGO – Non-Government Organisation

NGR – Net Gambling Revenue

NICE - National Institute for Health and Care Excellence

NSP – Needle and Syringe Program

OST – Opioid Substitution Therapy

PC – Productivity Commission

PGSI – Problem Gambling Severity Index

PrEP – Pre-Exposure Prophylaxis

PWID – People Who Inject Drugs

RTP – Return to Player ratio

SE – Self-exclusion

SMS – Short Message Service. Also called text messages.

STI – Sexually Transmitted Infection

TAB – Totalisator Agency Board

TasP – Treatment as Prevention (for HIV)

TTM – Trans-Theoretical Model (of behaviour change)

VCGLR – Victorian Commission for Gambling and Liquor Regulation

VRGF – Victorian Responsible Gambling Foundation. Also called the Foundation.

VLT – Video Lottery Terminal

WHO – World Health Organization

Executive summary

Purpose, research questions and methods

The purposes of this project were (i) the identification of gaps in the evidence concerning gambling harm prevention and minimisation policies; and (ii) identification of strategies, policies and interventions likely to prevent or minimise harm associated with gambling.

In order to achieve these purposes, three research questions were developed, as follows:

RQ1. What are the most effective evidence-based policies and initiatives to reduce harm associated with gambling, what are the gaps, and what should be the priorities?

RQ2. What have been the most effective policy drivers for change in areas such as alcohol, tobacco, physical activity and HIV (human immunodeficiency virus), and how might they be replicated in gambling?

RQ3. What effective policies used or proposed in other areas of public health could be translated to gambling?

RQ1 was addressed by undertaking a comprehensive review of existing harm prevention and minimisation interventions and policies, in order to achieve an understanding of the state of evidence in the field.

RQ2 was addressed by commissioning a narrative review for four areas of public health activity from four groups of academic experts in the relevant fields. The fields chosen for this were: alcohol policy, tobacco control, obesity, overweight and physical activity, and blood borne viruses.

RQ3 was addressed by establishing a topical array drawn from both RQ1 and RQ2 and populating that with relevant themes, initially identified as opportunities and relevant issues for each review.

RQ3 identifies these key themes and provides a series of recommendations derived from this discussion and categorised thematically.

Issues, opportunities and interventions identified from each of the areas investigated

In addition to investigation of the gambling literature, this project sought to identify policy, interventions, issues and opportunities from four other fields of public health, relevant to the prevention and reduction of harm derived from gambling. Other fields of public health activity investigated were Alcohol Policy, Tobacco Control, Promotion of physical activity and prevention of obesity, and prevention and harm reduction in relation to Blood-Borne Viruses and Sexual Health.

Each of these areas produced a range of likely areas for development of action in the prevention and minimisation of harm from Gambling. In the body of the report, these are discussed at length, firstly in the relevant section devoted to the specific field, and in the final section which outlines themes identified by synthesis of the evidence from all sections.

In order to provide information on the major themes identified from examination of each of the public health fields examined for this report, Table 1 provides a summary of themes suitable for utilisation in the prevention and minimisation of harm from Gambling, and notes the fields in which these were identified.

Table 1: Summary of themes identified and distribution across fields (including clear analogues)

Issue - priority	Gambling	Alcohol	Tobacco	PA & Obesity	BBV
Accessibility	x	x			x
Advertising and marketing restrictions	x	x	x	x	
Affect and Social worlds		x	x		x
Data access	x		x		x
Education, social marketing, media	x	x	x	x	x
Evidence base quality, research, industry influence	x	x	x		
Framing of the issue		x			x
In venue identification	x				
Interactive messaging, PoD prompts	x	x	x	x	
Modification of consumption environment		x			x
Monopoly operation		x	x		
National strategy		x	x		x
Peer - community engagement					x
Political bi-partisanship					x
Population health focus			x		x
Pre-commitment	x				
Price		x	x	x	
Product information	x			x	
Regulatory fragmentation	x		x		
Research - community engagement					x
Selection of priority product types	x				
Stigma reduction			x	x	x
Structural characteristics	x	x	x	x	
Systems or complex approach			x	x	

Note: PoD = Point of distribution

There are multiple themes not presently identified in the gambling literature. The task in this project was to identify these, and relate them to the gambling field. The next section outlines the priorities and recommendations arising from these. Note that all recommendations are, in the opinion of the authors, feasible and achievable, and are supported by evidence. However, some are of higher priority, or likely to be more straightforward in implementation than others. Some are both.

Key issues and topics

The project identified multiple topics for consideration in the advancement of gambling harm prevention and minimisation policy and interventions. Further, the project collaborators agreed that electronic gambling machine (EGM) and online/mobile wagering sectors constituted the most significant areas of concern around gambling harm, based on available data around rates of harm and population prevalence of use.

Topics identified via RQ1 and RQ2 are set out below with a brief account of significant themes and recommendations arising.

Recommendations which are of high priority based on available evidence are identified with an asterisk (*). Recommendations with ease of implementation are identified with a hash mark (#). Recommendations incorporating both characteristics are identified with both symbols (*#).

Topics, themes and recommendations

Structural characteristics of gambling products

The structural characteristics of gambling products are the 'building blocks' of the product. They are discrete but integrated elements of game design (i.e., the rules and elements of the game) that in the aggregate constitute the game portrayed. Altering these can be undertaken to reduce the harmful potential of specific products, especially where the products are provided via a digital platform (as with EGMs and online/mobile wagering). Because of their digital character, structural characteristics are amenable to ready modification, and a body of recent research has identified particular characteristics as closely linked to the harmful potential of the product.

The following interventions are recommended for EGM operation:

1. Abolition of congratulatory or other sounds accompanying a 'loss disguised as a win' – i.e., any game outcome where the result is an amount less than the amount wagered.*#
2. Further reduction in the maximum bet limit, ideally to one dollar per bet.*
3. Abolition of jackpots, particularly jackpots linked across sites.#
4. Abolition of 'game features', or 'bonus rounds'.
5. Requiring all virtual reels of a game to have an equivalent number of symbols in total.
6. Requiring as even as possible a distribution of winning symbols across all reels of a game.
7. Provision of accurate information about game characteristics via an unavoidable, clearly presented information screen. This should include the odds of winning the major prize, number of symbols on each reel, and number of winning symbols on each reel.*#
8. Provision of accurate average price information to game users, preferably via unavoidable information screens detailing average price of operation (e.g., 'on average this game is programmed to cost you 12.5% of your stake on each bet' or 'if you bet two dollars per spin this game will cost an average of 25 cents per spin') and median time on device for a given stake (e.g., 'half of the users of this game will spend a \$50 stake in six minutes or less betting two dollars per spin').*#

The following interventions are recommended for online wagering operations:

9. Continued restriction of in-play betting on mobile devices.*#
10. Abolition of spot bets.*#
11. Provision of accurate information via unavoidable information screens describing the operator's take out for each market offered to or selected by the user (e.g., 'the operator has factored in a profit margin of 16% when constructing markets for horse racing').*#

Pre-commitment and self-exclusion

Pre-commitment systems operate in Victoria and are proposed for the online/mobile wagering sector. At present these are voluntary or 'opt-out', and such systems have been shown to have low take-up rates. However, there is evidence to demonstrate that requiring universal utilisation of pre-commitment systems will have significant harm prevention and minimisation effects. Not least amongst these effects is the ability to introduce an effective and binding self-exclusion regime, which has so far been elusive because of difficulties in identifying individuals who have self-excluded, and because of other 'loopholes' in the existing systems.

12. Pre-commitment systems operating as 'voluntary' or 'opt-out' systems should be required to be adapted for universal use from a specific date. Universal use of pre-commitment means that every person who wishes to use EGMs or wagering services should be required to establish an account for that purpose, with a secure identity check required, and nominate at least a weekly limit for expenditure across the system. Daily, weekly and monthly limits should be available for selection, and users should also be able to nominate daily, weekly and monthly time limits.*
13. Loyalty programs should not be used for pre-commitment purposes. Pre-commitment systems should be operated by the provider of the monitoring system for EGMs, and data generated (including limits set) must not be used for commercial marketing purposes.*#
14. Data generated by pre-commitment systems should be routinely provided in a de-identified unit record form to researchers, and regularly published via the internet in a summary form for interested members of the public.*
15. Pre-commitment systems operated by online wagering providers should require users to nominate spending, deposit, and time limits that apply to all providers with whom users have accounts, including any accounts established by users with additional providers. Eventually, all gambling products should be registered to an individual, with limits applying across all products.*
16. Pre-commitment limits should be initially established via an easily accessible online system. Once established, limits should not be increased other than at set intervals (e.g., monthly or quarterly). Reduction of limits should be possible at any time, including via use of an 'instant exclusion button' to stop gambling for a specified period (e.g., 24 hours or seven days).*
17. Consideration should be given to establishment of a statutory maximum limit for bets and wagers, and deposit limits.
18. Users wishing to self-exclude from gambling should be required to either terminate their pre-commitment account or set a spending and time limit of zero.*
19. Self-excluded users should be required to demonstrate that they have taken appropriate steps to address gambling harms before being able to reinstate their account.
20. Users wishing to self-exclude for a short period (e.g., seven days) should be able to do so via an easily accessible 'instant exclusion button', activation of which means they will be locked out of the system for the relevant time period.
21. Users currently using limits provided by, or self-excluded using non-universal systems should be automatically transferred to an account with equivalent limits on the universal system.

Interactive and ‘pop-up’ messaging

There is evidence to indicate that interactive messaging, especially in conjunction with a pre-commitment system and a monitoring algorithm of use patterns, will assist in providing better information to assist gamblers to retain control of their gambling activity and minimise harms arising from loss of control. Generic messages urging ‘responsibility’ are not well supported by evidence, but targeted messages that convey meaningful information about expenditure and time spent on the device are likely to be helpful if properly designed and prominently and unavoidable displayed.

22. Interactive messages should be deployed regularly within gambling sessions to provide accurate information about expenditure and time spent within gambling sessions. This information should be provided on an established schedule (e.g., at intervals of 20 minutes) and whenever ‘trigger events’ are identified (e.g., when a proportion of a predetermined limit has been achieved – 25%, 50%, 75%, 90%).
23. ‘Generic’ messages should be avoided on pop-up messaging systems, in favour of information related to user behaviour. This can be facilitated by linking messaging to pre-commitment data.
24. When displayed on EGM screens, pop-up messages should be located centrally on the screen, with no competing messaging or game activity displayed concurrently. Messages should be provided in an easily read text. Consideration should be given to developing language options for registration via pre-commitment systems to allow messages to be provided in a language preferred by the user.*
25. When displayed via mobile or online devices, pop-up messages should be displayed prominently on the screen, with no competing messaging or wagering activity displayed concurrently. Messages should be provided in an easily read text. Consideration should be given to developing language options for registration via pre-commitment systems to allow messages to be provided in a language preferred by the user.*#
26. Support systems including counselling and advice on limit setting and risks associated with gambling activities should be marketed via pop-up messages regularly or under certain conditions (such as reaching a limit, or when gambling is undertaken on multiple successive days or at certain times of day or night).*#

Accessibility and exposure

Accessibility and exposure to gambling products, and to the promotion of these, is a key determinant of propensity to use and thus of propensity for harm. Although accessibility has been recognised as a major risk factor, and has been subject to some controls, there is considerable scope for more nuanced and carefully considered action for harm prevention and minimisation. In particular, decision making around changes to accessibility are of considerable importance in determining the pattern of harmful gambling, its regressivity and impacts. Accessibility also needs to be re-framed around such issues as venue and site operating hours, average number of EGMs within venues, and the relationship of access to specific harms.

27. EGM venue size should be reduced over a period of time to reduce the gambling intensity of large venues. Reductions should focus on larger venues (e.g., those with more than 49 EGMs) and those with high average EGM expenditure, and be expected to achieve a

reduction in average venue size from 53 EGMs (in July 2017) to 40 EGMs in 2023. This would represent an average reduction of 25% in EGM numbers, to a total of no more than 19,900.*

28. Government should provide the Victorian Commission for Gambling and Liquor Regulation (VCGLR) with clear direction as to the requirements of the 'no net detriment' test, including requiring that: applicants present an evidenced-based plan for addressing harm at their venue; VCGLR monitor actual EGM expenditure and charitable donations at venues to assess the accuracy of estimates of additional expenditure and undertakings to provide charitable contributions; and VCGLR take account of and provide significant weight to data or research relating to intimate partner violence (IPV) and other gambling harms. Where expenditure estimates or undertakings are not met, licence conditions should require some or all new or additional EGM entitlements to be forfeited.#
29. Operating hours of EGM venues should be reduced to (for example) not more than 14 hours per day, and venues should be closed for EGM operations between (for example) 2:00 am and 10:00 am every day. The basis of such operating hours requires further research, although restriction of operating hours is an established harm minimisation measure in gambling regulation.
30. Online wagering systems should not be permitted to operate for 24 hours a day. Restrictions on hours of operation in Australian jurisdictions should require that no wagers be permitted after (for example) 2:00 am or before 10:00 am local time on any day. The basis of such operating hours requires further research, although restriction of operating hours is an established harm minimisation measure in gambling regulation.
31. Users seeking to establish an online or mobile wagering account should be required to provide adequate identification and establish pre-commitment limits prior to placing any wagers.*

In-venue and real-time identification of 'problem gamblers'

For some time it has been clear that it is possible to identify people experiencing harm from gambling via observing their gambling and related activity. However, there is little evidence of the extent to which such knowledge has been applied, nor of its efficacy in reducing harm when this is achieved. It is also clear that such signs are most likely to be visible once significant harm has been incurred. Further, there is increasing evidence of the feasibility of using algorithms to detect harmful patterns at an early stage in the development of harmful gambling. Accordingly, there may be some merit in requiring venues and gambling operators generally to act on observed signs of gambling harm. However, there is better evidence to indicate that use of automated pre-commitment and algorithmic monitoring systems to detect harm and act via messaging or other interventions would be more likely to prevent or minimise harm at the earliest possible stage.

32. Observation of gamblers by staff is unlikely to provide conclusive evidence of harmful behaviour unless supported by data monitoring systems and algorithms capable of identifying emerging patterns. Both terrestrial and online systems should facilitate such systems, as noted above.
33. It is feasible to identify people exhibiting signs of gambling harm in venues and online sites. Such signs are likely to be observed when people are experiencing substantial and entrenched harm. Nonetheless, interventions in such circumstances are warranted and

should be required. Further, existing 'codes of conduct' for venue harm minimisation are (in some jurisdictions) voluntary, and highly subjective, and their implementation is not well enforced. Such codes should be mandatory, include objective measures to assess gambling harm (whether automated or observational) and enforceable, and venues failing to enforce any aspect of a code of conduct should be penalised by meaningful penalties, including fines and/or loss or suspension of licence, including where observation of harmful behaviour is not followed up.*#

34. Staff in venues and on online gambling sites should be trained and supported to offer assistance to people who they believe are experiencing harm. Such assistance can be implemented personally where indicated or via electronic messaging 'piggy-backing' on pre-commitment systems and harm identifying algorithms.*
35. Venue and online gambling operators must be required to implement mandated interventions when indicated via either personal observation or algorithmic identification. Such interventions should include reduction of pre-commitment limits, referral to counselling or clinical interventions, self-exclusion for a period of time or indefinitely, and activation of targeted messages in standardised form around expenditure or time spent gambling.*

Restrictions on advertising or marketing

There is evidence that the principal use of advertising for products such as tobacco, alcohol or gambling is, apart from recruiting new consumers, to 'normalise' the product and associate it with enjoyable and desirable activities, such as sport. There is evidence that proliferation of gambling advertising has achieved this, particularly with children and young people. Some moves are underway to restrict the visibility of advertising on mass media, such as free to air broadcast media, during sporting broadcasts. However, there are multiple additional opportunities to modify access to advertising to limit the extent of normalisation, and thus of reducing the uptake of gambling and associated harms.

36. Advertising of gambling should not be permitted in connection with sporting broadcasts during times when children are likely to be viewing, whether free to air, subscription or online. In practice, this may mean a prohibition on such advertising until after games have concluded.*#
37. Advertising or marketing of gambling products via computer or mobile applications or electronic games classified as G should be prohibited.*
38. Advertising or marketing of gambling products via social media should be prohibited.*
39. Establishment of a gambling account and associated pre-commitment limits should require formal identification and proof of age prior to implementation of the account.*
40. Sponsorship or 'branding' of children's sporting competitions by gambling operators should be prohibited.*
41. Sponsorship or branding of sporting competitions by gambling operators, including endorsements or sponsorship of players, should be phased out over a reasonable period and replaced by alternative sources of revenue.*

Stigma reduction

People affected by gambling harm are clearly heavily stigmatised and experience considerable shame. However, there is substantial evidence to demonstrate that drawing on the expertise and experiences of people who have lived experience of gambling harm can provide invaluable knowledge to support help-seeking activities and the design and effective implementation of effective interventions to prevent or reduce harm more broadly. The Victorian Responsible Gambling Foundation (VRGF) has supported some activities in this topic area. However, the discourses of the 'problem gambler' and 'responsible gambling' have contributed to the entrenchment of this stigma and there is considerable work to be done to change this situation. This has considerable potential to support effective reform and much better strategy in harm prevention and minimisation.

42. Effective campaigns and messages to counter the stigma associated with experience of gambling harm are key to overcoming the harms of gambling. These need to be adequately resourced, and developed in association with those affected by gambling harm, with multiple objectives;*#
 - a. De-stigmatisation will assist those affected by gambling harm to seek out assistance and support;
 - b. Establishing user experiences as significant and expert contributions will be crucial to the development of more effective harm prevention and minimisation initiatives and policies;
 - c. Stigma has been significantly reinforced via the individualising and frequently pathologising discourses of 'responsible gambling' and 'problem gambling'. Overcoming these will allow more rapid development of public health focused population health methods for gambling harm prevention and minimisation;
 - d. Develop strategic alliances between those affected by gambling harm, researchers, and the broader concerned community will better inform research activity, policy and intervention development, and provide more balanced and informative advice to policy and decision makers.

43. Peer expertise in developing effective messages and programs for gambling harm prevention, minimisation, and treatment has been substantially under-utilised. Provision of resources to better support such peer intervention and project development, and to implement such interventions, is likely to produce much more effective interventions.*#

Price

The price of gambling is not well understood by many people who gamble, particularly amongst those who gamble on EGMs and in some cases those wagering. Because of this, the use of price signals, which has a solid evidence base in other public health fields, has been largely neglected in the gambling field. However, price can be used to form disincentives for the 'super-profits' that some gambling operators are able to reap from highly intensive gambling forms. Further, there is considerable scope to improve the accessibility of pricing information and render it more comprehensible to gamblers. Progressive taxation has been adopted in Victoria and some other jurisdictions in relation to specific gambling types but this could be further developed to remove incentives for the more harmful forms of gambling.

44. The most harmful gambling products should be subject to highly progressive tax systems to discourage operators from pursuing the super-profits that such products frequently yield.
45. Current average net gambling revenue (NGR) should be utilised as a benchmark in determining progressivity of the EGM tax regime, with significant increases in EGM tax rates above the average level and at increments above that level – e.g., 125%, 150%, 175% and 200%. Such a regime should not distinguish between ‘not for profit’ and commercial operators.
46. The Australian government should impose a uniform national tax regime on interactive wagering operations based on gross revenue (as recommended by the Productivity Commission 2010). The proceeds of this should be distributed amongst the states on the basis of place of consumption. States should utilise the proceeds of this for funding product fees for the racing and sports industries and for general revenue purposes.*
47. Additional revenue resulting from any progressive or expanded tax regime should be allocated to the provision of effective social marketing around gambling harm, stigma reduction, well-resourced counselling, support and recovery programs, and research funding.
48. Price information for gambling products should be provided as transparently and clearly as possible (see recommendations 8 and 11, above).*

Framing of the issue

The way in which an issue is understood by the public, policy makers, regulators and those directly affected by it has enormous impact on the strategies and interventions adopted to address it. As noted previously in the Stigma topic, the discourses of ‘responsible gambling’ and ‘problem gambling’ are individualising and tend to pathologise individuals, rather than pursue a public health philosophy via population health methods. Public health approaches to gambling have been articulated since late last century, but the operationalisation of these has lagged. This is arguably associated with the orthodox discourses that have framed the issue and have largely served the interests of industry. Further, discourses around gambling harm have tended towards a focus on clinical considerations around treatment, rather than on harm prevention and minimisation. The re-framing of the issue along public health and population health concepts and alignments is important and can strongly support the reorientation of policy and interventions towards harm prevention and minimisation. This also has implications for the way in which product warnings are formulated and displayed, in order to convey accurate, product specific information rather than generic messages around ‘responsibility’.

49. The discourse of ‘responsible gambling’ has been effective in shifting responsibility from providers of harmful products to those experiencing harm from those products. It is timely to move from the ‘responsible gambling’ discourse to a discourse of gambling harm prevention and minimisation.*#
50. The ‘problem gambler’ discourse represents an individualising and pathologising concept that should be replaced by the concept of gambling harm, and the population affected should be referred to as those harmed by gambling.*#
51. Treatment or recovery programs for those experiencing gambling harm are essential and need to be expanded to enable access for all who require it. Expanding uptake requires comprehensive action to de-stigmatize the experience of gambling harm and encourage all

those affected to seek assistance and support, as noted in recommendations 42-47 (above).*#

52. Social marketing, promotional materials, and campaigns to reduce gambling harms should refrain from using terminology such as 'responsible gambling' or 'problem gambler' and avoid messages focused on individual behaviour. Messaging should focus on advice about how and where to seek assistance, accurate advice about the price and risks of gambling, and encourage the uptake of tools and techniques to monitor gambling activity and avoid, prevent or minimise harm.*#
53. Legislation regulating the provision of gambling should incorporate the prevention and minimisation of gambling harm as its principal objective.*
54. Gambling regulators should be tasked with ensuring that the prevention and minimisation of gambling harm is their prime objective, and decision makers dealing with applications for gambling licenses and entitlements should be required to address gambling harm prevention and minimisation as their principal decision-making criterion.*
55. 'Responsible gambling codes of conduct' should be (i) revised as 'Harm prevention and minimisation codes of conduct'; and (ii) be mandatory and subject to clear regulatory requirements, including specified minimum requirements, and penalties for breaches of these up to and including loss of licence or entitlements.*#
56. Mandatory warning signs and messages should be required on any marketing, promotional or advertising materials associated with gambling, and should refrain from use of such terms as 'responsible gambling' or 'problem gambler', in favour of accurate messages about the harms of gambling and the risks of experiencing those for regular gamblers, e.g.,: 'Gambling is associated with significant harms including increased risks of physical and mental health problems, separation, divorce, financial difficulties and bankruptcy, intimate partner violence and fraud' or 'up to 30% of weekly EGM users experience moderate or serious harm derived from gambling'.*#
57. The Community Benefit system operating in Victoria for club-licensed EGM operators (and its equivalents in other jurisdictions) should be comprehensively amended to provide for provision of accurate and transparent provision of information about donations and contributions. Any such contributions should be allowable only when made to (i) organisations with tax deductible status; or (ii) bona fide sporting or community organisations; or (iii) as scholarships, bursaries, or donations to bona fide educational institutions; or (iv) organisations to support returned service personnel, their families and dependents. In all cases, donations should not be permitted to organisations or persons linked to the donor or its office holders or agents. Such schemes should not permit the operating expenses, wages, or other costs of the business to be regarded as community contributions. Contributions should be allowed to reduce liability for gambling tax up to a maximum 8.33% of NGR. Contributions less than the maximum amount should reduce liability for gambling tax only by the proportion of NGR contributed.*
58. The Victorian Responsible Gambling Foundation should be renamed, for example as 'The Victorian Gambling Harm Prevention Foundation'.

Affect, place of consumption, and the social world of the gambler

With some important exceptions, gambling environments and their influence on the affective world of the gambler has been a neglected area of research activity. The social world of gamblers, and how this may be altered, has also been under-researched. Consideration of these and their interaction with gambling behaviour is important and likely to provide important understanding. Modification of the gambling environment and products together with modification of the affective system that characterises the promotion and depiction of gambling may have important impacts on the propensity of populations to be exposed to more harmful forms of gambling, and consequently to experience gambling harm.

59. Warning information for gambling should be focused on provision of accurate information about the risks of gambling harm arising from specific gambling types (e.g., 'amongst people using EGMs weekly or more often, the rate of serious harm is five times the population average').*
60. Price information relevant to specific games must be disclosed for each game in a simple and readily comprehended way (see recommendations 8 and 11, above), and must be unavoidably provided at the commencement of every session of use.*
61. Prominent messages relating to rate of expenditure and elapsed time of sessions must be regularly and unavoidably provided (as noted in recommendations 22-25, above).
62. The size and opening hours of venues and the operating hours of online providers should be subject to reasonable restrictions as noted at recommendations 27, 29 and 30 (above).*
63. Smoking areas in gambling venues should be required to allow egress from the venue other than through the gambling area.
64. Gambling venues should not be permitted to be open for business at times when the only part of the premises trading is the gambling area.
65. Gambling venues should provide clearly available information about how to gain access to information and support to address gambling harms, including via promotion of interactive systems to enable contact with services such as peer to peer support and counselling, etc.*
66. Development of a digital engagement strategy with the goal of providing a portal for multiple support systems for gamblers and others affected by gambling harm should be facilitated, and information about how to gain access to such support, and reminders to make use of it should be prominently displayed in gambling venues, and via mobile and online wagering sites.*#

Product information

Information about gambling products, particularly more harmful gambling products, is difficult to obtain and often difficult to comprehend. This includes basic information such as price, the probabilities of the game, and the fact that such characteristics can vary significantly between products that appear externally indistinguishable. This can also be supplemented by real time information allowing users to know how much time or money has been spent during a gambling session, and the relative risks of specific gambling products.

67. Information about the structural and other characteristics of all gambling products must be prominently and accurately provided within gambling venues and via all mobile applications or web sites offering gambling products.*
68. Such information should include detailed accounts of price (for each game offered, and in a form as suggested at recommendations 8 and 11, above).
69. The structural characteristics of games should be clearly and accurately described, and made readily available at every location where games are offered (whether terrestrial, mobile or on line), including, for EGM games, the information set out at recommendation 7 (above) and for online wagering, information about the structure and take out rate for each market offered as noted in recommendation 11 (above). The means of access to such information should be advertised prominently at the start and conclusion of every gambling session and should be made prominently available via the web and mobile sites of gambling providers.
70. Product information should be accompanied by warning signs as suggested at recommendation 60 (above).*

Structure of the industry

The structure of the gambling industry is related to its ability to influence policy and pursue its goal, which is generally the maximisation of revenue. This is at odds with the priorities of those concerned with the prevention and minimisation of harm. Consideration of the way the industry is structured, and how this might be altered to make effective harm prevention and minimisation more achievable, is of considerable importance. For example, some industry sectors are very large and operate effectively as monopolies, or as principal oligopolists within an oligopolistic sector. This provides the perception (if not the reality) of an inability to effectively regulate such operators. This, in turn, undermines the capacity of regulators and policy makers to pursue effective reform. Such a situation is undesirable, but is amenable to some interventions.

71. Large scale operators of gambling venues are currently subject to differing regulatory regimes in many jurisdictions on the basis of whether they are 'not for profit' or commercial operators. It is important to ensure that operators are regulated in a way that ensures consistency of harm prevention and reduction imperatives. Some 'not for profit' operators are indistinguishable from commercial operators, and enjoy considerable tax and regulatory benefits as a consequence. Such distinctions require scrutiny, with gambling tax arrangements modified to promote less harmful gambling forms or lower intensity operations whether operators are 'not for profit' or otherwise (see recommendation 49 (above)).
72. Corporate tax benefits for 'mutual' or 'not for profit' gambling operators should be subject to careful review by the Australian government (as recommended by the Productivity Commission 2010) and large scale operators (i.e., those operating multiple venues, or with revenues in excess of \$20 million p.a.) should be liable for corporate tax, and regarded as commercial operators for all other purposes.*
73. Australian casino operators largely operate within a jurisdictional monopoly environment. There is some perception that some such operators are, effectively, too big to regulate effectively, and have considerable power over government and regulators. For example, guarantees of compensation to gambling operators in the event that harm prevention or minimisation initiatives are adopted provides a substantial disincentive for adoption of such

measures. Dismantling such monopolies and removing such inhibitions on pursuit of harm prevention and minimisation initiatives are warranted.

74. Oligopolistic control of segments of the Australian gambling market is widespread and increasing. Experience suggests that large gambling operators are difficult to regulate effectively. Mechanisms to reduce such market concentration are warranted, including reduction of the threshold proportion of the market for any single operator, and co-operation with Australian Competition and Consumer Commission (ACCC) and other regulators including Australian Charities and Not-For-Profits Commission (ACNC) to explore mechanisms to maintain competitive markets in gambling products, consistent with harm prevention and minimisation priorities.*#
75. Gambling operators have provided significant financial support to political parties and have obtained significant apparent leverage over policy as a consequence. Action to significantly limit such influence and make it subject to real time disclosure and transparency is essential to reduce perceived distortions of the policy process and is a high priority for advancement of a harm prevention and minimisation agenda.*#

Regulatory fragmentation

Australia's federal system of government and its constitution mean that there are often important distinctions between the regulation of some common gambling types, including EGMs and online/mobile wagering. In some cases, this has meant a 'race to the bottom' both in regulatory and taxation contexts. There are some vehicles to address these, however, including the Australian and New Zealand Gaming Machine National Standards. These could be used to implement some 'best practice' policy, which would have benefits for Australian jurisdictions including regulatory consistency. The most recent version of these Standards includes reference to player information and consumer protection (VCGLR 2017a). These inclusions are helpful but remain largely non-specific with respect to structural characteristics and allow considerable variation between jurisdictions. It is reasonable to suggest that, with Australian Government leadership, the Standards could evolve to become consistent throughout Australian jurisdictions

Recent actions by the Australian government in the online/mobile wagering sector demonstrate that this principal has support from most Australian jurisdictions and can and should be extended for harm prevention and minimisation purposes. Further, co-operation between corporate and gambling regulators may assist in making harm prevention and minimisation interventions more achievable.

76. Directors, officers and management of gambling operators should be encouraged via relevant corporations' legislation to implement harm prevention and minimisation initiatives, without concern for any resulting impairment of assets, reduction in financial return or otherwise.*
77. Australian governments should use the Council of Australian Governments (COAG) and other government-to-government processes to pursue agreement to remove any tax redistribution or other disincentives to more effective harm prevention and minimisation policy and interventions.*#
78. The Australian and New Zealand Gaming Machine National Standards provide a basis for consolidating and standardising harm prevention and minimisation requirements for EGMs. However, they are not currently used for this purpose as well as they might be. States apply different parameter settings to EGM structural characteristics and operation (e.g., load up

limits, maximum bets, speed of operation, characterisation of losses disguised as wins, operation of multi-player gaming terminals, etc.). Modification of EGM structural characteristics provides a good basis for improved harm prevention and minimisation interventions, and best practice standards for these should be adopted by all Australian jurisdictions. If necessary, the Australian government should take a lead in co-ordinating discussions with all Australian jurisdictions to implement a genuinely uniform set of national standards, expanding new consumer protection priorities, with an explicit focus on harm prevention and minimisation. Failing agreement, the Australian government should legislate such a set of standards.*

79. The Australian government has recently taken a lead in negotiating a set of consumer-protection focused legislative and taxation standards with other Australian governments. The implementation of these should be expedited. It may be desirable for the Australian government to legislate uniform standards for harm prevention and minimisation in the online and mobile wagering industry, and impose uniform taxation arrangements as suggested at recommendation 50 (above). Development of a National Gambling Harm Prevention and Minimisation Strategy, in line with the National Drug Strategy, is a likely useful tool beyond the online gambling sector and COAG should be engaged in this activity.*

Industry influence on research

As with tobacco, alcohol and the food industry, gambling operators have been active in influencing research agendas and priorities. There have been many consequences of this, clustered around the framing of the issue of gambling harms, the approaches adopted to address these, and the subsequent development of the evidence base in particular directions. It is now acknowledged that the gambling evidence base is deficient in some important areas as a consequence of this activity, with a bias towards individualised treatment oriented approaches. This issue has been better addressed by the tobacco (e.g., article 5.3 of The Framework Convention on Tobacco Control) and alcohol sectors and some important interventions can be adapted from those sectors in order to develop a more independent and effective research sector, with the consequent production of an evidence base that more clearly supports harm prevention and minimisation approaches.

80. Gambling researchers should be required to disclose all funding sources and be ineligible for VRGF or VicHealth funding if they have accepted funding, consultancies or other support from gambling industry operators or their agents in the five years preceding any grant application.*#
81. Gambling research forums or conferences should not accept support or sponsorship from gambling industry operators or their agents, and government representatives should not attend any forums or conferences that do receive such funding. Non-industry dependent support for such independent forums should be available from relevant non-industry influenced sources such as VRGF or its equivalent in other jurisdictions.*
82. Research funding for gambling research should ideally be raised from general revenue. However, utilising taxation from gambling operations to support research funding may allow expansion of the evidence base. Where research funds are derived from gambling taxation revenues, allocation of funds should be subject to decision only by independent foundations (such as VRGF) or funding bodies (such as the Australian Research Council) and based on peer review processes. Researchers with a history of gambling industry support should not be peer reviewers in such processes.*

83. Government and government agencies may have specific knowledge requirements around gambling research. These should be informed by regular engagement with the research community and service providers engaged with the needs of those who have experienced or are experiencing harm from gambling. These should be subject to contract processes that echo the independence requirements of recommendation 83 (above).
84. Funding bodies should provide a significant proportion of available research funds to researcher-directed funding, with funding being based on criteria including innovation in harm prevention and minimisation, expansion of basic knowledge, soundness of method and improvement of community wellbeing.
85. Population monitoring studies should be preferred to prevalence studies as a means for developing understanding of the nature and extent of gambling harms, innovations in gambling behaviour, uptake of products and establishment of priorities for harm prevention and minimisation interventions and policy. Such studies are significantly less expensive than prevalence studies, can be undertaken frequently and regularly to develop a metric system for tracking harm, and can provide valuable information for improving harm prevention and minimisation activities.*
86. Gambling researchers should be encouraged to form independent research and professional associations with no connection to the gambling industry, and to agree on and abide by ethical and professional standards that minimise the risks of industry influence on research activity.*
87. Access to de-identified data and information about gambling operations and products should be available to bona fide researchers as a condition of licensing. Gambling operators should be required by licensing conditions to permit reasonable access to premises for the purposes of recruitment of research participants.*#
88. Gambling regulators and policy makers should be supported by researchers to acquire knowledge and understanding of innovation in gambling products and user activity, preferences, and behaviour. This will be facilitated by acquisition by regulators of technical information and data as suggested in recommendation 88 (above).*
89. Gambling regulators should consider re-acquiring technical expertise and 'in-housing' at least some approval processes for some products to ensure improved technical understanding and better regulatory capacity.

Advertising, marketing, knowledge transfer and educational interventions

Social marketing and advertising are common interventions intended to prevent, minimise or address harm associated with gambling or other public health issues. However, there is conflicting evidence as to the efficacy of these approaches. The evidence from other public health fields indicates that such messaging requires careful consideration and is most effective when accompanied or complemented by other material interventions or policy changes. Knowledge transfer activities also have an important role to play in mobilising opinion and providing support and evidence to policy and decision makers in pursuit of more effective harm prevention and minimisation activities.

90. Campaigns and messaging around addressing existing gambling harm (help seeking campaigns) should be carefully developed to avoid stigmatising those affected by gambling harm, should be oriented towards factual information about the nature and lived experience of harms, and provide clear advice for action to address those harms.*#
91. Campaigns and messaging around gambling harm prevention or minimisation (risk reduction campaigns) should incorporate factual information about the nature of gambling products, the relative risks associated with use of those products, and evidence based advice about how to minimise those risks. Material utilised in such campaigns should avoid stigmatising those affected by gambling harm, emphasising factors that may produce increased vulnerability, and indicating that at a population level, harm can be inflicted on people across a variety of backgrounds.*#
92. Campaigns around help-seeking or risk reduction should ideally accompany material changes to the gambling environment via improved harm prevention or minimisation policy or interventions. For example, both help seeking and risk reduction campaigns would be important around the phase-in of a universal pre-commitment system and assist in explaining why it is a useful and important initiative to support harm reduction. Information provided should be accurate, factual and evidence based.
93. Gambling researchers undertaking VRGF commissioned or funded research, or providing support to the development of campaigns, should be encouraged and supported to provide brief plain language versions of their research for distribution to interested members of the community.*#
94. VRGF should encourage researcher policy forums regularly, involving decision makers and political leaders, to assist in improving the understanding of all facets of the gambling harm prevention and minimisation program.*#
95. Educational interventions designed to improve understanding of the relative risks of gambling types should be factually based, draw on available evidence, and include advice on how to reduce the risks associated with gambling. Educational programs should be supported by general community campaigns reiterating and reinforcing similar messages, and identifying tools and resources available to support risk reduction, and harm prevention and minimisation.
96. Knowledge transfer activities between researchers and the policy community should be actively supported via development of topical material such as brief research summaries, electronic resources (e.g., podcasts, short video presentations, and where possible interactive 'webinars').

Standard of evidence

The standard of evidence applied to the development of public health problems is not comparable to that required for clinical interventions. This is an important issue, as the gambling industry amongst others has repeatedly delayed action on important interventions by arguing for unnecessary and impossible standards of evidence. Indeed, this is a classic tactic of industry including tobacco, alcohol and the packaged food industry. This does not mean that interventions or policy reforms should be ad hoc. Rather, they should rely on available evidence, be plausible, and have face validity, and in some cases, should be implemented via trials. However, the most important consideration should be the interruption of avoidable harm.

97. Interventions or policy changes intended to prevent or minimise gambling harm should be evidence based, and focused on gambling sectors where risks of harm are demonstrated and significant. However, given the nature of the gambling system, and its complex determinants, clinical standards for evidence supporting interventions are untenable, and should not be adopted.*
98. Interventions intended to be implemented in the gambling sector to prevent or minimise harm should be plausible, have face validity, and be evidence based. Where possible, trials of such interventions should be utilised in advance of their implementation. However, where evidence of harm is high, implementation of likely effective interventions should be expedited.*
99. Evidence or critiques of evidence of the likely or actual effectiveness of proposed interventions produced by the gambling industry, or by researchers or consultants engaged by the gambling industry, should be subject to careful and independent re-analysis before consideration. Data used in support of submissions by the gambling industry or its agents should be made available for re-analysis in full before such material is considered by policy or decision makers.*#

Multi-faceted and systematic interventions

Gambling harms, as with other areas of public health concern, arise from the complex interaction of a variety of determinants. These include social, psychological, economic, political, geographic, and many other factors. Effectively addressing the harms of gambling (or any other problem) will be much more achievable if this is recognised, and the determinants utilised to develop a systematic approach to preventing or minimising harm. This has been achieved in some areas and is eminently achievable in the gambling harm field. It does require a broadening of the field and a revisiting of some research priorities but is likely to achieve considerable reductions in the overall level of harm.

100. Approaches to gambling harm prevention and minimisation need to be cognisant of this complexity, and address factors such as these via effective multi-factorial interventions. Accordingly:
101. Research into factors other than those at the individual level relating to gambling harms should be expedited, particularly in relation to the socio-economic and regulatory determinants of gambling harm.*
102. Responses to gambling harm should be developed iteratively but systematically in order to produce a strategic approach that addresses all relevant factors to the greatest extent possible.*
103. Development of a systematic approach to harm prevention and minimisation should not delay adoption of likely effective interventions or policy innovations, but should proceed in tandem and produce a complementary system in which all effective interventions are accommodated.*
104. Understanding and knowledge from public health areas other than gambling harm should be regularly monitored and effective approaches or interventions identified for possible inclusion in the gambling harm prevention and minimisation system.*

Purpose and focus of this project

The focuses of this project are: (i) the identification of gaps in the evidence concerning gambling harm prevention and minimisation policies; and (ii) identification of strategies, policies and interventions likely to prevent or minimise harm associated with gambling.

The project draws on the lessons of some major fields of public health activity – tobacco control, alcohol policy, sexual health and blood-borne viruses, and physical activity and obesity. These fields were identified in order to provide a range of established and developing areas of public health activity in the prevention or minimisation of harm. In Australia, and globally, there have clearly been notable successes with tobacco control, some progress with alcohol policy, a mix of success and continuing progress with prevention of blood-borne viruses, and continuing progress on understanding the determinants and means to address the rapidly developing problems of lack of physical activity and increased rates of overweight and obesity.

These areas of public health harm prevention and minimisation activity were chosen to represent a spectrum of possible experience, knowledge and practice. The expectation was that such a mix of area would yield a diversity of strategies, policies and interventions. The authors believe that this has, indeed, been the result.

The purpose of the project is to understand both the evidence for implementation of specific policies, strategies and interventions in these fields, and to assess the key drivers for adoption of these.

In order to achieve this understanding, the project drew on the expert knowledge and experience of a number of public health specialists with significant expertise in the identified public health fields. These experts produced targeted advice identifying likely harm prevention interventions for adaptation to the gambling field, in the context of advice provided by gambling policy experts within the group.

This project report has been prepared drawing on this expert advice, in particular advice identifying effective policy drivers, and chains of evidence, opportunity and effect.

The project also involved a review of evidence for existing or proposed interventions, policies and strategies intended to prevent or minimise harm from specific forms of gambling. This involved a review of gambling literature, applying systematic principles, to identify gaps and limits to evidence

Focus on specific forms of gambling

There are multiple forms of gambling readily available on a commercial basis in Australia. It is clear that some of those are associated with greater levels of harm than others. In this project, for reasons we discuss in this section, we focused on two important gambling forms: electronic gambling machines, and online race and sports wagering.

Our consideration of these priorities was informed by data available from the Study of Gambling and Health in Victoria (Hare, 2015), and from data incorporated in the HILDA (Household Income and Labour Dynamics in Australia) report (Wilkins, 2017).

We sought to prioritise gambling forms for identification and development of public health interventions in order to direct resources to the most pressing issues. Some gambling forms (such

as lotteries) are widely utilised but are associated with low levels of harm. Others are little used, but are associated with high levels of harm amongst those who do utilise them. Selection of EGM gambling and online wagering was based on the relatively high levels of harm associated with those gambling forms, and their relatively high utilisation rate amongst the community, as illustrated below in Table 1.

For example, HILDA reports that Lotto games are utilised by about 29.5% of the adult population on at least a monthly basis, and thus ranked 1st in terms of utilisation. However, the combined problem and moderate risk category ('harm') associated with this form is ranked 10th (of 10). EGMs, on the other hand, are ranked 2nd in utilisation and 5th for harm. Race betting and sports betting are 4th and 5th in terms of utilisation, and 6th and 4th for harm. Some gambling forms are low ranked for utilisation (poker, casino table games, private gambling) but appear to present very high harm rates.

Table 2: Gambling participation, high risk PGSI and expenditure by mode

Gambling form	Population utilisation (a)		PGSI 8+ (a)		Highest expenditure allocation – PGSI 8+ (b)	
	%	Rank	%	Rank	%	Rank
Lotto etc.	29.5	1	1.3	10	9.2	3
EGM	8.0	2	6.2	5	50.6	1
Scratch tickets	7.5	3	2.3	9	0.0	8
Racing	5.2	4	5.5	6	31.0	2
Sports	3.5	5	6.7	4	0.8	6
Keno	3.2	6	4.2	7	0.0	8
<i>Casino table games</i>	<i>1.5</i>	<i>7</i>	<i>14.7</i>	<i>2</i>	<i>3.9</i>	<i>4</i>
Bingo	1.5	7	3.9	8	0.6	7
<i>Private</i>	<i>1.2</i>	<i>9</i>	<i>11.5</i>	<i>3</i>	<i>3.0</i>	<i>5</i>
<i>Poker</i>	<i>1.0</i>	<i>10</i>	<i>21.9</i>	<i>1</i>	<i>ns</i>	<i>ns</i>

Note: Estimates for gambling forms in italics are unreliable because of small sample sizes. 'Poker' was included in casino table games in Hare (2015). PGSI refers to problem gambling severity index score.

Source: (a) Wilkins (2017), (b) Hare (2015).

Gamblers typically use multiple gambling forms. Those who may develop gambling harms because of their use of one form are also likely to use another form, and may inflate the harm rate in that form, because they are principally experiencing harm derived from another gambling form. One avenue to determine the relative impact of various gambling forms is to ascertain the attribution of highest expenditure by gambling form for those experiencing severe gambling harm. In Table 1, this is presented using data obtained from Hare (2015). Notably, over half of this group attribute their highest expenditure to EGMs, followed by race betting, with lottery products a distant third.

We believe that it is reasonable to exclude casino table games, bingo, private gambling and poker from specific discussion in this report because of unreliable harm estimates, and the low utilisation rate presented by these gambling forms. That is not to say that these forms of gambling are unproblematic. However, they do not present the most pressing priority for action. Similarly, although the harms associated with lottery products are at a low level (just marginally higher than the overall population rate for PGSI 8+, which Wilkins (2017) estimates at 1.3%, the high population utilisation rate may indicate that some harm prevention or minimisation measures are necessary.

Nonetheless, the gambling forms that in our view have the most impact in terms of utilisation, harm, and expenditure allocation are EGMs and race betting. In terms of this project, we note that sports betting has grown at a rapid rate (in real terms, an average of 23.4% between 2011-12 and 2014-15, although this slowed to 11.5% between 2014-15 and 2015-16) (see Queensland Government Statistician's Office, 2017, Product Tables, Table Sportbetting 6), above that for other gambling forms. Australian online gambling providers are currently estimated to be conducting two-thirds of wagering turnover (see calvinayre.com 2017).

Thus, online wagering has emerged as a critical sector, integrating racing and sports betting. The sports betting component of this business is growing rapidly. Wagering on racing is already a major source of harm and sports betting can be anticipated to follow a similar pattern over time. The Australian Government has recognised this and recently responded with a suite of consumer protection measures, which may assist in harm minimisation efforts. However, these are yet to be implemented.

We also note that technological solutions to prevent or reduce harm for online wagering (race and sports betting) are likely similar in nature to those likely to be effective for EGMs. This derives from the computerised nature of both these forms of gambling. This does not preclude adoption of some harm prevention or minimisation measures for non-computerised gambling forms, nor does it prevent the utilisation of non-computerised measures for computerised gambling forms.

Our focus in this project was therefore determined to be EGM gambling and online wagering, including racing and sports betting. Researchers identified these priorities in the early stages of the project and all groups addressed their activities accordingly.

Methods

Research Questions

In keeping with the project's purpose and focuses, the researchers pursued three research questions:

RQ1. What are the most effective evidence-based policies and initiatives to reduce harm associated with gambling, what are the gaps, and what should be the priorities?

RQ2. What have been the most effective policy drivers for change in areas such as alcohol, tobacco, physical activity and HIV, and how might they be replicated in gambling?

RQ3. What effective policies used or proposed in other areas of public health could be translated to gambling?

Methods

RQ1 required an examination of the gambling literature to identify the major gaps in what is a comparatively limited evidence base (Livingstone et al., 2014). The research is complicated by the multiple forms (i.e., specific gambling activity such as slot machines, table games, lotteries, etc.) and modes (online and terrestrial) of gambling, which have quite distinct and varied harm profiles (Markham et al., 2015). As discussed above, EGMs have the strongest and most widespread demonstrated association with harm at present. Lotteries tend to have the least. Online gambling modes demonstrate a strong and potentially growing association with harm. Harm reduction priorities should be focused on the gambling forms and modes most strongly associated with harm in an Australian - with a particular emphasis on the Victorian - context.

There are multiple policy and intervention strategies intended to reduce harm. For the most part, existing strategies form elements of the currently dominant 'responsible gambling' approach. Most such strategies have a limited evidence base, as previously observed.

We undertook a rigorous review of the literature to identify a comprehensive range of those harm reduction strategies that have been utilised, hypothesized or proposed in the gambling field in Australia and comparable countries. This builds on a review of evidence undertaken for the Australian and New Zealand School of Government (ANZSOG) by Livingstone et al. (2014), which examined strategies including self-exclusion, pre-commitment, reduction of bet size, signage, in-venue identification of problem gambling behaviour, automatic teller machine (ATM) removal, and on-screen messages.

Further strategies we investigated for the present project included modification of EGM structural characteristics, user-tracking software, and other harm reduction or harm minimisation strategies identifiable from the literature (both formal and informal).

A systematic review using Cochrane-style protocols was not applicable to this process. The evidence base for harm minimisation or harm reduction interventions, strategies or policies in the gambling field is methodologically diverse and of variable quality, and, as such, is not generally suitable for categorisation into hierarchies of evidence quality. Nor, in most cases, have studies been undertaken using broadly comparable methodologies or methods. However, notwithstanding these limitations, this review applied systematic principles, as follows:

- Use of clear search terms;
- Adoption of clear exclusion and inclusion criteria;
- Searches of all suitable databases, including those drawing on academic and grey literature;
- Review of all suitable abstracts, and identification of those warranting full examination;
- Classification of literature as to quality (noting that much of the gambling literature does not lend itself to easy categorisation in this respect);
- Classification of literature according to a series of criteria including gambling form/s and mode/s, type of strategy or intervention, measures applied, conclusions reached, and quality.

- We sought to identify studies amenable to meta-analysis, but the review did not identify such studies.

The RQ1 review was led by Dr Angela Rintoul (Australian Gambling Research Centre [AGRC]) with Ms Cassi de Lacy-Vawdon (AGRC, Monash) and Dr Charles Livingstone (Monash)

RQ2 was focused in identifying drivers of policy change across a number of areas of public health activity. The following public health policy areas were identified as likely to yield useful insights. Responsibility for each area of review was with the researchers noted:

- Tobacco control - Prof. Ron Borland (Cancer Council Victoria [CCV]), Prof. Robin Room (La Trobe University [LTU])
- Alcohol control - Prof. Robin Room, Dr Michael Livingston (LTU)
- Sexual health and blood-borne viruses including HIV - Prof. Paul Dietze, Assoc. Prof Mark Stooze, Dr Rebecca Winter (Burnet), Dr Rebecca Jenkinson (AGRC, previously of Burnet)
- Physical activity and obesity harm prevention and reduction - Assoc. Prof. Ben Smith (Monash), Ms Cassi de Lacy-Vawdon (AGRC, Monash)

We selected these areas of activity for examination because they represent significant fields of public health activity, in most cases spanning decades of evolving policy, strategy and interventions. In some of these fields, spectacular improvements in human health and wellbeing have been associated with effective public health activity. In others, improvements have been less spectacular but nonetheless highly illustrative for the purposes of this project. Additionally, as noted above, these areas represent a spectrum of public health engagement, with the likelihood that sectors at different stages of development, with different underlying aetiology, political and social dimensions and engagement issues, will develop a broad range of responses.

Other areas of public health activity (e.g., motor vehicle injury) may also yield important lessons. This is not in dispute. However, we have limited the proposal to the fields referred to above for reasons of cost, timeliness of reporting, and incorporation of a spectrum of engagement as discussed above. In any event in all fields identified, multiple examples of effective (and less effective) policy drivers can be identified. The lessons from these fields are, to varying degrees, relevant to the gambling field.

For each of the policy areas above, the designated teams prepared a review identifying effective harm reduction strategies or interventions in that field.

The analysis adopted considers how potentially useful interventions shown to work in other settings might apply in gambling, or within specific areas of gambling. We note that the 'policy window' approach (Kingdon, 1995) suggests that policy implementation is dependent upon a number of propitious circumstances coinciding. In Australia, the varying prominence and success of prevention strategies (for example, with blood-borne viruses) have been affected by factors such as the politicization of relevant issues, the degrees of marginalization of respective risk populations, and temporal trends in political bi-partisanship. Where possible, we identify such factors.

However, the key task of this project has been the identification of possible areas of generalizability from other important areas of public health reform.

RQ3 required identification of effective policy change, and in particular that involving adoption of effective harm reduction strategies and interventions. It further required assessment of the extent to which these might be successfully adapted to the gambling field. We achieved this in three ways:

- Each group assembled to respond to RQ2 considered the review of gambling related harm minimisation produced in response to RQ1, both during the progress of its preparation and its complete form. The final section produced by each group was cognisant of the issues identified by that section.
- We developed a specific heuristic to assess the applicability to the gambling field of strategies, policies and interventions derived from other areas of public health activity. This permitted us to identify those most readily adaptable to the gambling field.
- We also tested the applicability of identified policies, strategies and initiatives to the gambling field, and to individual modes of gambling, via a series of workshops/seminars involving all CIs.

RQ1. Review of gambling evidence

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Purpose of this review

The purpose of this review is to provide a critical assessment of the evidence base for harm prevention and minimisation in relation to EGMs and online wagering. The review summarises the major bodies of evidence related to prevention and reduction of harm for these forms of gambling, including the components of these interventions, their effectiveness, and a summary of issues that have contributed to the adoption of countermeasures.

EGMs operated in hotel and club venues comprise the largest share (51%) of the \$23.6 billion in annual total gambling loss in Australia (Queensland Government Statistician's Office, 2017). Recent evidence demonstrated a dose-response relationship with EGM use, indicating that there may be no safe level of EGM gambling (Markham, Young, & Doran, 2015). Online gambling is a smaller but growing segment of the Australian gambling market. Lawful online gambling in Australia is primarily limited to online wagering, although lottery tickets (for example) may be purchased online. Total online and terrestrial wagering in Australia was almost \$3.9bn in 2016. Of this, sports betting losses from both land-based and online modes had increased from \$814.5m in 2015 to almost \$920.7m in 2016 (Queensland Government Statistician's Office, 2017). A recent study in Victoria estimated that 52% of those participating in sports betting did so over the internet (Victorian Responsible Gambling Foundation, 2015). Industry analysts report that this share has grown to over two thirds of turnover. Recent moves by the Federal Government have sought to address this with a review of the Interactive Gambling Act 2001 resulting in the development of a National Consumer Protection Framework for Online Wagering. This framework outlines a commitment to develop a national online self-exclusion (SE) program, an opt-out online pre-commitment system, new restrictions on inducements such as credit betting, and a strengthening of restrictions on in-play betting. The Australian government has recently introduced a package of reforms to the Interactive Gambling Act, has negotiated a set of consumer protection reforms with the State and Territory governments, and has overseen the adoption of new restrictions on gambling advertising via broadcast media. These reforms are consistent with many of the recommendations set out in this report, although some are not yet applicable to both EGM and online gambling forms (Australian Government Dept. of Social Services 2018).

In 2010, the Productivity Commission (PC) commented that there was an ongoing lack of policy-relevant research in gambling, and insufficient population level studies to justify evidence informed policy. However, the PC also cautioned against holding to an unrealistically high standard of evidence for this social policy area, as this could result in inaction which would be detrimental for the millions of Australians harmed by current gambling arrangements (Banks, 2011).

This review is organised by thematic topic, with each topic providing an assessment of challenges or obstacles to effective implementation, as well as a summary of the strength of evidence available in each area. The discussion summarises the areas of intervention most likely to provide significant gains in preventing and reducing harm from gambling.

The review does not separate the evidence by mode of gambling as the findings across online and land based interventions are broadly applicable to both online and land based electronic gambling.

However, there are implications for implementation of interventions that will differ by mode. For instance, interventions in an online environment are often more straightforward to implement from a technical perspective, as most require adjustment only of software. Interventions in land-based EGMs may in some instances require a change to hardware as well as software. For example, the advent of a universal pre-commitment system, or removal of banknote acceptors, may require hardware changes to at least some devices. Adjustments to EGM software (for example to modify structural characteristics) may (but will not always) require some minimal machine-by-machine adjustment (e.g., changing EPROMs or other memory cards); online gambling modes would require an even less difficult and less expensive upgrade to centralised server-based software.

Method

This review provides a synthesis of the evidence from review articles, individual peer-reviewed studies and grey literature reports on the effectiveness of interventions for the prevention of harm from EGM and online wagering forms of gambling.

Inclusion criteria and search strategies

This review is intended to expand and update a review undertaken by Livingstone, Rintoul, and Francis (2014). The present review includes interventions focused specifically on online gambling and additional non-venue EGM interventions (not addressed in the 2014 review), and extends the limited consideration given to EGM structural characteristics in the earlier review. Accordingly, the search strategy was twofold.

1. For harm minimisation measures included in the 2014 review, including self-exclusion, signage and pop-up messages, onscreen player information display, advertising restrictions, and pre-commitment, the literature was searched for studies published between April 2013 and January 2017.
2. For harm minimisation measures new to this review, including online gambling environments, EGM features, venue environments, and licensing, the literature was searched for studies published between January 2010 and March 2017. For interventions where no recent evidence was available, studies published earlier than this range were sought and included.

An extensive search was conducted using the following electronic databases: CinahlPlus, Informit, Ovid Medline, Proquest, PsychINFO, PubMed, and Sage journals online. The websites of government agencies and departments as well as gambling-specific research centres were also reviewed (see Appendix A). In addition, the bibliographies and reference lists of identified papers were scanned for additional papers not captured in the original search.

Terms used in the search were: problem gambling, harm minimisation, harm reduction, responsible gambling, responsible gaming, electronic gambling machines (including pokies, poker machines, EGMs, slot machines, and video lottery terminals [VLTs]), gambling venues (including betting shops and casinos), online gambling, online gaming, and online wagering.

Key search terms relating to harm minimisation measures were: self-exclusion (including self-banning), pre-commitment technology, venue signage, identification of problem gambling, ATM removal, on-screen messages (including player information display and pop-up messages), sound, bet size, venue size, EGM caps, licensing, operating hours, loyalty cards and membership, and marketing and promotions.

Truncations of key terms were included as set out in Appendix A.

Both peer reviewed journal articles and grey literature were included for review. Studies were included where they assessed or evaluated the effectiveness of EGM and/or online gambling harm minimisation or prevention initiatives or policies. In addition, grey literature reports were included where they also provided sufficient detail for the assessment of their methodological quality. Multiple study designs were identified in the literature, incorporating qualitative, quantitative and mixed methods, and reviews.

Quality assessment

Assessing the quality of evidence in this area of social policy is a more complex undertaking than other topics such as clinical trials. As such we would not expect to encounter studies that are held to the same standards, such as randomised controlled trials. Nonetheless, we applied the McMaster University Health Evidence Quality Assessment Tool (McMaster University, 2016) for review articles, and where necessary adapted this tool to assess individual studies. This tool guides researchers to assess the research question, inclusion criteria, search strategy, level of evidence, methodological quality, transparency of results, and data to support the authors' interpretation. This tool was adapted for use in appraising the quality of original studies such that five key domains were assessed: clarity of the research question and outcome focus; level of evidence; methodological rigour; transparency and consistency of results and conclusions; and, quality of evidence and methodology.

Results and structure

Results are presented by type of intervention, and the weight of evidence to support the intervention. An overall assessment of the evidence base is provided in the discussion section.

Results and discussion

There were approximately 100 articles or other references included in this review. The results presented here are arranged by intervention type. The following interventions were identified in the search: pre-commitment, SE programs, warning messages (pop-ups), structural characteristics (bonus features, free spins, losses disguised as wins, near misses, bet size, jackpots, multi-line reels, weighted and unbalanced reels), cash access, in-venue identification by staff, accessibility (venue location, size, density and opening hours) and advertising and promotions. A tabulated summary of existing and potential interventions by mode is provided in Appendix B.

Pre-commitment programs

Overview of pre-commitment

Pre-commitment is widely regarded as a tool to assist gamblers to limit their gambling losses (Livingstone et al., 2014). The forms of pre-commitment described here are formal arrangements supported by technology rather than informal commitments such as 'budgeting' or 'using willpower'. Pre-commitment can involve setting monetary limits and/or time limits, both in venues and for online gambling platforms, and may be utilised as an aspect of cashless card or loyalty card systems.

Monetary pre-commitment can take a number of forms including deposit limits – limiting the amount of money that can be deposited at any one time; play limits – limiting the amount that can be gambled at any one time; loss limits – limiting the amount that can be lost in a session; and, bet

limits – limiting the amount that can be bet on a single or concurrent games (Auer & Griffiths, 2013). In addition, win limits, limiting the amount that can be won in a session, have also been proposed (Walker, Litvin, Sobel, & St-Pierre, 2015). Meanwhile, time pre-commitment restricts the length of time that can be spent gambling.

Both monetary and time pre-commitment can include both optional (gamblers voluntarily elect to pre-commit) and universal (gamblers are required to pre-commit) systems. Within universal pre-commitment systems limits can either be self-imposed (i.e., each gambler must select a limit of their choosing) or fixed (i.e., the operator or jurisdiction nominates pre-set limits that are imposed on all gamblers). In a similar vein, pre-commitment systems can be full or partial systems where gamblers must, respectively: use an identifying device or system each time they use an EGM, and where gambling automatically ceases once limits have been met; or where gamblers can elect to use a card or other system to monitor their gambling.

Strength of the evidence

A modest body of literature appraising the effectiveness of various aspects of pre-commitment programs now exists. However, this body of evidence is relatively diverse and of low to moderate quality. This review incorporates the results of 11 new studies including three reports, two of which were commissioned by an industry-funded charity (Blaszczynski, Parke, Parke, & Rigby, 2014; Salis, Wardle, Morris, & Excell, 2015); one literature review of electronic gambling harm-minimisation tools (Harris & Griffiths, 2017); one review of responsible gambling measures from real-world environments (Ladouceur, Shaffer, Blaszczynski, & Shaffer, 2017); and six other articles appraising various interventions. A number of limitations were identified, including:

- Non-representative study populations (Brevers et al., 2016; Kim, Wohl, Stewart, Sztainert, & Gainsbury, 2014; Salis et al., 2015; Wohl, Gainsbury, Stewart, & Sztainert, 2013), including a focus on the ‘most intense’ gamblers (Auer & Griffiths, 2013), samples selected by venue employees (Nisbet, Jackson, & Christensen, 2016), and research on university students (Brevers et al., 2016; Kim et al., 2014; Wohl et al., 2013);
- Lack of clarity in the description of study methods (Auer & Griffiths, 2013; Blaszczynski et al., 2014; Lucar, Wiebe, & Philander, 2013; Nisbet et al., 2016);
- Lack of clarity in the discussion of results (Nisbet et al., 2016), or the presentation of interpretations going beyond the scope of the results (Auer & Griffiths, 2013; Brevers et al., 2016);
- Lack of research in ‘real world’ settings (Brevers et al., 2016; Kim et al., 2014; Walker et al., 2015; Wohl et al., 2013);
- Short follow-up of ‘real world’ interventions (Salis et al., 2015);
- Industry funding (Ladouceur et al., 2017);
- Failure to declare interests and sources of research funding (Auer & Griffiths, 2013; Walker et al., 2015);
- Failure to adequately operationalise key terms (Walker et al., 2015); and,
- Lack of comparison of group characteristics at baseline (Salis et al., 2015).

However, overall the greatest limitation in the literature was the diversity of pre-commitment programs – that is, the diversity of characteristics which are incorporated into various forms of 'pre-commitment'. This has presented significant challenges in comparing and drawing conclusions about the effectiveness of interventions.

Impact of pre-commitment

Types of pre-commitment

There is a paucity of research about comprehensive universal pre-commitment systems. Within this review, one study evaluated a universal pre-commitment system for an online gambling provider in Austria (Auer & Griffiths, 2013). Registering with this online gambling provider requires gamblers to set self-imposed time and deposit limits of up to a maximum of 800 euros per week. Authors reported that among online poker gamblers, both monetary spending and duration were significantly decreased after setting a voluntary time limit, whilst monetary spending significantly decreased for online casino and lottery gamblers after setting voluntary spending limits.

Optional pre-commitment systems are utilised in a number of jurisdictions including Victoria, Australia. However, uptake of pre-commitment remains low. In an evaluation of recent EGM policy changes in the UK it was found that less than 0.5% of evaluated gambling sessions across the study month had included optional time or monetary limit-setting (Salis et al., 2015). In a study of monetary limits used in online gambling it was found that pre-commitment functions are seldom promoted by online providers and that while these programs are viewed positively, they are largely unused by gamblers (Lucar et al., 2013). Wohl et al. (2013) and Blaszczynski et al. (2014) assert that most gamblers set monetary limits on their gambling. However, this appears to refer to informal approaches to limiting expenditure, rather than formal pre-commitment systems supported by technology.

Within pre-commitment programs, time limits are reportedly used less frequently than monetary limits. This was demonstrated in a recent review of harm minimisation tools for electronic gambling (Harris & Griffiths, 2017) and a report on operator-based harm minimisation strategies (Blaszczynski et al., 2014). Accordingly, within this review, only two studies examined time pre-commitment (Auer & Griffiths, 2013; Kim et al., 2014). Of these, a study of online gambling limit-setting behaviour found that 7% of limits set were session duration, 8% were daily duration, and the majority of limits (84%) were monetary limits (Auer & Griffiths, 2013).

Features to support pre-commitment

Card-based systems are one of the most commonly used mechanisms for implementing pre-commitment on EGMs. Within these, gamblers typically register for a card, and then use the card to gamble on EGMs, enabling them to track expenditure. Uptake of these programs is reportedly low. Such cashless card systems are sometimes paired with loyalty card programs, which may dilute their effectiveness as a harm prevention or minimisation measure. In a study of cashless loyalty card EGM usage, it was reported that uptake of opt-in responsible gambling features was "typically less than one per cent of card users" (Nisbet et al., 2016, p. 231). However, it is unclear how this figure was derived as it was presented within a qualitative study including interviews with gambling venue staff and patrons.

Similarly, in an evaluation of recent Fixed Odds Betting Terminal (FOBT) policy changes in the UK, in which data were drawn from loyalty card gamblers only, it was found that 10% of gamblers used loyalty cards, thus significantly limiting the generalisability of study results (Salis et al., 2015).

The evidence for the efficacy of these systems is contradictory, as gamblers “did not believe that cashless card use impacted key aspects of their play including individual expenditure, machine choice, session length, or breaks in play relative to their prior non-cashless card use”, whilst others reported that it helped them manage their gambling money (Nisbet et al., 2016, p. 237).

From their combined literature review, gambling website review and gambling discussion board review, Lucar et al. (2013) made a number of recommendations to improve online gambling pre-commitment systems. These were as follows:

1. Promote pre-commitment features on gambling websites;
2. Require universal, flexible limits, and display these on the screen during a session;
3. Display pop-up warnings when approaching limits, log gamblers off once limits are reached, and block gambling until limits have expired;
4. Allow limits to be decreased immediately, but only increase after a compulsory waiting period; and,
5. Provide account history information including limits and expenditure.

A number of these recommendations were supported by findings from other studies. For instance, pop-up messages often facilitate pre-commitment using prompts to set limits, and provide reminders when limits have been reached. Kim et al. (2014) found that among university students participating in a virtual reality gambling environment, those who were prompted to set a time limit via a pop-up message at the start of gambling were significantly more likely to set a time limit ($p=0.001$), and to spend less time gambling ($p=0.041$) than those who were not.

Wohl et al. (2013) found that among university students participating in a virtual reality gambling environment, those who received a pop-up message to indicate when they had reached their monetary limit were, unsurprisingly, more likely to detect when they had reached their limit ($M=5.81$, $SD=1.62$) than those who did not ($M=4.71$, $SD=2.04$). This finding was not significant ($p=0.38$) however. Further, awareness of reaching the limit may not translate into action to forestall or limit further gambling.

Similarly, cooling off periods have been recommended to reduce instances of impulsive increases to pre-commitment limits. Lucar et al. (2013) found that most online gambling sites had waiting periods for limit increases of 24 hours up to 7 days. Auer and Griffiths (2013) described a 72-hour waiting period for limit increases for an online gambling platform. Blaszczynski et al. (2014) similarly advocated for binding limits with waiting periods on limit increases, however suggested that “the exact length of time, whether 24 or 48 hours or longer... is an arbitrary decision” (p. 10). None of the reviewed studies advocated for a specified cooling off period.

A 2014 UK report commissioned and funded by the (then) Responsible Gambling Trust, investigated technology to predict likelihood of gambling problems, using machine user data. This technology appears likely to be effective in preventing and reducing harm. Such a measure would involve applying an algorithm to machine user data to identify early stages of harm, and use this to suggest a remedial intervention when indicated. This study (Excell et al., 2014) built on a body of work by Schellinck & Schrans and others (e.g., Schellinck & Schrans, 2003, 2011; Dragicevec et al., 2011) which has previously indicated the feasibility of the technology. Further, the gambling industry has adopted the necessary technology for consumer profiling purposes (Schüll, 2009).

Excell et al (2014) answers the research question 'Is it possible to distinguish between harmful and non-harmful gaming machine use?' with an unequivocal 'yes'.

In combination with a universal pre-commitment system, such an approach would be likely of high efficacy in identifying people beginning to experience harm. This would facilitate appropriate interventions at an early stage, and at a more consistent level of reliability than other strategies intended to identify the signs of harm amongst gamblers. The technology is equally applicable to online and terrestrial gambling, where a universal pre-commitment system is in place.

Overall comments on pre-commitment

Overall, this review indicates that there is little evidence for the effectiveness of pre-commitment systems in their current forms, which are primarily voluntary and partial pre-commitment systems. While a laboratory-based study found that the opportunity to pre-commit, whether taken up or not, may be effective in reducing the attractiveness of risk (Brevers et al., 2016), this does not appear to be translated into real-world gambling environments. For instance, the Blaszczyński et al. (2014) report found only tentative, self-report evidence for the effectiveness of pre-commitment systems, while Nisbet et al. (2016) argued that "there is no evidence to suggest that problem gamblers will be rehabilitated by participation in a state-wide [optional pre-commitment] scheme. In all likelihood, many of these gamblers will not engage with responsible gambling features" (p. 233). One low-quality review found that pre-commitment systems may only be effective for reducing the harms experienced by some gamblers (Ladouceur et al., 2017).

Universal, full pre-commitment systems may be more effective (Auer & Griffiths, 2013), and a number of authors have argued for this (Livingstone et al., 2014; Lucar et al., 2013). However, as Blaszczyński et al. (2014) argue, these systems are less likely to get the support of government and industry under current political arrangements.

Barriers to pre-commitment

Political pressure from the gambling industry in Australia effectively undermined an attempt to introduce universal pre-commitment systems in 2010 (Panichi, 2013). Pre-commitment is reportedly underutilised and appears to be largely ineffective in its optional forms. There may be a number of reasons for this.

Industry reluctance and card technologies

Pre-commitment systems do not appear to be industry's preferred 'responsible gambling' tool, and operators have opposed (Panichi, 2013) or been slow to provide pre-commitment technologies for their products. However, this approach may be changing. Industry is reportedly indicating interest in using tracking data obtained from pre-commitment systems, including cashless card pre-commitment systems, to target marketing and loyalty programs to "entice players into further expenditure", and to decrease overheads associated with cash handling within venues (Nisbet et al., 2016, p. 233).

Other issues include privacy concerns associated with card technologies, including the establishment of systems requiring data storage via central servers (with data potentially available to government agencies). Nisbet et al. (2016) highlighted these within the Australian context whilst Blaszczyński et al. (2014) also asserts that this would be problematic within US and UK populations. Notably, the industry opposition to the pre-commitment proposal for EGMs under the Gillard government focused on privacy concerns (Panichi, 2013). These privacy concerns appear to

be in contradiction to more recent industry enthusiasm for the utilisation of card information for commercial purposes.

This indicates a necessity for pre-commitment interventions to include safe-guards to avoid the exploitation of card technologies in ways that could increase rather than reduce harms experienced by gamblers.

Non-binding pre-commitment

A number of the studies reviewed presented descriptions of non-binding pre-commitment whereby gamblers, upon reaching the pre-committed time or monetary limit, could elect to continue gambling (Kim et al., 2014; Wohl et al., 2013). Thus, when gamblers are in ‘a highly-aroused state’, they can elect to change their limits and continue gambling (Harris & Griffiths, 2017). In online forums, gamblers reported frequently being able to exceed their limits, including switching to different gambling websites (Lucar et al., 2013). The non-binding nature of such pre-commitments systems, lacking consequences for exceeding limits, render these systems largely ineffective.

Perceptions of pre-commitment

The discourse of pre-commitment has sometimes incorporated the sense that it is for “players experiencing difficulties controlling their expenditure” (Blaszczynski et al., 2014, p. 11) or that it is used to reduce the “consequences of uncontrolled gambling” (Salis et al., 2015, p. 3). It is therefore unsurprising that voluntary pre-commitment systems attract few gamblers electing to formally pre-commit. Those who consider their gambling unproblematic would have no perceived need for a pre-commitment system (Nisbet et al., 2016). A ‘targeted approach’ for voluntary pre-commitment systems is likely stigmatising and not conducive to population-wide harm prevention.

These conclusions have led to authors, including Blaszczynski et al. (2014) and others, to call for the normalisation of pre-commitment systems to increase their usage and effectiveness. This is also consistent with the findings of the Livingstone et al. (2014) review. Normalisation would effectively occur via a jurisdiction-wide, full, universal pre-commitment system. If all users are required to use such a system, none could be stigmatised for doing so.

Self-exclusion

Overview of self-exclusion

Self Exclusion (SE) requires an individual to enter into an agreement with a gambling provider to exclude themselves from gambling in casinos, clubs, hotels or specific online gambling operators. Rather than being a harm prevention measure, SE is a harm reduction strategy that is most frequently utilised by those with established gambling problems (Livingstone et al., 2014). It requires an individual to identify as having problems with their gambling and take specific steps to prohibit themselves from venues and online platforms. It has been described as an “extreme form of pre-commitment” (Gainsbury, 2014, p. 230) or “the most restrictive of harm minimisation measures” (Blaszczynski et al., 2014, p. 52). Perhaps because of these issues, SE is reportedly under-utilised in most jurisdictions as an intervention for those experiencing gambling problems (Gainsbury, 2014).

Strength of the evidence

SE appears to be a harm minimisation measure favoured by venues and online operators, and one of the more frequently provided in-venue interventions to reduce harm (South Australian Centre for Economic Studies, 2015). The provision of SE is required by law in many jurisdictions.

However, there are also several limitations to this intervention. Surprisingly, evaluation of SE programs is relatively rare. The present review incorporated two low-quality reviews evaluating SE programs specifically (Gainsbury, 2014) and responsible gambling interventions more generally (Ladouceur et al., 2017). Five new evaluation studies with various limitations (Hing, Cherney, et al., 2015; Hing, Tolchard, Nuske, Holdsworth, & Tiyce, 2014; Meyer, von Meduna, Brosowski, & Hayer, 2015) are included. Amongst these are two studies looking at online gamblers (Dragicevic, Percy, Kudic, & Parke, 2015; Hing, Cherney, et al., 2015), and six reports including two funded by a gambling industry charity (Blaszczynski et al., 2014; Parke & Rigbye, 2014). Papers ranged from very low to moderate quality. Major limitations identified in Livingstone et al. (2014) persist. These include:

- Non-representative study samples including those with limited generalisability to other jurisdictions due to different characteristics such as legal requirements and penalties (Hing, Cherney, et al., 2015; Hing, Russell, Tolchard, & Nuske, 2015; Hing et al., 2014; Meyer et al., 2015; Parke & Rigbye, 2014; South Australian Centre for Economic Studies, 2015);
- Lack of validated measurement instruments (Hing, Russell, et al., 2015; Meyer et al., 2015; South Australian Centre for Economic Studies, 2015);
- Absence of control or comparison groups (Hing, Russell, et al., 2015; Meyer et al., 2015); and,
- Reliance on self-report data (Hing, Cherney, et al., 2015; Hing, Russell, et al., 2015; Hing et al., 2014; Parke & Rigbye, 2014; South Australian Centre for Economic Studies, 2015).

In addition, other limitations identified in more recent studies include:

- Lack of transparency in study methods (Amity Community Services Inc., 2015; Blaszczynski et al., 2014; Gainsbury, 2014; Meyer et al., 2015; Parke & Rigbye, 2014; South Australian Centre for Economic Studies, 2015);
- Lack of transparency in results and/or conclusions (Amity Community Services Inc., 2015; Gainsbury, 2014; Meyer et al., 2015); and,
- Failure to declare funding and potential conflicts of interest (Dragicevic et al., 2015; Responsible Gambling Council, 2014, 2016) and declarations of industry funding (Ladouceur et al., 2017).

It is evident that the evidence base for SE programs and the quality of this evidence base has not greatly improved in recent years.

Impact of self-exclusion

Two review studies (neither a systematic review) asserted that although SE programs are not necessarily effective in preventing people from gambling, they appeared to have some impact on reducing gambling consumption and improving overall wellbeing and functioning (Gainsbury, 2014), as well as having positive financial and social impacts (Parke & Rigbye, 2014). However, Parke and Rigbye (2014) indicated a lack of clarity as to whether these improvements would have occurred without SE as part of the natural pathway to recovery.

In their appraisal of an SE program in Queensland, Australia, Hing, Russell, et al. (2015) made similar findings. Their study indicated that whilst self-excluders (also participating in counselling, or

participating in SE alone) were more likely to abstain from gambling, overall gambling outcomes, including expenditure, debt, perceived gambling severity, PGSI score, Gambling Urge Scale, CAGE questionnaire for alcoholism, General Health Questionnaire, and harmful consequences of gambling, showed no significant differences with non-excluders who had undergone counselling alone.

Authors postulated that this was likely due to SE program users or gambling counselling services users already having taken steps to address their gambling problems by engaging with these programs. In a similar vein, the South Australian Centre for Economic Studies (2015) concluded that while it is relatively easy for people to circumvent current SE programs, the act of excluding motivates people to change their gambling perhaps more than the successful enforcement of the SE program itself.

A prominent issue with SE, common among all reviewed papers, is that SE is not completely effective in preventing people from gambling. This is discussed in greater detail in subsequent sections, but it is worth observing that this could lead to non-excluders expressing the view that SE would not work for them (Hing et al., 2014). This study did not discuss excluders' perceptions of SE effectiveness, but noted that 8 participants (of 53) ended SE during the study. Meanwhile, among moderate risk and problem online gamblers, participants described SE features as useful for limiting online gambling (Hing et al., 2015). However some referred to the use of external software to block specific sites rather than using in-built SE features on gambling websites.

One study produced 'best-practice' recommendations from consultations with people who had excluded, gambling venue staff, and experts in the field at a round-table discussion (Responsible Gambling Council, 2016). This provided some anecdotal evidence for the effectiveness of SE programs. The overall focus of this study was on best practice for reinstatement of gambling after SE or renewal of SE agreements. This study advocated for active reinstatement (i.e., at the gambler's request), taking the individual's circumstances and breaching behaviours throughout the SE period into consideration before approval.

Overall, these findings indicate that there is very modest evidence for the effectiveness of SE programs, with indication that people who use SE programs may already be making positive headway independent of their SE behaviours. Thus, SE may be seen as an element of broader treatment activities.

Barriers to self-exclusion

Research has highlighted a number of limitations of SE programs, including barriers to program entry and compliance issues. Compliance is discussed in greater detail below, but access and utilisation of SE programs is plagued by access and entry difficulties.

Uptake

Rates of SE uptake reportedly remain low, although none of the included papers reported new data on this. Blaszczyński et al. (2014) and Parke and Rigby (2014) cited three papers from 2003 (see Nowatzki & Williams, 2003; O'Neil et al., 2003; South Australian Centre for Economic Studies, 2003), and Amity Community Services Inc. (2015) cited one of these as well as the Williams et al. (2012) paper and the Productivity Commission (2010) report in reporting the rate of SE uptake among 'problem gamblers'. Ladouceur et al. (2017) also cited low utilisation of SE, but did not substantiate this. It is not possible to indicate the current levels of SE program usage. It is most likely that uptake rates are low. For example, the Independent Gambling Authority of South Australia reported in Feb 2017 that at 30 June 2016 there were 1,510 individuals subject to

'barring' orders (of which 6 were involuntary, at the request of family members). In addition, the Authority reported that 821 'banning' arrangements (all voluntary) had been made directly with gambling providers. A maximum of 2,331 people in South Australia were therefore excluded from gambling venues.

Applying gambling harm prevalence rates from the most recent South Australian prevalence study (The Social Research Centre, 2013) to 2016 census data (Australian Bureau of Statistics, 2017) suggests that there were 7,943 people in the PGSI 8+ category (i.e., those experiencing severe gambling harm) and a further 33,097 in the PGSI 3+ category (i.e., those experiencing moderate to severe gambling harm). Therefore, the number of people self-excluded was equivalent to a maximum of 29.4% of the highest risk population or 5.7% of the PGSI 3+ population.

The Independent Gambling Authority further reports that the incidence of self-exclusion in 2016 was 162 (that is, new instances of self-exclusion in that year). That is equivalent to 2.04% of the PGSI 8+ population and 0.4% of the PGSI 3+ population. This may be a useful metric in assessing the actual extent of SE, as it assesses the proportion of current gamblers experiencing harm who seek SE in a given period.

Successful enrolment into SE programs depends on a number of factors, including program awareness, ease of access to a wide range of venue SE programs, appropriate action by venue staff, and the provision of correct information. In most Australian land-based gambling venues, identification by staff relies on manual recognition of a small photograph, so that identification can be uncertain. A number of authors discussed the lack of awareness of SE programs and the need for greater promotion of these within venues (Amity Community Services Inc., 2015; Blaszczyński et al., 2014; Gainsbury, 2014; Hing et al., 2014; Parke & Rigbye, 2014).

As found by Livingstone et al. (2014), while a number of studies advocated for multi-venue or multi-operator SE (Blaszczyński et al., 2014; Gainsbury, 2014; Hing et al., 2014; Parke & Rigbye, 2014) there are no evaluations of these. It is well-accepted that SE from a single venue is likely to result in people transferring their gambling to another venue, because requiring SE at individual venue level discourages enrolment. In particular, Hing et al. (2014) found that while participants found SE to be relatively accessible, the time it took to exclude from each venue was a major barrier. This obstacle was not reported in a study of online SE (Dragicevic et al., 2015). Researchers have been advocating for multi-operator SE for some time. However little progress has been made with this. Current approaches to SE place the onus on the individual and do little to provide environmental support. Whilst a number of authors have asserted the viability of remote (out-of-venue), multi-operator, multi-modal SE (Blaszczyński et al., 2014; Gainsbury, 2014; Hing et al., 2014; Parke & Rigbye, 2014), and some industry bodies and operators provide such systems, no evaluation of this intervention has been identified. An industry funded review of a multi-venue SE program in the UK offered no evidence of efficacy, but recommended further research on this theme (Parke & Rigbye, 2014).

Issues of staffing and staff training have also been reported as barriers to SE uptake. Hing et al. (2014) found that low confidence in the ability of staff to maintain privacy and confidentiality, and low staffing levels, inhibited SE uptake. Meanwhile, Gainsbury (2014) highlighted a greater need for staff training to facilitate SE and the recognition of problematic gambling. A small German mystery-gambler study found that staff members frequently responded inadequately to signs of problematic gambling (95%), ignored the issue, or gave incorrect information about SE (19 of 29 cases, 66%) (Meyer et al., 2015). Staff training and recognition of problem gambling behaviour will be discussed in greater detail later in this paper.

Other issues with SE reportedly include embarrassment experienced by people wanting to exclude (Blaszczynski et al., 2014), rigidity of SE programs (Blaszczynski et al., 2014; Gainsbury, 2014; Parke & Rigbye, 2014), cooling-off periods (Amity Community Services Inc., 2015), and a lack of linkage to other help and treatment services (Blaszczynski et al., 2014; Gainsbury, 2014).

Compliance

Compliance with SE agreements remains an issue. All of the SE literature reviewed highlighted issues with breaches of SE agreements. Gainsbury (2014) found, across a number of countries, that breaches to SE agreements were common, and that this undermines the SE process. In addition, Gainsbury recommended that “Operators must take active steps to identify and remove self-excluded persons who return to gaming facilities” (p. 248). In a review of Australian casinos (South Australian Centre for Economic Studies, 2015), breaches of SE agreements, and the detection of these, were a prominent concern. The Star, a Sydney casino, appeared to have high rates for the identification of breaches (4-5 per day), utilising security and surveillance footage to detect people who SE from the venue. However, the reporting of such data was not transparent for all casinos. It is understood (personal communication) that Australian casinos are currently investigating facial recognition technologies to assist with preventing SE breaches, however these have not been evaluated to date.

On the whole, it appears that people participating in SE programs may have difficulties resisting the urge to return to venues, and when they do, frequently go undetected. In a study of Queensland's SE program, Hing, Russell, et al. (2015) reported that of 34 participants who had undergone SE and counselling, 32.4% had breached their agreements, compared to 15.8% of 19 participants who had undergone SE alone (no counselling) who had breached their agreements. Of these, 54.5% of breaches by those in the SE and counselling group and 5.3% (n=1) of breaches by those in the SE alone group were detected by venue staff. Participants from both groups breached 1-10 times. A qualitative study of the same SE program found that whilst many participants were confident that venues could monitor and prevent breaches, others described having re-entered venues on several occasions (14 of 53), experiencing apathy and confusion from venue staff, and a sense that SE could not be properly managed (Hing et al., 2014). These findings were consistent with those from a mystery-gambler study conducted in German amusement arcades. This study, conducted without ethical approval (Meyer et al., 2015), found that of 15 follow-up visits after SE, 13 (87%) of their mystery gamblers had no problems re-entering the venue. A report sponsored by the Responsible Gambling Trust found that at least 50% of people who have opted for SE continue to gamble, either with the same provider or elsewhere, and that 33-77% of breaches are undetected (Blaszczynski et al., 2014).

Three studies suggest that withholding or disallowing winnings could support SE programs, as this would remove any prospect of reward for ongoing gambling (Blaszczynski et al., 2014; Parke & Rigbye, 2014; Responsible Gambling Council, 2014). Further, while not reporting on rates of SE breaches, Parke and Rigbye (2014) suggested that a card-blocking system (i.e. blocking the use of debit or credit cards for gambling activities), or operator penalties, may abate this. However limited evidence for these was provided. Similarly, Blaszczynski et al. (2014) discussed, again with limited evidence, imposing operator fines and computerised ID checks as potential methods for preventing breaches.

ATM removal

Evidence around the removal of ATMs from gambling venues is scarce. Two reports published on this topic were identified. One Tasmanian study found that, of proposed and implemented harm minimisation measures, the lowest decrease in enjoyment for ‘non-problem’ gambler's was that

associated with the ban on ATMs in EGM venues (0.2 %), while the removal of ATMs was seen to show significant reductions in expenditure among moderate and ‘problem gamblers’ as compared to non-‘problem gamblers’ ($p < 0.001$) (Jackson, Christensen, Francis, & Dowling, 2016). Thomas, Pfeifer, Moore, Meyer, et al. (2013) found that the removal of ATMs from EGM venues in Victoria led to decreased time and money spent on EGMs, and a 7% reduction in nominal state-wide EGM revenue.

This limited evidence indicates some positive effect of ATM removal from EGM venues. However, there is also evidence that the removal of ATMs has led to increased use of EFTPOS (electronic funds transfer at point of sale) facilities (Rintoul, Deblaquiere, & Thomas, 2017; Thomas, Pfeifer, Moore, Meyer, et al., 2013). As such, only tentative conclusions can be drawn at this stage.

Identification of ‘problem gambler’ characteristics and interaction with gamblers

Overview of the evidence

The issue of identifying ‘problem gamblers’ within venues has received significant attention since 2014. These harm-minimisation strategies typically involve identifying behavioural indicators of harmful gambling via gambler observation, conducted by EGM venue staff. These indicators reportedly include “visible emotional reactions, unusual social behaviours, and very intense or frenetic gambling behaviour” (Delfabbro, Thomas, & Armstrong, 2016, p. 419). In order to reduce harm, these strategies rely on staff members personally intervening with gamblers to offer advice and refer to counselling and other services when they believe them to be demonstrating signs of harmful gambling.

Strength of the evidence

No reviews were identified on this form of gambling harm minimisation. This review identified nine exploratory studies (Delfabbro et al., 2016; Excell et al., 2014; Haefeli, Lischer, & Schwarz, 2011; Hing & Nuske, 2012; Hing, Nuske, & Holdsworth, 2013; LaPlante, Gray, LaBri.e., Kleschinsky, & Shaffer, 2012; O’Mahony & Ohtsuka, 2015; Quilty & Robinson, 2013; Quilty, Robinson, & Blaszczynski, 2015), including one that examined the identification of gamblers experiencing problems online, via written communications (Haefeli et al., 2011). A recent study using mixed methods including unannounced venue observations, and data triangulated with self-report from gamblers and professionals, was also published during this period (Rintoul et al., 2017). However, these studies include a number of limitations:

- Direct industry-funded research (Haefeli et al., 2011; LaPlante et al., 2012) or inappropriate or insufficient declarations of interest (Excell et al., 2014; Quilty et al., 2015);
- Results from a single study published across multiple papers (Hing & Nuske, 2012; Hing et al., 2013);
- Lack of validated tools (Delfabbro et al., 2016; Haefeli et al., 2011; Quilty & Robinson, 2013; Quilty et al., 2015);
- Reliance on self-report data (Delfabbro et al., 2016; O’Mahony & Ohtsuka, 2015; Quilty & Robinson, 2013; Quilty et al., 2015);
- Insufficiently addressed research questions (Excell et al., 2014); and,

- Short follow-up of interventions (LaPlante et al., 2012).

Overall, the studies conducted in this area were of low to moderate quality, and provided limited or no evidence of effectiveness of staff identification and interaction interventions with gamblers exhibiting signs of problematic gambling.

Impact

The research included in this review indicates that there are visible indicators that can be used by staff members to identify people gambling problematically within venues, and that staff often observe these (Delfabbro et al., 2016; Hing et al., 2013; LaPlante et al., 2012; O'Mahony & Ohtsuka, 2015; Quilty & Robinson, 2013; Quilty et al., 2015). However, the evidence of the effectiveness of staff recognition and contact as a harm minimisation strategy is lacking. One recent Australian study reports that rather than implementing codes of conduct requiring staff to intervene to prevent and reduce problematic gambling, evidence demonstrated staff actively encouraged harmful gambling. This was observed to occur via (i) the provision of food and beverages to gamblers while using machines through meal times; and (ii) facilitating multiple withdrawals of cash (Rintoul et al., 2017). In particular, there is little evidence for what occurs after contact (e.g., referral to support services, SE, etc.), and the outcomes experienced by gamblers (e.g., gambling cessation, participation in counselling, etc.). As described below, there are a number of challenges faced by staff that likely limit the practical impact of these approaches.

One study explored this within the online gambling environment. This was an exploratory study involving the development of a framework for the identification of 'problem gamblers' from their written correspondence to gambling operators (Haefeli et al., 2011). While researchers found that this strategy correctly predicted 76.6% of 'problem gamblers', 'problem gamblers' were defined only as those who subsequently self-excluded from the site.

As previous research outlined in this review demonstrates, SE is underutilised. One study using self-report data from gamblers noted breaches by staff who did not fulfil their obligations to deny access to self-excluded gamblers (Rintoul et al., 2017). This significantly limits confidence in the efficacy of SE. Similarly, Excell et al. (2014) used industry EGM data to assess 'theoretical markers of harm' among gamblers. However, that study failed to adequately define 'harm'.

Limitations

For these strategies to be effective, they depend on venue staff recognising and responding to gamblers in an appropriate and timely manner. Role ambiguity and uncertainty over how best to approach gamblers observed experiencing difficulties have been reported, by venue staff, to inhibit the effectiveness of this intervention (Hing & Nuske, 2012; Hing et al., 2013; Quilty & Robinson, 2013; Quilty et al., 2015). In particular, concerns over negative responses from management, and negative responses from patrons, were highlighted (Hing & Nuske, 2012; Hing et al., 2013). An online survey of casino employees from Canada also found job satisfaction to be inversely related to perceived challenges to responding to signs (Quilty et al., 2015). Sympathy was also a factor identified as affecting staff responses. A study in Victoria (Australia) reported that staff were well equipped to recognise patrons displaying signs of problematic gambling, and that young men appeared to be the most vulnerable (O'Mahony & Ohtsuka, 2015). However, venue employees reported little sympathy for these patrons and were therefore less likely to intervene. Overall, a number of studies found that staff require better training for these interventions to be effective (Hing & Nuske, 2012; Hing et al., 2013; Quilty & Robinson, 2013; Quilty et al., 2015). However, training was not found to be effective in correcting erroneous beliefs among gambling industry employees (LaPlante et al., 2012). Notably, these are not harm prevention interventions. Severe

harm has often already been experienced by the time people exhibit signs of problematic gambling. They may offer some harm reduction potential. However, no evidence of efficacy was identified.

Dynamic warning messages, or “pop-ups”

Overview

While static warning signage has been a requirement of licensing in all Australian jurisdictions for some time, more recent studies have focussed on dynamic warning or pop-up messages. These are typically designed as a brief intervention to interrupt or modify gambling behaviour. The goal of pop-up messages may be to interrupt use and reduce the sense of dissociation (‘the zone’) that is known to occur with continuous, intensive or extended use of EGMs. Messages may do this by attempting to encourage a break in gambling, or remind users that they have been gambling for a specified time period. In a pre-commitment system, a pop-up message may alert the user to progress towards a nominated limit, or that it has been reached. Generally, the desired effect is to prevent escalation into problematic gambling. A body of literature has emerged on this topic; this review includes 19 papers that focus on (n=12), or include sections that relate to the use of, pop-up messages (n=7).

Although overall the evidence is poor quality and demonstrates limited effect, pop-ups are thought to have a greater influence on modifying behaviour than static signs (Harris, Parke, & Griffiths, 2016). Using data from an online gambling operator, Auer, Malischnig, and Griffiths (2014) reported that of 400,000 control condition online gambling sessions, 4,220 sessions lasted beyond 1,000 spins. Of these only 4 sessions ended at the 1,000 spin point. A comparison of 400,000 pop-up intervention sessions, showed 4,205 reached 1,000 spins. Of these, 45 sessions ended after the pop-up message appeared. That is, less than 1% of gamblers ended a session after viewing a pop-up message. A recent self-report study of 667 Australian gamblers concluded that “regardless of message type, location or level of problem gambling, most players reported that the messages did not change their gambling behaviour in terms of thoughts, most wanted to keep playing” (Department of Social Services, 2014; Gainsbury, Aro, Ball, Tobar, & Russell, 2015b). However, a New Zealand study reported that three quarters of participants who were aware of having seen pop-up messages did not find them helpful, although 25% of these participants did report that they believed messages did help to control their spending (Palmer du Preez, Landon, Bellringer, Garrett, & Abbott, 2016).

Components of effective pop-up messaging

A variety of studies explored a range of aspects of pop-up message effectiveness. These include so-called:

- Informative messages:
 - “Stick to your limit. Play within it.” (Gainsbury et al., 2015b)
 - “A winner knows when to stop gambling.” (Gainsbury et al., 2015b)
- Self-appraisal messages:
 - “Have you spent more than you can afford?” (Gainsbury et al., 2015b)
 - “Do you need a break? Gamble responsibly.” (Gainsbury et al., 2015b)

- “Play Responsibly...Pause and Think, Are you in Control of your Risk-Taking?” (Harris & Parke, 2016)
- ‘Enhanced self-appraisal’ messages, such as:
 - “we would like to inform you that you have just played 1,000 slot games. Only a few people play more than 1,000 slot games. The chance of winning does not increase with the duration of the session. Taking a break often helps, and you can choose the duration of the break” (Auer & Griffiths, 2015)
- Personalised normative feedback (PNF):
 - “1) this is how much you gamble; 2) this is how much you think the “typical student who gambles” gambles; and 3) this is how much the “typical student who gambles” actually gambles.” (Celio & Lisman, 2014)

The evidence for informative messaging has been described as inconclusive (Harris & Griffiths, 2017). Further, the categorisation of some messages as ‘informative’ could be interpreted as simplistic and little advanced from static signage. The evidence for normative feedback is conflicting. One comparison of simple vs. enhanced personalised normative feedback found that while the effect size is very small, users who were shown an enhanced pop-up message were twice as likely (1.39%) to discontinue gambling compared to those who were shown a simple message (0.67%) (Auer & Griffiths, 2015). However, a randomised control trial of personalised feedback and normative feedback reported unexpected findings; normative messages showed no impact on gambling levels, but partial feedback (with no normative information) demonstrated a modest effect by reducing the number of days gambling compared to the control group (Cunningham, Hodgins, Toneatto, & Murphy, 2012).

Other considerations relating to the effective implementation of pop-up messaging include:

- Timing and duration (after 15 mins for 15 secs, after 30 mins, 60 mins use etc.)
- Reception and impact of pop-up messages depending on the context in which these messages are delivered (winning or losing scenarios). The evidence on this aspect is contradictory. One study Ginley, Whelan, Keating, and Meyers (2016) found that messages delivered to gamblers in winning scenarios resulted in them betting smaller amounts, placing fewer bets, and not speeding up betting compared to other conditions. While gamblers in a losing condition did reduce the size of their bet over time, they did not reduce the number of spins or rate of betting. A second study (Harris & Parke, 2016) apparently aiming to replicate real FOBT use, manipulated a coin toss simulation and allocated 24 participants 100 counters (not real money) to either a condition where 75% of the tosses were wins, or losses. Betting intensity and stake size increased in both conditions following the pop-up message (pictured below). However, the authors reported that players delivered a pop-up message in the win condition played 60% longer than gamblers in the loss condition. Relevant factors in the effectiveness of this intervention included:
 - Positioning on the EGM screen: Perhaps unsurprisingly, gamblers recall seeing messages in the middle of the screen more than the top or the bottom of the screen (Gainsbury, Aro, Ball, Tobar, & Russell, 2015a).

- Display: font, colour, spacing etc., so as not to be confused with error messages.
- Outcome of responding to options within the pop-up: i.e. “you have now played 1,000 games. Do you want to continue [YES/NO]?” (Auer et al., 2014). If the user selects no, does the screen close automatically or readily allow the user to continue gambling?
- Monetary and time-based pop-up reminders may be considered an aspect of pre-commitment. These are considered above.

Breaks in play accompanied by a warning message

One study explored the effect of creating a ‘break in play’. University students (n=141) were recruited to play a simulated Blackjack game online. The authors found that when a break was imposed it was not an effective harm minimisation strategy, as it increased self-reported craving to continue gambling. Longer breaks (8 min) increased craving compared to both shorter (3 min) and no break conditions (Blaszczynski, Cowley, Anthony, & Hinsley, 2016). The authors concluded that breaks in play should be accompanied with warning messages to avoid unintended consequences of increasing gambling cravings.

Strength of the evidence

Studies have used a range of methods, each with their own limitations and strengths. These include:

- Session-level data obtained from online gambling sites;
- Surveys that describe recall, self-reported attitudes and behaviour change with gamblers exiting venues; and
- Laboratory studies of university students using online simulations of gambling products, often using tokens rather than real money.

While there is plausible reason to believe warning messages may be a mechanism for harm reduction, the research conducted to date has in some cases been undermined or compromised by methodological and/or reporting issues including:

- Failing to report pertinent outcomes (such as reductions in money spent) when such data would presumably have been available (Auer & Griffiths, 2015; Auer et al., 2014); or,
- Interference by gambling operators in the study design, without acknowledgement of this effect (Department of Social Services, 2014; Gainsbury et al., 2015a, 2015b).

Overall, study design was assessed as consistently very weak, with studies focussed on surveys of recall, and self-reported influence on behaviour. Studies frequently focused on session completion data rather than considering whether users reduced bet sizes, and did not report other measures of gambling intensity.

Overall comments on pop-ups

Dynamic warning messages are a relatively low-cost intervention. In some modes they may cause annoyance to gamblers. Limited emerging evidence (Cunningham et al., 2012), and basic logic, indicates that well designed messages - such as personalised information - may have a limited and short-term impact in supporting efforts to control gambling. Messages have been demonstrated to

be capable of being delivered in a way that does not affect overall enjoyment of gambling (Department of Social Services, 2014). However, there was also no reported impact on venue revenue following a trial of pop-up messaging intervention (Department of Social Services, 2014). This suggests that they are unlikely to reduce harmful gambling activity.

Furthermore, some messages could be perceived as stigmatising and 'victim blaming'. In an Australian trial of dynamic warning messages (Department of Social Services, 2014; Gainsbury et al., 2015a, 2015b), eight messages were developed in collaboration with gambling providers, to the extent that one venue adjusted the original design at the venue in question (only) by reducing the display time from once every 15 mins to once every 60 mins, and from a 15 second duration to a 10 second duration. Users were tested for recall and impact on behaviour. These messages included themes focused on individual responsibility, such as "You are responsible for your gambling" or "Do you need a break? Gamble responsibly". Fewer than half of those surveyed (43.5%) recalled having seen any message on the screen, and the most commonly reported impact was that users "wanted to keep playing". The authors claim that this is not necessarily a problem as continued use may be an appropriate decision for most gamblers in the venue. However, the authors also reported that 31.3% of this sample were moderate-risk or 'problem' gamblers, and that the sample was self-selected.

Despite these issues, there is weak evidence demonstrating some marginal effects, which at a population level may result in meaningful reductions in harm.

Structural characteristics

Overview

A considerable volume of evidence has emerged in the area of EGM structural characteristics and design. We identified 33 papers and reports exploring this topic. There is considerable evidence over a now lengthy period that structural characteristics affect use patterns of EGMs (e.g., Blaszczynski et al 2001) and that these characteristics have a greater effect on the number of bets made than either age or gender (Leino et al., 2015).

An assessment of a variety of measures incorporating modifications to structural characteristics and introduction of universal pre-commitment introduced in Norway has demonstrated positive effects on harm reduction (Rossow & Hansen, 2016). Universal pre-commitment incorporated a mandated spending limit, reduction in jackpots, reduction in machine numbers, and account based operation (i.e., operation of the games was dependent on having an established account with the operator).

Jackpots

Jackpots have been found to increase and intensify gambling. The effect increases with larger prizes. Browne et al. (2015) shadowed 234 gamblers in three venues in Australia. They found jackpot oriented machines were associated with a greater spend by gamblers. Psychological 'priming' of gamblers and PGSI score predicted selection of jackpot-oriented machines.

Bonus rounds or 'free spins'

'Free spins' (also known as 'game features') have been identified as attractive characteristics, especially for 'problem gamblers' (Livingstone & Woolley, 2008; Schottler Consulting, 2014). A study of EGM structural characteristics found that EGM users identified 'free spins' as the most coveted and exciting aspect of EGMs, and that win multipliers during 'free spins' were more exciting for those with problem gambling PGSI scores (Schottler Consulting, 2014).

Multiple lines, Losses Disguised as Wins (LDW), Return to Player (RTP) ratios

Dixon, Graydon, et al. (2014) found that gamblers preferred to bet on multiple lines, were more likely to miscategorise LDWs (i.e., achievement of an outcome which provides reinforcement but constitutes a reward lower than the amount wagered) as actual wins, and found multi-line games to be more absorbing, (especially for people with gambling problems), to facilitate illusion of control and misperception of outcomes, and increase gambling intensity. Multi-line games make LDWs possible. Although the betting strategy known as “mini-max” (i.e., minimum bets on the maximum number of available lines) has been identified previously as the self-reported style for ‘problem gamblers’ in particular (Livingstone & Woolley, 2008) further empirical evidence of this has now been produced (Leino et al., 2015).

Coates and Blaszczynski (2014) explored “the extent to which accurate estimates of payback percentages and volatility combined with prior learning, enabled players to successfully discriminate between multi-line/multi-credit slot machines that provided differing rates of reinforcement”. It was reportedly very difficult for gamblers to determine this at the individual level. The study reported “Participants displayed a general tendency to discriminate payback, but counterintuitively placed more bets on the slot machine with lower payback percentage rates”.

Weatherly and Brandt (2004), (in Leino et al., 2015), reported that “monetary losses can also be reduced by increasing the payback percentage of a game”. The design of contemporary EGMs frequently incorporates characteristics such as “unbalanced reels” (e.g., where a game has different total number of symbols on each reel) and “starved reels” (e.g., where the number of winning symbols is reduced on some reels) (Harrigan, MacLaren, Brown, Dixon, & Livingstone, 2014). These characteristics permit the programming of ‘near misses’, which appear to generate physiological responses similar but less intense than either actual rewards or LDWs (Dixon, Collins, Harrigan, Graydon, & Fugelsang, 2015; Dixon, Harrigan, Sandhu, Collins, & Fugelsang, 2010; Dixon, Harrigan, et al., 2014; Dixon & Schreiber, 2004). Schottler Consulting (2014) reports that EGM users self-report LDWs as less exciting than actual wins.

Reduction of bet size

A well known study from 2001 (Blaszczynski, Sharpe, & Walker, 2001) reported that reduction of maximum bet size to one dollar on modified EGMs was effective in reducing expenditure by ‘problem gamblers’ whilst not being noticeable to ‘non-problem gamblers’ (see also Sharpe, Walker, Coughlan, Enersen, & Blaszczynski (2005)). Schottler Consulting (2014) reported that more than 11% of ‘problem gamblers’ bet consistently over one dollar per spin in shadowing observations.

Celebratory sights and sounds

Dixon et al. (2015) found that celebratory sights and sounds associated with LDWs affected the ways that users categorised the outcome of their wager. Comparing responses between standard sound, silence, and negative sounds, they found that two third of participants in this condition demonstrated a physiological response consistent with a reward, compared to 57.7% in the silent condition and 31.4% in the negative condition. The differences between standard and silent were not significant. However, the difference between both the standard and silent conditions, and the negative condition, were significant.

Positive sounds were more likely to be associated with miscategorisation of a win in the condition of a LDW when wagers were placed on multiple lines than the condition where a negative sound accompanied a LDW (Dixon et al., 2015). The authors proposed that a way to reveal LDW would

be to pair it with a negative sound, improving the likelihood that gamblers categorise this as a loss. Further, Blaszczynski et al. (2015) argue that “[p]ositive alerts to players, in reference to ‘losses disguised as wins’ should be prohibited”. Both the Australian jurisdictions of Queensland and Tasmania currently prohibit reinforcement of LDWs. In Queensland, an onscreen message or celebratory sound accompanying a net loss is considered to be in breach of section 228(2) of the Gaming Machine Act, which prohibits any false or misleading message being conveyed or exhibited by a gaming machine (Queensland Office of Liquor and Gaming Regulation, personal communication 4 Aug 2017). The Queensland Office of Liquor and Gaming Regulation has also issued ‘Gaming Guidelines G08, which incorporates specifications for the manner in which artwork, messaging and bet design are to be implemented, so as to provide fair and reasonable explanations to users about the way the game operates (Queensland Office of Liquor and Gaming Regulation 2016). The Tasmanian appendix to the Gaming Machine National Standards requires (at item T3.16) that:

If the net win of a play is less than the total credit bet any audible affirmation associated with the win will be subject to close regulatory scrutiny, and any display of “congratulatory” messages is prohibited (Department of Treasury and Finance, 2015).

A recent body of evidence has documented the reinforcement effects of celebratory sounds and other reinforcing effects. Unsurprisingly, the consensus is that such effects reinforce gambling behaviours and maintain gambling activity. There is some further evidence that venue level environmental reinforcement (e.g., constant exposure to visual and audio effects) also maintains gambling activity (Rockloff, Greer, & Fay, 2011).

Other game level characteristics

Anthropomorphic games (i.e., those incorporating an identifiable “humanised” theme, such as that of a film or TV personality) are thought to increase gambling intensity (Riva, Sacchi, & Brambilla, 2015).

Strength of the evidence

The standard of evidence in this topic area is of medium to good quality. It remains largely experimental but recording of physiological effects (notably skin conductivity and heart rate) by some researchers (notably the work of Dixon et al) indicates consistent results.

The shadowing technique utilised by some researchers is likely to have a range of limitations, particularly the Hawthorne effect. A range of inconsistencies were noted in the M. Browne et al. (2015) study, including a misunderstanding of how the Hawthorne effect may influence the study results:

... while observation effects (e.g., the Hawthorne effect, the mere measurement effect) may have occurred in the present investigation, it is important to note that the main results of this study cannot be attributed to such effects as they applied equally to all participants. (M. Browne et al., 2015, p. 1711)

The quality of this study was further undermined by a lack of explanation of the “priming manipulation” technique used in the study.

Exposure and accessibility

Caps on EGMs in areas of socioeconomic disadvantage

There is consistent evidence that EGMs in Australia are clustered in areas of relative disadvantage (Livingstone, 2017; Rintoul, Livingstone, Mellor, & Jolley, 2013; Young, Doran, & Markham, 2014). Accessibility to gambling venues predicts increased expenditure and increased expenditure is associated with higher rates of harm, and larger venues demonstrate increased expenditure per EGM, as well as higher harm rates (Young, Markham, & Doran, 2012; Markham, Doran, & Young, 2013; Markham, Young, & Doran, 2014) including increased rates of intimate partner violence (Markham et al., 2016). As Markham et al (2013) indicate, the association of harm with both venue size and accessibility indicates that both factors may be highly relevant to harm prevention and minimisation interventions and policy.

Neurological studies have recently demonstrated that gambling stimulates the striatal dopamine system (Murch & Clark, 2016, Yucel et al 2018), and that both 'problem' and 'pathological' gamblers display elevated cortisol levels (Wohl, Matheson, Young, & Anisman, 2008). This suggests that the mechanism driving the geo-locational characteristics of EGM venues is at least partly associated with elevated stress amongst disadvantaged or other segments of the population. This may also include, for example, residents of outer suburban areas, where relative disadvantage is not clear cut but stress levels could be determined by other factors including high housing stress, increased travel times, and difficulty in child care arrangements.

A study of the effects of regional caps on EGMs in some regions of Victoria was undertaken in the mid 2000s (South Australian Centre for Economic Studies, 2005). The authors concluded that by the third year of the regime, there was no evidence that the reductions reduced expenditure in capped areas. Further, there was no evidence of increased help-seeking behaviour. In contrast, significant reductions of as much as 19% in expenditure were associated with the introduction of smoking prohibitions in venues. South Australian Centre for Economic Studies (2005) concluded that the reduction in EGM numbers imposed by the caps were of insufficient magnitude to have measurable effects. There were modest (3.3%) but significant reductions in expenditure associated with the introduction of a prohibition on 24-hour operation of gambling venues. A simple economic interpretation would indicate that reducing machine numbers is likely to increase the extent of queuing at machines during peak times, thereby effectively limiting access.

Caps on EGMs in venues

All Australian jurisdictions operate some form of cap on the number of EGMs permitted in gambling venues. However, we were unable to identify any study that directly evaluated the effects of this. A study of consumer attitudes to gambling harm minimisation interventions in Tasmania did not go to efficacy (Jackson et al., 2016).

Young, Markham, and Doran (2012) report: "Venues in accessible locations and those with higher numbers of EGMs, particularly casinos and clubs located near supermarkets, were most closely associated with gambling-related harm, even when differing player socio-demographics were accounted for." Their study suggests that geographic location and venue characteristics such as the number of EGMs within a venue are significant markers of harm.

A strong relationship between the number of EGMs in venues, the net revenue per EGM, and the level of gambling problems within the venue has been demonstrated (Young et al., 2012). Generally, larger venues (measured as EGMs per venue) produce more revenue per EGM and are associated with increased levels of harm (Markham et al., 2013).

Venue type – effects

Empirical evidence available in Victoria (Australia) indicates that hotel based local EGM venues produce significantly higher net revenue per EGM than EGMs located in club venues (VCGLR, 2017). In 2015-16, hotel based EGMs generated average net revenue of \$126,384 per EGM compared to club venues, which averaged \$70,494 per EGM (VCGLR, 2017). As already noted, larger venues generally produce higher revenue per EGM (Markham et al., 2013).

Gambler venue preferences and effects

A theoretical framework through which to analyse gambler preferences for options including gambling platform (online/mobile/land-based), the specific provider/venue, and the game or machine features (such as graphics, themes, and bonus features) has been developed (Thorne, Rockloff, Langham, & Li, 2016).

The framework was utilised in a subsequent study of gambler preferences (Rockloff, Moskovsky, Thorne, Browne, & Bryden, 2016). This examined preferences including venue based or online gambling, the preferred provider, and the preferred game. The study sampled 245 EGM venue-based gamblers and 7,516 EGM gamblers from an online panel.

This study concluded that gamblers prefer:

- Gambling at club close to home, and to do so with a group of friends.
- Quiet venues
- Air conditioning
- Large gambling space
- Cheap food
- Classic games
- Small bet sizes
- Good animations
- Safe and secure
- Variety of games

'Problem gamblers', however, reportedly cared much less about having company, and preferred larger venues.

Rockloff et al. (2011) conducted a study involving use of a computerised poker machine simulator. This was provided in three different conditions – in a room alone; in a room with one other person and a video of 5 other people using computer-based EGMs, and in a room with one other person and a video of 25 others using computer-based EGMs. The authors found that gambling intensity increased with larger crowd sizes.

Evidence in this topic area is of inconsistent quality, particularly in relation to evaluations of efficacy. However, there is strong evidence of associations between socio-economic disadvantage

and EGM venue location, and between size and type of venues and expenditure. There is evidence associating harm with larger venues. Venue characteristics in general (size, type of venue, and number of EGMs) are collectively of some significance and provide a basis for exploration of harm prevention and harm minimisation opportunities.

Advertising and promotions

Little research has been conducted on this topic, despite its recent prominence in the context of advertising by online bookmakers during sporting broadcasts. A 2014 review of gambling advertising literature prepared for the UK Responsible Gambling Trust (Binde, 2014) principally concluded with a range of recommendations for further research, especially around the generation of empirical data. It did not report the effectiveness of advertising in inducing gambling activity, and did not discuss “counter-advertising.”

A recent study of children’s and parent’s recall of advertising, concluded that sports betting advertising associated with sport resonates with sports spectators under the age of 18 (Pitt, Thomas, Bestman, Stoneham, & Daube, 2016).

There is a modest literature on counter-advertising, including educational programs targeted at children. One study concluded that such programs did not demonstrate effects (Ladouceur, Goulet, & Vitaro, 2013). The Productivity Commission did not recommend adopting school based educational programs given the strong possibility of no, or adverse effects (Productivity Commission, 2010: 9.20). Any such programs should be subject to comprehensive evaluation.

Overall observations on the evidence base

Study design

As already described, the overall quality of studies is generally weak. This persists for a variety of reasons, including relatively small resources allocated to address gambling problems, meaning that large-scale studies are difficult to undertake. It should be acknowledged that evidence in an area of social policy cannot readily adopt standards achievable for clinical trials. In many cases, randomised control trials, for example, are neither feasible nor desirable.

There are also historical and systemic issues that arise due to the relatively nascent development of gambling studies as a field of research. While lessons from tobacco about industry funding are acknowledged to be directly applicable to gambling, scholars and researchers who pursue independence of the evidence base from industry influence are by no means a majority of the gambling research population. The modest and in many areas weak evidence base in gambling research may be viewed as significantly affected by the influence of industry.

Industry influence on the gambling evidence base

Several gambling studies scholars have described the challenge faced by gambling researchers to improve the quality of evidence generated in this field (Adams, 2016; Adams & Livingstone, 2014; Adams, Raeburn, & de Silva, 2009; Cassidy, 2014; Cassidy, Loussouarn, & Pisac, 2013; Livingstone & Adams, 2011, 2015). Yet industry participation in research continues to be supported by some prominent researchers (e.g., Blaszczynski & Gainsbury, 2014), who maintain that funding of gambling research by the gambling industry is unproblematic. This systemic issue requires a systematic response, possibly including separation of vested and conflicted interests from the design and conduct of public interest research, education of researchers to apply a critical approach about the moral jeopardy and other dilemmas resulting in accepting direct funding from

industry, and the effects of this on the quality and depth of the evidence base in the field (see Adams, 2016).

Disclosures of interest and ethical standards

An ongoing challenge is the need for full and transparent disclosures of interest. Few gambling journals consistently apply or require authors to follow the ISAJE guidelines for disclosures of conflicts of interest. Critique of this has been directed towards the editors of some prominent gambling research journals (Livingstone & Adams, 2015).

While one study reviewed reported no disclosures or conflicts in the appropriate section of the manuscript, the authors stated in the acknowledgments section that:

The project also involved approval and contributions from the Queensland Government and the Queensland Hotels and Clubs industry. These stakeholders were advised of the project methodology and had some input into this, but were not involved in any way in the collection of data, analysis, or preparation of this manuscript. There are no constraints on publishing (Gainsbury et al., 2015b).

However, the authors reported elsewhere in the paper that the largest gambling operator involved in the trial did in fact influence the design, reducing the frequency and duration of the pop-up message displayed on EGMs at this venue:

The messages appeared every 15 min for a period of 15 sec for all venues at the commencement of the project. The messages at the Large Club displayed messages once every hour for a period of 10 sec, at the request of the venue. (Gainsbury et al., 2015b)

This issue is relevant to other publications that were produced using data from this trial (Department of Social Services, 2014; Gainsbury et al., 2015a).

A recent disclosure unconventionally inserted in the acknowledgements section of an article details extensive funding and support from large number and range of gambling businesses from across the world (Ladouceur et al., 2017, p. 233). It provides an example of the extent to which some prominent researchers are supported by industry actors:

The authors jointly accept responsibility for the content of this article. None of these supporters or any of the authors has personal interests in bwin.party, La Loterie Romande, ClubNSW, or the National Lottery that would suggest a conflict of interest.

During the preparation of this article, Howard Shaffer received reimbursement from Laval University for travel expenses, but no honorarium. In addition, The Division on Addiction at the Cambridge Health Alliance has received funding support from a variety of sources, including the following: bwin.party Interactive Entertainment, AG; The Foundation for Advancing Alcohol Responsibility (FAAR); National Institutes of Health (i.e. NIDA, NIAAA, NIMH); Substance Abuse and Mental Health Services Administration (SAMHSA); The National Center for Responsible Gambling (NCRG); Massachusetts Council on Compulsive Gambling; The Massachusetts Gaming Commission; The University of Nevada, Las Vegas; and DraftKings. Dr. Shaffer has received funding for consultation from Las Vegas Sands Corp., Davies Ward Phillips & Vineberg, LLP, and the DUNES of Easthampton.

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During the preparation of this article, Alex Blaszczyński obtained reimbursement from the project funders for expenses; he did not receive any honorarium for this work. Dr. Blaszczyński has had financial professional dealings with the gambling industry and various state and federal governments directly and indirectly over the last three years including research funding, personal fees for professional consultancy, honoraria for grant reviews and theses examination, royalties for published books, and research funding and expenses covered to attend and present at conference and government meetings from the following gambling industry operators including: La Loterie Romande (Switzerland), Svenska Spel (Sweden), Club NSW (Australia), Camelot (United Kingdom), La Française des Jeux (France), Loto-Québec (Québec, Canada), Casino Austria, National Lottery (Belgium), Sportsbet, British Columbia Lottery Corporation, and Aristocrat Leisure Industries. He also has had financial dealings with organizations that are funded directly or indirectly from the gambling industry or levies on the gambling industry including the Victorian Responsible Gambling Foundation, Ontario Problem Gambling Research Centre, the Responsible Gambling Trust, Manitoba Gambling Research Program, Ministerial Expert Advisory Group (federal government), and honoraria and expense reimbursement for training programs and workshops conducted from government-funded problem gambling counseling services. Government-funded agencies include the NSW Office of Liquor, Gaming, & Racing, Australian Institute of Family Studies, Gambling Research Australia, Australian Department Social Services and non-industry or government agencies including the National Association for Gambling Studies, National Council on Problem Gambling, and Le Comité d'organisation Congrès international sur les troubles addictifs.

During the preparation of this article, Paige Shaffer obtained reimbursement from the Laval University; she did not receive any honorarium for this work.

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Despite this considerable listing of potential conflicts, in the subsequent disclosures statement the authors report no conflicts of interest.

Disclosure represents a significant step forward in unpacking and comprehending potential conflict. However, acceptance that conflict can be, at the very least, perceived within such situations is yet to be achieved across the gambling research field.

Aside from issues of undeclared, incomplete or inaccurate declarations of interest, several authors either reported that they did not obtain ethical approval, or made general mention of ethical standards being upheld, but did not declare that ethical approval was in fact obtained (Harris & Parke, 2016; Kim et al., 2014; Lucar et al., 2013; Meyer et al., 2015). These represent challenges not only for the authors who make the statements, but also for peer-reviewers and editors of journals that implicitly accept these statements through publication.

Industry-normative discourse

The way concepts, ideas and research is perceived and described constructs the way it is addressed (Livingstone et al., 2017). The language adopted by many researchers in the gambling research field frequently adopts industry or business perspectives and discourses, as compared to consumer protection or public health perspectives and discourses. This was highlighted some time ago by Livingstone and Woolley as ‘the discourse of business as usual’ (Livingstone & Woolley, 2007). It remains a significant element contextualising much of the gambling research literature, and circumscribing the available interventions and responses.

For example, it is common to see gambling activities described as ‘gaming’, an elision arguably intended to trivialise the possible harms.

The casino industry prefers to use the term “gaming.” We tend to use the terms gambling and gaming interchangeably (Walker et al, 2015, p. 967).

Similarly, the term ‘play’ is often used instead of the more neutral term ‘use’, when referring to gambling activity, with similar trivialising effects.

Further, and in some ways most significantly, the widespread discourse of ‘responsible gambling’ continues to largely posit that the responsibility lies with the individual, rather than with the large scale and very organised set of businesses that have developed considerable expertise in recruiting gamblers and encouraging large scale gambling. Further, some researchers argue that a research focus on the structure and political economy of gambling businesses is ideological in nature (Delfabbro & King, 2017). Livingstone et al. (2017) argue in contradiction to this that a lack of understanding of the political economy, sociology, and anthropology of gambling in its contemporary form has led to the extent and severity of harms experienced at present.

Continuing reference to an imagined and simplistic dichotomy between, in the first instance, gambling that is entertainment focussed and recreational, and in the alternative harmful or problematic, demonstrates a fundamental misunderstanding of the nature of gambling, and of its harms. The oppositional spectacle of a few disordered ‘problem gamblers’ versus the majority, orderly and disciplined mass of recreational gamblers offers a continuing illusion of the dominance of ‘responsible gambling’ (Livingstone & Woolley, 2007).

Gambling and its associated harms might best be thought of as occurring along a continuum, where large numbers of people accruing low to moderate levels of harm will, in the aggregate, account for most of the costs, including that passed on to others. Nonetheless, a smaller group of people will experience significant harm, and affect multiple others (Brown et al., 2016; Browne et al., 2017; Productivity Commission, 2010).

The dichotomous approach also fails to recognise that harm occurs across time, meaning that so called ‘recreational’ gamblers can experience harm and develop multiple problems through use of EGMs or online gambling accounts, and that ‘recovered problem gamblers’ and their families and associated others may continue to experience harmful consequences long after they have stopped gambling.

In some cases, researchers explore specific gambling behaviour under various conditions without explicit acknowledgement of the purpose of such studies. Some explanation for this may include influence by gambling businesses through funding of gambling research. It may also relate to the disciplinary orientation of some authors active in gambling studies, including those from tourism, hospitality, psychology, computer science, and more recently, public health disciplines.

Literature emerging from business or tourism oriented disciplines may highlight concerns about containing regulatory costs to the industry, while overlooking super-profits generated by many EGM operators and the substantial negative externalities associated with such businesses. For instance:

Understanding actual play behaviour and intended and unintended consequences of card use is critical, therefore, to ensuring an efficient, universally available scheme: one that is well-designed, has maximum player benefit, and contains the cost to industry while not inhibiting innovation. (Nisbet et al, 2016, p. 237)

The comment above suggests a lack of consideration of what might be the most appropriate balance between maintaining profits and preventing harms. Its emphasis is towards minimising disruption to existing operations, including limiting economic costs to business, rather than considering the benefits of harm prevention for the broader society. It maintains ‘the discourse of business as usual’, albeit in an unintentional manner. Intentionality, however, is not the issue. Rather, it is the continuation of a way of understanding gambling and its harms that privileges the gambling industry. It does not represent a public health approach that arguably needs to be better developed in this field.

Other industry-normative influence is reflected in the broader discourse that permeates much of the literature, ranging from describing gambling as a “popular pastime”, overlooking or downgrading substantial and severe harms accruing to many in the community, and to repeated references to ‘play’ and ‘entertainment’ when reporting on studies of ‘problem gamblers’, for example:

For many people, gambling is an enjoyable form of entertainment, partly due to the excitement associated with betting money on an uncertain outcome (see Wulfert, Franco, Williams, Roland, & Maxson, 2008).

However, characteristics that make gambling enjoyable can also propel some gamblers to spend excessive amounts of time and money gambling, resulting in serious psychological, financial and interpersonal harms to the gambler and others (Fong, 2005; Kim et al, 2014; S. C. Newman & Thompson, 2007; Potenza, Kosten, & Rounsaville, 2001; Squires, Sztainert, Gillen, Caouette, & Wohl, 2012).

Other researchers have been clearly mindful of protecting industry interests from ‘unfair criticism’, despite evidence that industry is well able to do that itself:

The features and principles of a self-exclusion program should be fully understood by individuals who wish to self-exclude, employees of gaming venues, gaming venue operators and regulatory bodies. This is essential in order to clarify expectations regarding the role and limits of all parties including legal and governmental authorities and avoid unrealistic expectations and unfair criticisms. (Gainsbury, 2014, p. 231)

Some studies go to considerable lengths to avoid conclusions that their findings may indicate harm is caused by use of EGMs:

From this research it is not possible to state categorically whether only gaming machine play predominantly contributes to problem gambling status, or whether this is accounted for by participation in multiple forms of gambling. Readers should not assume that problem gambling status is causally and predominantly related to gaming machine play.

Indeed, given the complexity of gambling behaviours, the researchers have concluded that any corporate responsibility strategy must take a balanced, rounded approach. That is, that by factoring in the environment, the individual player, and the product being played to provide a complete view rather than focusing on a single variable the gambling industry will be able to significantly improve the detection rate of problem gamblers and the minimisation of gambling related harm. (Excell et al., 2014, p. 5).

The Excell et al study (2014) was funded by the UK Responsible Gambling Trust (now GambleAware), a gambling industry charity entirely dependent on contributions from gambling businesses to fund research. As noted above, this study demonstrated that algorithms to analyse user data could differentiate between harmful and other gambling. The positive response to the conclusion that this was indeed feasible was dampened by the comments reported above, and dampened even more by a commentary on the study, which concluded:

It is suggested that at this stage, it would be inadvisable to rush policies on the basis of these foundational studies (Blaszczynski 2014; 3).

Despite considerable research identifying the complex causality, behaviour and motivations associated with gambling problems, some researchers continue to adopt an arguably simplistic, 'greed focused' account of the motives of those experiencing gambling harm:

Price regulations designed to minimize expenditure, such as a maximum bet limit and reduced jackpot prizes, aim to reduce the amounts that gamblers are willing to spend. Such policies may be effective as a harm-minimisation strategy for gamblers. Such strategies intend to encourage gambling at recreational levels as an entertainment activity, rather than as a means to obtain potentially large wins by betting high amounts. (Gainsbury, Blankers, Wilkinson, Schelleman-Offermans, & Cousijn, 2014, p. 778)

Gambling is a complex set of behaviours, conditioned by multiple systems and arguably understandable in any detail only when multiple perspectives are applied to these phenomena, as Livingstone et al. (2017) argue. Gambling research arguably requires considerable development and sophistication before a comprehensive understanding of these complex behaviours is achieved. However, that does not mean that we lack knowledge about how best to prevent and minimise the harms derived from gambling. There is much that can be done, and in key areas the problem is not a lack of research evidence, but rather of political will and, in some cases, industry influence on key elements of what Adams call 'the knowledge chain' (Adams, 2016).

Conclusions

Australia leads the world in gambling expenditure per capita (The Economist online, 2014, 3 Feb), and experiences widespread harm associated with gambling, as the Productivity Commission noted (1999, 2010) and Browne et al. (2016, 2017) documented for Victoria and for New Zealand. As a consequence, the harms of gambling, and their successful prevention and minimisation, represent a considerable public health challenge.

Opportunities and relevant issues

Structural characteristics

The review confirms that modification of technical requirements for EGM and other gambling structural characteristics is likely to be an essential upstream measure, capable of providing a

range of opportunities for the prevention and reduction of gambling harm. It is encouraging to see that much new evidence has concentrated on this theme. Significantly, many of these countermeasures could readily be adopted if technical issues were the only impediment to their implementation.

Key amongst these are modifications intended to reduce the very high reinforcement rates achievable on contemporary EGMs, via losses disguised as wins, uneven and starved reel configurations which permit regular appearance of 'near misses', and ubiquitous 'bonus rounds', also known as 'features'. The available evidence indicates that reduction of high reinforcement rates is likely to be effective in reducing the harmful potential of all gambling modes, including online wagering. Other structural characteristics where modification is supported by available evidence include stake reduction, modification or abolition of jackpots (as distinct from major prizes inherent to game maths), and better representation of the price of use (rather than the current provision of limited information on RTP or odds). Analogous interventions can be conceived and have been partly implemented for online wagering (e.g., limiting in-play betting).

Pre-commitment

Pre-commitment systems appear to offer considerable potential for harm prevention and minimisation of adopted in universal and binding forms. The evidence for voluntary pre-commitment, although arguably more extensive, strongly indicates a lack of perceptible effect. In part, this appears to be associated with the stigma occasioned by enrolment in a program perceived to be for people who need help to manage their gambling. Universal pre-commitment would address this issue.

In combination with harm detection algorithms pre-commitment could be a highly valuable approach to the prevention of harm, its early detection, and effective referral of affected individuals to appropriate support. Again, this is an area where technical issues are minimal (particularly in Victoria, where a voluntary EGM pre-commitment system has been activated). The Australian Government, in partnership with Australian state governments, has also announced a proposal for a universal 'opt-out' pre-commitment system for online wagering. This could also be expanded to provide a universal system across providers. Attempts to implement pre-commitment have often been undermined by what could have been predicted to be obvious flaws in the design (optional enrolment, non-binding limits etc.).

Although self-exclusion has limited uptake at present, and its efficacy is largely undemonstrated, adoption of a universal pre-commitment system (or another effective requirement for identification of users) would likely significantly increase its utility and effectiveness. This would be achieved by a requirement to establish and maintain an account, for the purpose of setting limits for use of EGMs and online wagering. In the case of a self-excluded user, the limit would be zero, or they would cancel their pre-commitment account.

Interactive and 'pop-up' messaging

Pop-up messages demonstrate some small effects in some studies. The quality of this literature is relatively poor, and 'common-sense' improvements to messaging have not always been applied. There is some evidence to suggest that 'pop-up' messages, driven by personalised monitoring algorithms, may provide benefits for some gamblers. The evidence suggests that a personalised message (relating to expenditure, time or both) is likely to be more effective than impersonal messages promoting 'responsible gambling'. This intervention could be tailored to both EGMs and online wagering.

Accessibility and exposure

There is good evidence about the relationship between accessibility of EGMs, socio-economic disadvantage, expenditure and harm. There is little formal evidence demonstrating that redistribution of EGMs reduces expenditure or harm, although such studies have involved only modest reductions or redistributions of EGMs. The face validity of the efficacy of EGM reductions is high.

There is also good evidence that venue size predicts expenditure and harm. Interventions reducing the size of venues, redistributing or limiting access to EGMs and/or online wagering (via 'capping' for terrestrial gambling forms and/or restrictions in hours of operation) are therefore indicated.

In-venue or real-time identification of 'problem gamblers'

Available evidence demonstrates that identification of users experiencing significant harm from gambling is feasible. However, there is no evidence that such practices are implemented (the evidence suggests the opposite) and no evidence of efficacy (i.e., that such interventions produce good outcomes). Observation of such behaviours is, in any event, most likely at a point where individuals will have experienced significant harm. It is, at best, a harm minimisation activity, and not a harm prevention intervention.

Extensive training and substantial support is required for those working in gambling environments to be capable and confident of undertaking such interventions. At present, there is no evidence that this is provided. As noted above, these interventions are much more likely to be effective if automated using user data. Online wagering is already operated on an automated account based platform and is immediately amenable to this intervention. EGMs are networked and with the adoption of a universal pre-commitment system would be readily amenable to such an intervention.

Restrictions on advertising and marketing

There is little evidence of the efficacy of restricting gambling advertising, although there is evidence that advertising affects the way young people conceive of sport and appears to 'normalise' gambling as a legitimate aspect of sport. Some restriction of advertising (e.g., for EGMs and casinos) has been adopted in Victoria and elsewhere but no evaluation of the effect of this is available. Some further changes to broadcast advertising of wagering services has been proposed but is yet to be implemented. Other restrictions (e.g., on the promotion of gambling via inducements, etc.) are also proposed. Again, there is no evidence on the efficacy of these, although the face validity of such interventions is high.

There is also some face validity to the restriction of marketing and advertising activities, particularly in relation to advertising.

Quality of the evidence base

As noted by Livingstone et al. (2014) the overall quality of the gambling harm prevention and minimisation evidence base is low. This is particularly so in relation to actually existing in-venue harm promotion activities. This arguably means that understanding of likely effective interventions is less well developed than it should be. This can be attributed to multiple factors including industry influence, a failure to adopt an active public health philosophy, the priority given to research into gambling harms as a branch of abnormal psychology, and the adoption of the 'responsible gambling' model.

RQ2.1 Evidence from other public health fields: Alcohol

Robin Room PhD & Michael Livingston PhD

This discussion starts from a consideration of the experience and research literature on policy interventions to prevent or reduce alcohol-related problems. Drawing on the preceding chapter on gambling problems prevention, the discussion proceeds to and considers what may be learned for gambling problems prevention from a comparison with the broadly equivalent alcohol problems prevention literature.

Experience and research on alcohol policy interventions

With the exception of aboriginal societies in Oceania, including Australia, and in North America roughly north of Mexico, alcoholic beverages have been known and consumed throughout recorded human history. The recognition that substantial social and health harm often results from alcohol consumption has an equally long history. Historically, most societies have wavered between two responses to this recognition: to forbid drinking entirely, or to try to limit the harm by restricting who can drink under what circumstances, and through other measures which limit or channel the drinking so as to minimise harm (Room & Hall, 2017). In Australia since British settlement, at one time or another there have been legal prohibitions on sales for Aborigines, “dry” districts, and for children. Some of these prohibitions remain today – for children, but also with such measures as designated dry areas and individual-oriented prohibitions such as the Banned Drinker Register in the Northern Territory.

In traditional societies, control of alcohol availability and consumption was mostly a matter of religious rules or social norms and customs. Limitations were also imposed by the availability of raw materials for alcohol production, and to some extent also by social arrangements; for instance, in many traditional African societies, the production was mostly by women, although the drinking was mostly by men. This implied some limits (Colson & Scudder, 1988). Alcoholic beverages – primarily spirits and beer – were among the first products whose availability and form were transformed by the Industrial Revolution. The results were succeeding waves of overproduction and overconsumption in Europe and European settler societies in the 18th and 19th centuries. In this context, where the dominant governmental view of alcoholic beverages had previously been as a relatively easily taxed consumer good and thus a source of state revenue, by the late 18th century governments started to view their duty as including controlling the social and health damage to the population from drinking. Particularly in Protestant populations in or deriving from northern and western Europe, strong temperance movements emerged which (until the reactions against the movements in the mid-20th century) provided political support for controlling alcohol in the interests of public health and order.

So there is a rich record since the middle of 19th century of “natural experiments” (as researchers often refer to them) in diverse kinds of alcohol control measures. Often there were clear changes in alcohol consumption levels or in rates of alcohol-related harm as a result of the policy changes. For instance, tax rises in Denmark during World War I resulted in a more than 10-fold rise in spirits prices, along with a near-doubling in beer prices, reduced alcohol consumption by three-quarters,

and turned Danish drinkers overnight into beer rather than spirits drinkers (Bruun et al., 1975). Studies of the effects on consumption levels of alcohol prohibition in the U.S. established that the total level, including of illegal alcohol, had fallen to one-third of previous consumption in the early years of prohibition, but had risen to two-thirds by the early 1930s (Moore & Gerstein, 1981).

By the 1950s, a policy research literature on the effects of alcohol controls had begun to appear, occasionally even including controlled studies of effects of policy changes (e.g., Kuusi, 1957). Ironically, the dominant neoliberal orientation of policies in the later 20th century meant that more studies have been of the effects of weakening rather than strengthening controls on alcohol availability (Olsson et al., 2002). Australian contributions to this literature only began to appear in any number in the 1980s (Chikritzhs et al., 2007), and, in an era in which unfettered-market ideology has become more contested, have included a number of evaluations of the effects of measures which strengthened controls of availability (e.g. Kypri et al., 2014), as well as internationally significant studies of the effects of drink-driving countermeasures (Homel, 1988).

An important element of alcohol policy is how responsibility for alcohol control and the minimisation of alcohol-related problems is organised. A substantial aspect of this is the organisation of the market in and availability of alcoholic beverages. Often this market is defined as two separate segments, one for “off-premises” sales of alcoholic beverages in containers for consumption elsewhere, and the other in terms of “on-premise” consumption of alcohol in a tavern or restaurant. Often, on-premise sales places are divided between places primarily organised around drinking (taverns) and places where the drinking is defined as ancillary to eating food (restaurants), but the boundary between these categories has become increasingly fuzzy in Australia, as elsewhere, in recent decades. In Australia, reflecting the 19th-century tradition of country “hotels” as multi-purpose stopping places for travellers, still today a “hotel” alcohol licence generally authorises off-premise as well as on-premise sales (Manton et al., 2014:3-19). In Australia today, almost 80% of alcohol is sold for off-premises consumption (Callinan et al., 2016), an enormous reversal of the situation 60 years ago, when drinking was primarily engaged in by men in taverns (Room, 1988).

In societies where there was not a strong temperance-movement history, alcoholic beverages are often treated as just another comestible, and government control of alcohol sales is a part of the responsibility of agencies controlling sales and service of food in groceries or restaurants. In Australia, as in other countries with a temperance tradition, sale and service of alcoholic beverages is authorised by specific “liquor licences” under the authority of a specialised agency. States and territories are the primary level of such control in Australia, as in most federal countries. But other levels of government also have responsibilities. The federal government has primary responsibility for taxes and for product standards, and substantial responsibility for controls on advertising and other promotion. Local governments, which often have an important role in dealing with adverse consequences of drinking (Room, 1990), also play some role through planning processes and in advising on licensing, but their interests are often overridden at the state level (Manton et al., 2014:47-78).

Within each level of government in Australia, responsibility for dealing with alcohol problems is split and often diffuse. Liquor licensing will be under the jurisdiction of one ministry (often as a semi-autonomous authority), but dealing with alcohol-related problems will be split between a number of departments – e.g. at the state level: welfare for child protection and family issues, health for injury and physical and mental health issues, justice and policing for violence and other criminal-law issues. There is usually little effective coordination between the different departments or specialisations on alcohol issues; cross-departmental committees or other means of coordination are often evanescent and staffed by lower ranks, and usually have dealt with illicit drugs as well as alcohol, with political priority often given to drugs. Particularly for alcohol, where strong legitimate

market interests are at stake, Australian government initiatives often choose policy options which have minimal interference with the market, but which have little promise of effect on alcohol-related problems. That circumstances could be otherwise is illustrated by the Victorian experience with driving down the rate of traffic crash deaths (notably including drink-driving deaths) from 1,000 to less than 300 over a period of four decades. This result was attained with focused whole-of-government coordination at high levels, and such dedicated resources as a Traffic Accident Commission and the Monash University Accident Research Centre (Johnstone, 2006).

There is much less research on the effectiveness of implementation of liquor licensing and regulation than there is on the effects of specific alcohol policy provisions. In all Australian jurisdictions, liquor licensing and gambling regulation have now been combined into a single combined regulatory agency. One logic for this combination is that some particular forms of gambling (notably EGMs) are mostly confined to on-premise drinking places. But academic studies of the operation of liquor licensing authorities, or now of the combined operations, have been relatively rare (see Wilkinson & MacLean, 2013; Manton et al., 2014:99-108, 179-195, 224-232). One general conclusion from the Australian studies is that, particularly with respect to on-premises drinking, routine activities which can be conducted at 10am, such as checking the appropriate posting of required notices, can easily absorb the main efforts of enforcement staff, but make little contribution to the prevention of alcohol-related harm – observing whether those already intoxicated are refused further service may require deployment at 3am.

As noted, there is by now a well-developed international literature on alcohol policy effects and effectiveness, which is drawn on, for instance, in publications of the World Health Organization's Global Strategy to Prevent the Harmful Use of Alcohol (World Health Organization, 2010). A selective narrative review of the global research literature can be found in Babor et al. (2010), while Loxley et al. (2004) give an account of the Australian literature up to the early 2000s (see also Chikritzhs et al., 2007). The following account follows the ordering in Babor et al. (2010).

Controlling affordability: Pricing and taxation

This set of strategies qualifies as a “best buy” in the context of the World Health Organization's (WHO) Global Strategy on alcohol. The strong evidence of effectiveness of price interventions in reducing levels of alcohol consumption, including in affecting the drinking of heavier drinkers, has been strengthened in recent years by the Australian experience with raising taxes on “alcopops” (premixed spirits-base drinks; Doran & Digiusto, 2011), and new elasticity estimates (Jiang et al., 2016). Raising the minimum unit price (floor price) for alcoholic beverages has also been shown in Canadian studies (Stockwell et al., 2012) to be an effective way of reducing levels of alcohol consumption.

Regulating physical availability

These strategies also qualify as “best buys” in the context of the WHO Strategy. Most Australian attention in this area has been focused in recent years on closing hours, particularly for on-premises drinking, as a delayed reaction to the increased late-night problems arising from radical extensions in recent decades of on-premise opening times. Strong evidence has emerged that making closing hours earlier reduces alcohol-related violence late at night and overall (Manton et al., 2014:122-136), with lasting effects (Kyprilou et al., 2014). In Australian political discourse, changing closing times is often misidentified as introducing “lock-outs”, a separate intervention often adopted contemporaneously, which allows drinking places to continue to serve those already inside the door at the lock-out time, while refusing entrance to new customers. There is little

evidence that this measure is effective in reducing net rates of alcohol-related problems (see Miller et al., 2012 for example).

Another dimension of availability which has received attention in recent years in Australia is the density of sales outlets. Babor et al. find that the international evidence on the effect of this on both consumption and alcohol-related problems is moderately strong, and recent Australian studies support this, having found, for instance, that changes in the density of off-premise outlets in a neighbourhood has a greater effect on rates of domestic violence and chronic disease, while density of pubs and nightclubs has a greater effect on rates of street violence (Livingston, 2013).

Babor et al. also cover several other strategies under the “availability” rubric. One is minimum drinking age. There is good evidence from North America and New Zealand that raising or lowering the drinking age affects rates of alcohol-related problems, particularly from drink-driving, in affected ages (Wagenaar and Toomey, 2002). But raising the drinking age has not had any political support in Australia in recent years.

Another strategy classified in Babor et al. under “availability”, one which has had growing application in Australia, is bans on drinking in public places. Babor et al. classify this as of unknown effectiveness, and the review by Pennay and Room (2012) of 16 studies in Australia, New Zealand and the UK noted that such bans were often a tool in contests over decorum in and “ownership” of public space, as illustrated by the growth in the same era of permits to pubs and restaurants for footpath occupancy for drinking and dining. The review concluded that “there is no evidence that street drinking bans reduce alcohol-related harm or benefit the community in other ways”, but do result in perceptions by residents of increased safety and improvement in amenity in the neighbourhood.

Babor et al. also deal with “government monopoly of retail sales” under availability, although this strategy also has other connections with alcohol consumption and problems. At the level of local and tribal governments, there is experience in Australia with such government monopolies, with mixed results according to whether the primary aim of the collective ownership was revenue for the government, or reducing rates of alcohol problems in the community – aims which are somewhat opposed (Brady, 2014; Brady, 2017). There is no Australian experience with such off-sale monopolies at the state or national level, such as exist today in Canadian provinces, Nordic countries, and many US states. Such a monopoly has been proposed for the Northern Territory, given its special circumstances (Room, 2017), but this tends to be viewed as an “extreme” suggestion (Sorensen, 2017). A substantial literature exists on the effectiveness of such monopolies in reducing rates of problems from alcohol (Hahn et al., 2012), not only because of the smaller numbers of stores and shorter opening hours, but also because of such factors as better limitation of sales, for instance to the underaged or already drunk, and the monopolies’ substitution for private interests which would otherwise be lobbying for greater availability (Room, 2000).

Even further outside the frame of current Australian policy thought is the idea of rationing alcohol supplies to families, as a measure for alcohol problems control. This general restriction of availability in the population was in place in Sweden for four decades before 1955. It was combined with a measure which is within the current Australian frame: individual-level prohibitions analogous to the Northern Territory’s Banned Drinker Register. The system was highly effective in holding down the drinking of very heavy drinkers; cirrhosis mortality rose by one-third in Sweden the year after the rationing system was abolished (Norström, 1987).

Modifying the drinking environment

Research in this area is primarily limited to strategies to modify the environment of on-premise drinking – which, as noted, accounts for only about 20% of present-day Australian drinking. A primary emphasis has been on training or persuading staff not to serve further drinks to those who are already drunk. An effective measure for this in the U.S. has been “server liability”, whereby the serving establishment can be held liable for damage caused by a drinker whom they served who was under-age or already drunk. But Australian tort law jurisprudence has essentially ruled this strategy out. “Responsible Beverage Service” training of staff has proved to be effective only to the extent it is backed up by enforcement, with penalties for noncompliance. A Canadian controlled study showed some success with reducing aggression in on-premise drinking environments through staff training about managing aggression (Graham & Homel, 2008).

Drink-driving prevention and countermeasures

Babor et al. record that a series of measures which have been strongly applied in Australia – lowered BAC limits, random breath testing of drivers, administrative licence suspensions – along with a zero BAC limit and graduated licensing for young drivers have had demonstrated success in reducing drink-driving casualties. Such measures are thus among WHO’s “best buys”. This is a preventive area in which Australia has played a leading role internationally.

Restrictions on marketing

Advertising and other marketing of alcoholic beverages is partly about persuading the consumer to buy the product today or within a relatively short time. But marketing also has functions which operate in the longer term, seeking to integrate the product more firmly into the culture and everyday life, and to associate it with culturally-valued symbols and activities. Studies of the effects of marketing are better able to measure the immediate effects on consumption than the cultural and political positioning of the product, which occurs over the longer term. The latter effects can be described retrospectively and qualitatively (e.g., Eriksen, 1993; Meerabeau et al., 1991), but it is only the more immediate effects, which can be measured in conventional quantitative effects studies. Babor et al. record that associations can be shown at the individual level between youths’ exposure to alcohol advertising and early onset of drinking. But it has been difficult to find effects in the short term of alcohol advertising and promotion on levels of consumption at the population level. One thing which is clear from the literature is that Australian controls on alcohol advertising and other promotion are comparatively weak (D. A. Brand et al., 2007).

Education and persuasion

Despite a very large research literature in this area, and its popularity as a strategy both in politics and with the public, Babor et al. find that it is hard to show consistent successes with either school education or public persuasion campaigns. They conclude that “compared with other interventions and strategies, educational programs are expensive and appear to have little long-term effect on alcohol consumption levels and drinking-related problems” (Babor et al., 2010:215). They note that the most useful form of public education campaigns may be in building support for effective public health-oriented policies, as illustrated in a classic New Zealand study (Casswell et al., 1989).

Treatment and early intervention

At the population level, Babor et al. consider that the most effective form of such intervention may be brief interventions, for instance by primary health care personnel, with at-risk drinkers. For more seriously affected drinkers, medical and social detoxification is effective in preventing acute harms

in the short term. In the longer term, mutual help group attendance (e.g., Alcoholics Anonymous) and talk therapy are seen as moderately effective.

Comparing drinking and gambling as behaviours and problems

There are substantial differences in the measures considered in the policy literatures. This partly reflects inherent differences in drinking and gambling and the problems that can result, but it also reflects differences in the social framing of the problems of gambling and of alcohol.

Commonalities between drinking and gambling

There are also some commonalities, and we will deal with them first.

Both are viewed as potentially highly attractive behaviours – attractive enough that the means of carrying on the behaviour can be sold for much more than the cost of production. There are thus highly profitable industries selling what is needed for both behaviours, including providing environments for engaging in the behaviour. Both behaviours are traditional and current sources of revenue for governments, and both industries are accordingly highly attuned to and expert at influencing the actions of governments concerning the respective behaviour.

Alcohol is seen as habit-forming, in the same way as gambling is. In recent decades, this has meant that the governing image for both, in societies like Australia, has been in terms of addiction, and the measures of “problem gambling” and “problem drinking” in population studies, which total up positive responses on a number of “criteria” (signs), are interpreted in terms of an “addictive disorder” framing.

For both, this implies a very individualist perspective on where the problem is located: there is a problem drinker or a problem gambler, who needs to be persuaded into treatment. This framing is convenient, in both cases, for the industries which are supplying the habitual behaviour, since attention is focused on the customer, not on the provider. But the framing ignores in both cases that the behaviour is mostly highly social. Drinkers are mostly drinking with others, and there is influence in both directions between the other and the drinker. Even where the gambling is not as explicitly collective as for drinking, there is a social world of other gamblers in which most gamblers are operating, and the gambler is influenced by and influences others in this world. Affecting the social worlds of heavy drinkers or heavy gamblers and the mutual influences in those worlds has been rare in alcohol prevention, and apparently absent in gambling prevention.

The gambling literature has recently paid considerable attention to the idea of being “in the zone” when a habitual gambler is intently engaged in gambling: that gambling becomes an activity that blocks out other thoughts, and the gambler is focused on the present moment, stretched out as long as possible, while the diurnal world of day breaking and night falling and time passing falls away. This state sounds in many respects like the state of mind of the drinker in the course of a drinking session, described as “alcohol myopia” (Steele and Josephs, 1990).

Both drinking and gambling have been recurrently viewed throughout human history to a greater or lesser extent as potentially problematic behaviours. Both are forbidden in some cultures, and limited and controlled in many others. Both have been through periods of prohibition in English-speaking and some other Protestant cultures in recent centuries, and their status as a morally accepted activity remains contested. Thus both are usually forbidden to children in these cultures.

The differences between drinking and gambling

The major differences come from the fact that alcohol is taken into the body.

Alcohol is a psychoactive substance that after a few drinks will produce intense intoxication, changing the state of consciousness of the drinker. Unlike most other psychoactive substances, there is good evidence that alcohol intoxication can produce aggression and other socially undesirable behaviour, as well as muscular incoordination. There are thus explicit social expectations that governments will in some way control the drinking or its environment to avoid drink-driving crashes, family and street violence, and other drunken misbehaviour. Governments have often extended this expectation to exert control over the drinking to those selling drinks. Keeping a troublesome drunk out of a tavern is thus thought of in terms of coercive measures – a ban by the local police or Liquor Accord, or an ejection by a bouncer – rather than in terms of self-exclusion.

Alcohol is a “dirty drug” that, immediately or cumulatively, adversely affects many organs in the body. Immediate effects can include overdose and injury; longer-term effects from recurrent heavy drinking can include cirrhosis, cancer, and other diseases. While knowledge of many of these effects was suppressed in societies like Australia as part of the cultural reaction against the claims and restrictions of the temperance era a century ago, the physical health problems from drinking are now again being recognised, and popular concern about health and social harms from drinking has been growing. The physical health problems from drinking mean that alcohol is unquestionably a public health concern, while gambling is only recently, and still marginally, seen as within the scope, for instance, of the World Health Organization.

Alcohol has a clear price for the customer, either by the bottle or by the drink (in the latter case, of course, much of price reflects service and provision of a place to drink). While intoxication of the buyer and customs such as shouting/buying rounds sometimes mean that the price is hard to figure and keep in mind, alcohol behaves more or less as an ordinary commodity in terms of economists’ assumptions involved in computing price elasticities. However, for some forms of gambling – electronic gambling machines (EGMs), for instance, -- the gambling equipment and consumer information is designed to obscure the cumulative effective price of the gambling. While there is a literature on price elasticities of different forms of gambling (Gallet, 2015), governments do not seem to have been inclined to use raising the effective price as a way of discouraging excessive behaviour, as has fairly often been done for alcohol.

In the gambling policy arena, there is an additional set of actors, besides the government, the industry and the consumer. In many countries, gambling became legalised somewhat against popular opinion, and the way in which this was done was with an “alibi” (Kingma, 2004): that the money was being collected at least in part for a good cause, which no-one could oppose. So, the parties who benefit from gambling includes, besides the government and the industry, the good causes which get a part of the take. These good causes are often strong actors in their own interest in gambling policy debates and negotiations.

Gambling research is much more influenced and more often funded by the gambling industry than alcohol research is by the alcohol industry. This has influenced the gambling policy and prevention literature towards focusing on less strategic and more individually-oriented policy strategies, which are less threatening to industry interests. The same often seems to be true for government agencies in the two fields. While there is some variation, government alcohol monopolies have usually defined their primary task as limiting social and health harm from the products they sell. In pursuit of this task, some alcohol monopolies have encouraged and supported objective policy

research. They have generally been clear that their institutional interest and the alcohol producers' interests are not the same. The contrast with the perspectives of government gambling agencies has been clear, for instance in Canada (Room, 2009).

The differences thus imply some sharp differences in the shape of the policy intervention literatures for gambling and for alcohol. In some cases this may mean that the knowledge accumulated in the alcohol literature will just not be applicable in the gambling sphere. But sometimes, instead, it may be that the way societies have thought about gambling has meant that they have not thought of a potentially effective policy intervention of proven value in the alcohol literature.

Alcohol experience with policy interventions used in gambling

Pre-commitment programs

Rintoul et al. (RQ1 above) make clear that, as these have been applied and tested in gambling, they have been primarily optional voluntary commitments to limit the amount of gambling decided upon by the gambler, and then carried through by the gambling provider. There is no testing of any formalised equivalent of this in the alcohol literature. More coercive forms of individualised "commitment" have been common in the alcohol sphere, particularly before half a century ago. As noted earlier, until 1955, alcohol was rationed in Sweden, with each family assigned an individualised monthly ration decided on by a government agency; the ration was refused for about one-tenth of those applying. The rationing scheme was effective in holding down recurrent heavy drinking; cirrhosis mortality rose sharply when rationing was abandoned (Norström, 1987). Particularly in the U.S., but also in Australia and elsewhere, it has been common for criminal court systems to impose a ban on drinking as a condition of parole or probation, particularly when the crime is alcohol-related. These are often enforced by regular breath-tests or alcohol-sensing leg patches. The South Dakota "24/7" program, a systematised version of this control, has been shown to be effective not only in reducing drinking but also in reducing drink-driving crashes and domestic violence calls (Kilmer, Nicosia, Heaton, & Midgette, 2013). Other individualised bans on drinking have been imposed by local associations of pub-owners in Britain and in Australia; the literature is not generally supportive of these semi-official bans being effective.

It will be seen that initiatives in this area for alcohol are quite differently oriented from the initiatives for gambling. While gambling initiatives have mostly been a matter of voluntary self-imposition of a limit on gambling, for alcohol the restrictions have usually been imposed by official or semi-official decisions, and set the limit at zero.

Self-exclusion

As noted already, exclusion from drinking places has been a common initiative in the alcohol field, but there is no literature on self-exclusion as an agreement with an alcohol provider. Such self-exclusion (or exclusion by petition of the drinker's family) was an option in some state and provincial alcohol monopolies in North America a half century ago. It is unlikely that there was a study of its effectiveness.

In-venue measures: ATM removal

The closest equivalent of this for alcohol would be provisions, for instance in the UK, which forbade a pub granting credit to regular customers for drink purchases. In many pubs, it was customary for

a running tab of drinks purchased to be kept on a chalkboard for regular customers, to be settled on payday. The temperance movement was dead-set against this entrapment, as they saw it, and keeping such tabs was banned in many places. We are not aware of any study of the effectiveness of this ban. The custom presumably was eventually superseded or replaced, anyway, by the advent of credit cards, with which alcohol is always available on credit.

In-venue measures: Identification of and staff interaction with problem drinkers

It is part of the job description for bouncers and floor staff at pubs to identify potentially problematic drinkers or situations and to other pub staff, and nip potential trouble in the bud. The focus is on trouble, not on amount of drinking. A controlled trial of the Safer Bars program, which trained bar staff to intervene in problematic situations, showed a reduction in violence (Graham et al., 2004), but was not concerned with trying to control levels of drinking.

Currently, a literature is emerging of studies of brief interventions using text and mobile phone messages, delivered when the subjects are out drinking, and presenting reminders of their previous intentions or admonitory messages. A substantial literature, with some promising results, is emerging of such “in-venue measures” decided on and operated from outside the venue (e.g., Wright et al., 2016).

Licencing requirements

In every Australian jurisdiction, and many other countries, those selling alcohol are obliged as a condition of their license, to refrain from serving alcohol to those who are already intoxicated. The requirement is neither commonly obeyed nor well enforced; a part of the problem is that what constitutes intoxication is not well defined. Server Intervention Training, required to be undertaken by alcohol sales and serving staff in many jurisdictions, does not have a measurable effect in itself; but US studies suggest that it can be effective when backed up by police enforcement of the requirement not to serve the intoxicated. Dramshop Laws, current in some US states but not elsewhere, hold the alcohol seller liable for damage done by the drinker when the alcohol was illegally sold (because the drinker was intoxicated or underage). There is evidence that such laws are effective in reducing drink-driving casualties (Rammohan et al., 2011).

Dynamic warning messages

See the discussion above of brief telephone and SMS (short message service) messaging.

Structural characteristics

Rintoul et al. remark that this area has the largest volume of evidence on gambling interventions. For “jackpots”, the closest alcohol equivalent might be the effect of banning “happy hour” promotions, with reduced-price drinks in off-hours; the small literature on this does not suggest much effect. The closest equivalent in the alcohol literature for “free spins” alcohol is probably the extensive price-elasticity literature, which finds that the price elasticity is generally around -0.5 in all demand – that alcohol sales are moderately responsive to price, though economists call this level “inelastic”. An equivalent of “reduction of bet size” would be the reduction in the size of standard drinks in Britain during the First World War, one of a series of measures that greatly restricted alcohol consumption at that time, and continued to have an effect after the war. On “celebratory sights and sounds”, the closest equivalent for alcohol is a small and indeterminate literature on the effects of different types, speeds and loudness of music on alcohol consumption rates in taverns.

Exposure and accessibility

As noted above, there are substantial alcohol literatures in this area, examining particularly the effects of variation in opening hours and days, and of the density of alcohol outlets. The general finding is that levels of alcohol sales are affected to some extent by availability, considered both in terms of time and of distance and density.

Advertising and promotions

There is a substantial literature in this area, but the effects of advertising on alcohol consumption are much disputed, with results depending on where one looks. Longitudinal studies of children find that early exposure to alcohol advertising goes with earlier onset of drinking and more drinking (e.g., Casswell & Zhang, 1998). On the other hand, a study of the effects of bans on alcohol advertising in one or more conventional media finds little evidence of effects on consumption (Nelson, 2010).

Opportunities and relevant issues

Price

Price has been shown to be a key factor in reducing consumption of alcohol. This is not easily replicable in the gambling area, given the apparent inelasticity of demand for gambling products (even though price elasticity for alcohol is considered reasonably inelastic). This may be associated with the lack of price information associated with most gambling products, especially EGMs. However, some consideration of price signals may be effective in gambling regulation.

Accessibility

As has been demonstrated with gambling products, accessibility is a key determinant of consumption, and is associated with the distribution of harms. Accessibility includes geographical distribution, hours of availability, as well as other restrictions on access (such as increased age limits).

Monopoly state operation

In multiple jurisdictions state owned monopolies operate alcohol retailers, with an associated loss of, or declining emphasis on profit motive. If policy supports a harm reduction perspective, state actors are in a position to restrict hours of operation, regulate the marketing and promotion of alcohol and restrict sales to those intoxicated. This was the practice prior to the 1990s in many Australian jurisdictions, where state owned gambling enterprises provided minimal services for wagering, lotteries and some other forms of gambling (McMillen, O'Hara, & Woolley, 1999).

Moderation of the consumption environment

The consumption environment can be seen as a vehicle to introduce interventions to reduce or prevent harm. This is implemented in practice by responsible service of alcohol, and responsible gambling polices. In alcohol these are arguably more honoured in the breach than in the observance; the same is arguably true of the gambling environment (see Rintoul et al., 2017). Although observation of behaviour is possible in both instances it is rarely implemented as a harm minimisation tool. Where some form of enforcement is applied in the alcohol field, it tends to be around the avoidance of 'trouble', rather than the reduction of other forms of harm such as disease.

In-venue consumption accounts for only about 20% of Australian alcohol, consumption, but a greater proportion of Australian gambling consumption – at least 60% or more by revenue share. Gambling environments of greater intensity (i.e., larger venues with more EGMs, for example) produce higher rates of revenue per machine, and are associated with greater levels of harm.

Framing the issue

Both gambling and alcohol have regularly been framed in the context of addiction, with the principal actor in this framing the ‘problem drinker’ or ‘alcoholic’, or the ‘problem gambler’. This is a convenient framing from the point of view of those seeking to protect or expand consumption levels. It largely ignores complications associated with harms and focuses attention of the treatment of the aberrant individual. Although necessary and helpful for many, treatment does not address underlying issues with the product.

Advertising and marketing

The alcohol literature is divided on the effects of regulating advertising. Early exposure to advertising has been shown to reduce the age of first consumption of alcohol. No similar studies have been developed for gambling advertising at this point, although there is evidence that such advertising ‘normalise’ gambling for young people exposed to it.

Characteristics of the product

Modification of the product (e.g., substituting beer for spirits or reducing the standard size of drinks) appears to have led to reductions in consumption and associated improvements in health. This is analogous to modifying the structural characteristics of game types.

Affect and the social world of the drinker or gambler

The patterns of consumption for both alcohol and gambling may be susceptible to the social worlds in which consumption occurs. Few attempts have been made to influence these social worlds, although both alcohol and gambling are promoted via discourse which emphasises sociality and enjoyment and may construct a social world of drinkers or gamblers which promotes heavy consumption. Some intervention in this process may be helpful for harm prevention or minimisation purposes.

Industry influence on research

Although there is a history of industry influence in the alcohol research field, this has been addressed over a long period of time. Industry has much less influence in alcohol research than in gambling. This is a problem because it undermines the evidence base and means that innovation and reform is delayed. Alcohol researchers (through the activities of organisations such as the Kettil Bruun Society for Epidemiological Research on Alcohol) have been effective in reducing reliance on industry funding and co-operation. This is still underway in the gambling field. Advancing this may produce better evidence and more effective interventions.

RQ2.2 Evidence from other public health fields: Tobacco

Ron Borland PhD

This section explores the relationship between gambling and smoking, focusing on insights from smoking that may be of relevance to gambling. It is organised into four parts: first, a brief description of some potentially important similarities and differences between the two behaviours; second, an analysis of the nature of the two industries, and thus the implications for both regulation and other forms of control at an industry or system-wide level; third, an analysis of specific tobacco control strategies that are designed to affect an individual's likelihood of taking up, continuing to use, or to reduce harms of tobacco use; and finally, a short section on insights from the strategic approach taken by leaders in tobacco control as they might apply to gambling control. In conducting this analysis, it became immediately apparent that the two behaviours are sufficiently different that simple extrapolation of strategies from tobacco to gambling was not a useful approach. Rather I have attempted to go beneath the surface to apply the analytic framework that supported the tobacco control initiatives and use similar conceptualisations to identify potential strategies of relevance to gambling.

Similarities and differences between smoking and gambling

Both are behaviours where the development of habitual use occurs with some possibility of this transforming into an addiction; i.e., a habit that persists in the face of compelling evidence that it is counterproductive, often indexed by repeated failed attempts to stop. The dependence that leads to prolonged smoking is primarily due to the drug nicotine, while in the case of gambling, no drug is administered, it is the contingencies between the behaviour and reward that generates the highly rewarding experiences that are the basis of a gambling addiction.

They share a similarity in that the forms of the activity which are the most problematic are those where the effects of the behaviour are most rapid. Nicotine in the form of patches has no notable dependence-generating capacity, and dependence inducing capacity rises as the speed of nicotine delivery increases, with cigarettes the most addictive. For gambling it is EGMs which are most problematic.

Regular gambling is less likely to be problematic than long-term smoking as a result of tobacco harm being from exposure to the chemicals in smoke (primarily) for smoking, while it is cumulated monetary losses that is the primary harm from gambling. The bulk of the harms from smoking come from prolonged use over many years. By contrast gambling related problems tend to emerge in the medium term over periods of months or a small number of years, and are associated with large losses, which, while relatively uncommon, are extremely disruptive to the life of the gambler and those around them. Observable costs of gambling, in the form of unacceptable losses, should be apparent (at least to the gambler) as an early indicator that gambling is getting out of control. There is no comparable indicator that smoking may be beginning to cause significant, potentially irreversible harms. I am not certain, as to whether there is evidence as to the extent to which initial, or early episodes of excessive spend/loss stimulate people to either stop gambling or to exercise greater restraint, but clearly, as for smoking, some do not. The costs of gambling, being in the first

instance financial, are also more directly socially shared than the more personal health effects of smoking.

Both are chronic relapsing conditions, with relapse back to the problematic behaviour known to occur even after extended periods of abstinence.

Smoking is characterised by frequent cigarettes, with little or no thoughts of smoking in between. By contrast gambling is often associated with extended periods of immersion in the activity, particularly where the wager and the reward are closely tied in time (e.g., EGMs), the most addictive forms. For smoking, periods of obsessive interest only tend to occur when cigarettes are resisted, so is mainly an issue after the person has quit.

Up until recently, tobacco control had been notionally pursuing an eliminationist model while gambling, at least in recent times, been about reducing the harms from excessive use. That said, there is a lot of eliminationist rhetoric in some gambling discourse. As for smoking, some see gambling as a moral failing, so no level will ever be acceptable. The eliminationist agenda is being challenged for tobacco with the introduction of consumer-acceptable lower harm alternatives, and more fundamentally through the lack of any credible scenario where all nicotine use is effectively ended. The challenges this debate is creating for tobacco control provides some insights for gambling.

The tobacco control field is not dominated by clinicians whose focus is on treatment for those who seek or are referred for help. This has allowed for a much stronger influence from population health than from clinical medicine, and is thought by some to be part of the reason for many of the successes. To the extent that aspects of the problem reside in broader population-level factors, this is likely true.

Smoking and gambling also share the reality that there is a strong concentration of power among a small number of for-profit corporations. The tobacco market in Australia is dominated by three companies. In some key areas of gambling there is similar concentration with oligopolistic control of the wagering, and considerable concentration in electronic gambling markets. Thus, one common interest is in dealing with concentrated corporate power. In an earlier stage of the development of online markets, more aggressive competition between companies arguably lead to forms of advertising that have likely had detrimental effects on consumer choices.

Both smoking and gambling control efforts need to consider the potential roles of secondary players, although probably more so for gambling. Secondary players in tobacco control include retailers, and in the past, elements from the restaurant and bar industries that were concerned about implications of smoking restrictions on patronage of their venues. These concerns effectively disappeared after smoking bans were implemented. In the gambling area, multiple clubs and pubs have considerable dependence on gambling revenue, so are likely to be much more actively engaged in pursuing their interests. In the sports gambling area, sporting clubs and/or associations, receive revenue, either directly or indirectly from gambling profits. In Australia, the effective banning of sports sponsorship by tobacco companies played an important role in breaking previously strong associations.

The nature of the tobacco problem

Borland, Young, Coghill and Zhang (2010) analysed the tobacco industry from within a broad systems framework. This analysis conceptualised the tobacco industry as being constrained by government regulation and the activities of the tobacco control movement, all three potentially

influencing the behaviour of smokers and potential smokers. The regulatory sub-system (government) sets the agenda (either actively, or as a function of the implications of existing rules) and determines what is allowed and what restricted. It can either act to change the nature of either or both the tobacco control and industry systems, or regulate to constrain their behaviour. Government typically makes changes to the nature of the tobacco control system (e.g., setting up services) and both resourcing and constraining it via the limited funding it provides. By contrast, most efforts directed at the industry are around constraining what it can do, the main structural changes have been where the previously government-owned industry was privatised. An analysis of the effects of privatisation of government owned gambling services (e.g., TAB) would be instructive, as might the transformation of the nature of their main competitor (Tattersalls) from managed estate to ordinary corporation. Government can also constrain the behaviour of individuals (e.g., smoke-free laws). The tobacco control sub-system acts to advocate for stronger regulation and to educate and support people away from smoking. It is largely dependent on resources from outside the tobacco control system, often from government, but in Australia a significant proportion is provided by the Non-Government Organisation (NGO) sector (largely Cancer Councils). This contrasts with the industry which is engaged because it makes money from within the system. The nature of the relationship between the industry sub-system and the smoker is much more direct and interactive than that between the smoker and the other two sub-systems, giving it a primacy in power to influence smoker behaviour. The gambling sector could be similarly characterised.

This analysis of the structure of the tobacco use system identified two fundamental issues and five systemic or structural issues that together create the problems associated with effectively controlling tobacco. In this section, we take each of these issues and consider its relevance to gambling. To this analysis, we add one additional structural problem that of the concentration of industry power in a small number of corporations.

The first fundamental issue for smoking is that humans are vulnerable to nicotine dependence. Individual variability in susceptibility appears to range from effectively zero to very high, at least once exposed. The social context is also an important determinant of vulnerability, and can magnify or temper individual tendencies. Propensity to become a problem gambler also appears to vary greatly. This means some smokers and gamblers are prone to overuse, which in the case of smoking is sustained use over many years. These individuals have reduced ability to act in their best interests; i.e., they are addicted. This provides the justification for government intervention in the market, and the need for a control subsystem (tobacco or gambling as the case might be).

The second, and related, fundamental problem is that the forms of nicotine that are currently most attractive to consumers, cigarettes, are the most harmful and have the least prospect of having their harmfulness reduced. This means that people are vulnerable to using the most harmful forms of nicotine. While the most profitable form of tobacco use is the most harmful, the goals of the tobacco industry and those of public health are incompatible. Tobacco companies are unable to act responsibly because their organisational goals, of maximising shareholder value in the short to medium term, are inconsistent with the public health goal of eliminating smoking, or more correctly the harms associated with smoking. These contingencies have made it commercially impossible for the industry to move from smoking to less harmful, less psychoactive, alternatives voluntarily. This unfortunate reality is also likely to be a major factor in why there is no effective regulation of tobacco products to minimise harms anywhere. Recently technologies have emerged that hold the promise of providing sufficient satisfaction from very low toxicant nicotine products, something that could allow tobacco marketers to become part of some potential solutions.

The problem of the link between harmfulness and addictiveness/attractiveness is potentially a more direct issue for gambling because the harm inducing aspect of gaming machines, the contingencies between use and reward, is what is dependence-forming, whereas in the case of smoking the presence of toxicants, which have been the main vehicle to carry nicotine to the lungs, is the primary component causing harm, not the nicotine (the reason for smoking). Because the perverse relationship between consumer interest and harm is intrinsic to gambling, it is perhaps implausible that a technological solution will emerge that would maintain profits and allow the gambling industry, or more correctly the electronic gambling industry, to voluntarily adopt less harmful forms of gambling. Like the tobacco industry, the gambling industry might be expected to actively resist regulatory activities that they perceive as direct threats to their most profitable business activities. This means strong regulation of industry behaviour as a necessary factor for minimising gambling-related harms, and as for tobacco, likely to be strongly resisted as it is likely to affect company profitability.

This fundamental problem underlies a more general point. A simple analysis of any commercial business is that their profitability is a function of the profit per unit transaction multiplied by the volume of transactions minus fixed (and sunk) costs. It is immediately apparent that this model of business creates problems for behaviours we want people to do either less of, or to engage in less harmful forms of (in the case of gambling, arguably the less profitable ones).

We now turn to the systemic problems that are faced by tobacco control, and where relevant, parallels to gambling.

Systematic problems facing tobacco control and gambling harm prevention and reduction

The **first structural problem** is that because industry goals are inconsistent with societal values (in so far as those are protecting health or not exploiting the vulnerable), the tobacco industry has been motivated to obfuscate the relationship between its activities and the self-harming behaviour of its customers, creating an inability to pursue rational decision-making, at least in the public arena. This would appear to be the case with gambling as well. The companies resist making linkages, or discourages research (or disparages it when conducted) that might or does highlight conflicts between company fiduciary imperatives and societal norms and expectations. Lack of clarity is likely to lead to an underinvestment in harm reduction options, because this would be a tacit admission of the harm. There are negative incentives for producing harm-reduced products, unless there is some certainty that they'll be attractive enough to consumers to be net profitable.

The **second structural problem** is that the externalities, in this case mainly the adverse health effects and the costs of managing them, are not integrated into the tobacco use management system such that they feed resources into the tobacco control sub-system and/or generate direct costs to the industry that it is expected to bear. This means they neither support tobacco control efforts nor create incentives for industry to make its products less harmful. A similar problem occurs for gambling. Mechanisms are needed to ensure that the externalities are as completely as possible incorporated within the system that manages gambling. One possible solution to this would be to resource control efforts with some percentage of revenue or turnover, with the percentage being larger for the more harmful forms.

The **third structural problem** for tobacco lies within the tobacco control subsystem. It is the lack of consensus around a harm reduction model, as compared with an abstinence-based goal. In tobacco control, there is some hope, albeit almost certainly illusory, that all forms of tobacco and nicotine use could be eliminated. Some might have similar ambitions for gambling, but it is also

inconceivable that gambling will be eliminated. If it is accepted that some forms of the behaviour are likely to persist, then a harm reduction model becomes the real, rather than just a de facto framework for trying to regulate the industry. A genuine harm reduction approach focuses on the relative harm of various forms of the activity, and creates a pattern of incentives and disincentives designed to drive people towards the least harmful forms (or to those which there are net benefits if they exist) and away from the most harmful forms. One of the challenges associated with a harm reduction approach is that it is widely perceived to invalidate the position that all forms of the behaviour are bad and that the only really desirable solution is complete abstinence. However, harm reduction is not about the adoption of an acceptable or even desirable alternative, it is about the lesser of two evils. If what is seen as the harm reduction option was in fact a desirable state of affairs it would no longer be necessary to frame it as a harm reduction approach.

People are programmed to want to act in concordance with how they feel about things (Borland, 2014, 2016), so are likely to be naturally wary of harm reduction as it involves acting in ways that are not fully congruent with feelings. Understanding this discomfort about compromise solutions is important for building any relationship between those who have come to a harm reduction position through a rational appraisal of the situation, those who have come to it because they value the base behaviour, and those who feel uncomfortable about the compromises involved.

Harm reduction is increasingly influencing tobacco control. Over the last 10 years the technologies for delivering nicotine in vapour rather than in smoke have improved considerably and they are now seen by some as a viable alternative to smoking. This creates the potential for moving large proportions of smokers away from smoking to these almost certainly far less harmful products. However, large elements of the tobacco control, and broader public health community are adamantly opposed to this approach. Currently some tobacco control efforts are foundering because of a failure of the public health community to come to a consensus on appropriate action, a consensus based both in the reality of what consumers are likely to accept, and a solution that does not gratuitously disadvantage commercial interests. This has effectively stopped governments from taking systematic action. For gambling, this means some consideration of what are acceptable societal goals for gambling, what forms of gambling should be privileged, and doing this in a way that does not create a black market by over-constraining forms which people are highly motivated to use.

The **fourth structural problem** lies with the model of regulation of tobacco. It is currently fragmentary and there is a lack of executive control, coordination, and strategic capacity. Any changes typically requires legislation, something that takes time and occurs within a framework that is not necessarily sympathetic to a coordinated and systematic approach to the focal problem, but is rather concerned with the solution fitting in with other priorities. Gambling faces similar problems in that the issue is too politically fraught to allow gambling regulators the control they need to properly manage the problem.

This problem is in some senses a manifestation of the **fifth structural problem** of having to deal with competing priorities from other supra-systems (powerful interests) within which the problem is embedded; e.g., the health system, the welfare system, and the system of for-profit corporations and how they are regulated. Tobacco companies are corporations, and under corporate law mandated to act in ways that maximise shareholder value. This means that in some circumstances they are legally constrained from taking actions that may not be in the broader societal interest because it would cost them money (strongly related to shareholder value).

The **sixth structural problem** is the concentration of the market. This exacerbates the problems identified in problem five as it increases the centralisation of power of those with vested interests in

the continuation of the problematic behaviour, thus making it harder to successfully compete against. It also increases the capacity of the companies involved to create alternative models of functioning that can act to undermine public policy in ways that governments find difficult to control. These include using the public sources to match price rises, rather than collusive behind doors agreements which are illegal.

All of the last three problems clearly occur for gambling as well as for smoking. It is beyond the scope of this section to explore possible solutions. These may be better thought of as largely unchangeable conditions, at least in the short to medium term. However, it is important to keep them in mind because they arguably place constraints on what is possible.

A comprehensive approach to engineering change

Describing the problem

The second set of issues around smoking that are relevant to gambling emerge out of a theoretical understanding of human nature in relation to data on the prevalence, distribution and forms of nicotine use, and of the systematic efforts to either promote or constrain it. Smoking and gambling are both complex problems with multiple determinants. Neither will be fixed with simple solutions; a comprehensive multi-pronged approach is likely to deliver the best results. One of the great strengths of tobacco control is that it has always attempted to build from the existing evidence in identifying new opportunities to intervene and has used surveys and other methods to systematically evaluate the effects of interventions.

Population monitoring

The key to tobacco control efforts has been getting data about the nature and scope of the problem at a population level. This should include understanding what smokers and potential smokers are doing and thinking.

Representative population-based surveys of smoking behaviour and related attitudes have been critical for describing the nature of the problem, differences in smoking rates among various subgroups, and progress in efforts to facilitate cessation and/or to discourage uptake. For **cessation**, the focus has been on adult surveys, while for **prevention** the focus has been on surveys of adolescents, typically school-based surveys. The surveys not only document the nature of the problem, but also, by demonstrating that problems remain, provides evidence for public debate about the need for and appropriateness of possible solutions.

Industry monitoring

This involves developing a systematic understanding of the extent and nature of promotional and other activities of the tobacco industry that potentially influence consumers. In some places, most notably the USA, there is legislation requiring tobacco companies to disclose promotional activities, including budgets, allocated to various kinds of advertising and other marketing strategies. This has proved extremely useful in the US for understanding the extent of industry activity, and some sense of what may be required to counter this activity.

Understanding the products

There have also been sporadic attempts to systematically collect information on the nature of tobacco products, and how they operate when used (e.g., smoked). These have never been systematic, and most of them have been fundamentally flawed because the tool used to assess

yields of smoke from cigarettes resulted in estimates that were unrelated to the actual yields that smokers achieve. The failure to adequately **understand the nature of the product** and whether, and if so how, it is changing is a major gap in the information base supporting tobacco control efforts. Where there is a need to regulate the nature of the product, it is imperative that the **research community have access to the kind of data** they need to be able to understand the mechanisms, and to test out possible solutions that may reduce the extent of the harm. Because the contingencies of gambling are programmed by people, it should be possible to develop a detailed understanding of gambling forms, and to use that to identify mechanisms to constrain, modify, or eliminate the most harmful forms.

Theory based analysis of efforts to intervene

Tobacco use has been a rich area for theorising, most notably around the development of the Trans-Theoretical Model (TTM) of behaviour change (Prochaska, 2013; Prochaska & Clemente, 1982; Prochaska & Velicer, 1997) which has been applied to a wide range of other behaviours including gambling. However, the TTM has been shown to be wrong in key areas and to miss important aspects of tobacco use, so is no longer relied on by most working in the area. Theory is important for understanding the dynamics of the behaviour and its relationship to the products used (e.g., cigarettes). For a theoretical analysis at the level of individual behaviour in this section, we apply Context, Executive, and Operational Systems (CEOS) theory, a theory on the strengths and limitations of self-regulatory behaviour (Borland, 2014; Borland, 2017); that is, of the capacity of the individual to exercise executive control based on a conceptual analysis of what is needed. The theory argues that, insofar as people think about it, they try to act in ways that are in their long-term interest, but the primary motivators of their actions are the immediate contingencies of the situation in relation to their internal needs (collectively called operational processes). These are experienced as feelings: emotions, needs, and urges. The extent and valence of affective reactions, collectively referred to as affective force, is more general than feelings. Feelings are the experience of some aspects of affective force.

Affective force does not need to be experienced consciously, indeed it only tends to be experienced consciously when it is resisted or cannot be resolved (experienced as negative feelings), or after it has resulted in a change of priorities (e.g., as a result of successful completion of a task). The operational system is the interface between the person and their environment, and as such is the primary driver of behaviour. Reacting to the context of the moment can result in impulsive behaviour that is incompatible with longer-term goals. The capacity to pursue goals independent of, or in conflict with, operational urges, defines a second, executive system. However, the executive system is completely dependent on the operational system, which means, among other things, that affective reactions are primary to all behaviour. For thoughtful or executively driven behaviour to occur, the executive system needs to generate sufficient affective force to overcome any competing behavioural tendencies generated by operational processes acting in the moment (largely automated reactions to a situation in relation to physiological needs).

For CEOS theory, the challenge of self-regulation is to accept that all behaviour emanates from the **operational system** and to develop strategies to generate sufficient affective force around rationally generated goals to successfully pursue those goals.

CEOS theory identifies a range of places where interventions can result in behaviour change. The first area is interventions directed at the **executive system**. The only area of direct relevance here is that of education and persuasion. Self-change strategies involve the active engagement of the person, and external interventions typically require a therapist or life coach. Many arguments from those opposed to regulation argue that the person should rely on self-control. Given that effort is

always required to exercise self-control, this in effect turns into an argument that people should have to incur costs to allow the promotion of activities they may want to resist.

CEOS theory also helps explain the difficulty many face in embracing a harm reduction model for problematic behaviour. In essence, it postulates that we naturally tend to combine things with the same affective valence, but find it difficult to combine concepts with different valence. For example, addictiveness and attractiveness, which in reality are almost synonyms, are often seen as very different. By contrast, it is easy to equate addictiveness with harmfulness.

Both smoking and gambling, indeed all problematic behaviours, share the characteristic that the person has strong urges to engage in the inappropriate behaviour at the time the behaviour can occur, but often have plans and intentions not to do so when they are not in that situation.

From this theoretical perspective, the challenge of effective regulation is to nudge behaviour by differentially reducing the strength of undesirable immediate cues, increase the strength of incompatible or more attractive alternatives, and/or increasing the potency of self-regulatory processes. This balance between forces motivating potentially harmful behaviour and those motivating responsibility, can be shifted by changes in the nature of each episode of the activity, the environmental context, and to a limited extent by public education.

A more detailed overview of how tobacco control has operated can be found in Borland and Yong (2017).

A harm reduction perspective

In seeking solutions to any problem, it is important to have a coherent conceptual framework as to what the goals are. For gambling, that would appear to be a harm reduction framework. As tobacco control is moving from an eliminationist to a harm reduction model, it may be useful to briefly outline some of the issues that have emerged in attempting this move. As noted above, the move is still being fiercely resisted by some. Understanding why this is so may provide insights as to similar, but less publicly espoused concerns within the gambling space.

There are two possible approaches to harm reduction: **Promote the least harmful forms; or make harmful forms less harmful.** A perceived threat of both is that the resultant changes will make the behaviour more attractive to people. This concern appears to be based in part on an economic analysis which implies the same or similar benefits at less cost. It is also likely that it is also grounded in discomfort about recommending something that may still be conceived of as undesirable in absolute terms. Given that the resultant behaviour is still assessed as undesirable, if it is encouraged, it could result in more people engaging in the activity, albeit the less harmful forms (i.e., vaping), and some people fear that they might then seek out the more harmful kind (e.g., smoking).

There is no evidence for the gateway effect of vaping leading to smoking. Indeed population-level data shows that in countries where vaping has taken off among young people, smoking rates have actually declined, in some cases at unprecedented levels. This also appears to be the case for adult smoking. The arguments about possible harms appear to emerge from ideas generated to rationalise concerns, rather than concerns arising from a more objective analysis. Related to this, it is hard for people to conceptually ungroup a set of activities that have been fairly uniformly associated with the same outcomes (believed, not necessarily actual).

The attributes of the dominant behaviour (e.g., cigarette smoking) is assumed to apply to all other forms of the behaviour. Thus, the affectively consistent, but factually erroneous conclusion that all tobacco and nicotine products are similarly bad. Within tobacco control, harm reduction options have a mixed history. The move to lower tar cigarettes was subverted by industry malfeasance in deliberately tricking the measuring tools, such that what was measured bears little relationship to what smokers take in. More success has been achieved in modifying cigarettes so they are less likely to smoulder and start fires. With a renewed focus on low-toxin nicotine delivery systems, harm reduction is currently an area of intense interest, and considerable controversy.

Translated to gambling, it would recommend not talking about regulating gambling as a monolithic undifferentiated set of activities, and moving towards considering differential regulation of different forms. Such an analysis should not only focus on the most dangerous forms, but on elements within individual gambling forms that increase the risk of harm. Gaining consensus as to what this should be from within the gambling control community broadly is likely to be the greatest challenge.

If the most problematic aspects of gambling are tackled, and interests in other forms of gambling do not see this as the thin end of a wedge, there is much more likelihood of getting a broad social consensus, or at least not having concerted and powerful coordinated opposition. Most of the possible interventions canvassed here are in essence harm reduction options as their aim is to reduce the harms associated with gambling without necessarily affecting the prevalence of gambling.

A comprehensive set of interventions

The focus here is on interventions provided by external change agents, primarily social and contextual change forces, but also a brief mention of individual therapy.

Public education and persuasion

If people are to make rational choices about their behaviour, they need an adequate understanding of what may be problematic. This is initially directed at executive processes, but also requires engaging operational processes if people's affective responses are to change sufficiently to support behaviour change. Where the goal is complete abstinence, as is the case for smoking, generalised concern about harm may be sufficient. However, where a reasonable aim is not complete abstinence, at least for most, but low harm use, a more nuanced understanding is necessary. Recent research has increasingly shown that there is often a **gap between what people know and the knowledge they bring to bear in decision making**. This issue of accessibility of information occurs in all contexts, but tends to be most extreme under conditions where there are immediate affective forces motivating an undesirable behaviour.

It is now well known that health warnings on tobacco products frequently stimulate concern about smoking (Borland et al., 2009; Hammond, 2011). The use of strong, emotionally charged, anti-smoking advertisements and health warnings on packaging have had a significant effect in motivating smokers to try to quit (National Cancer Institute, 2008; Yong et al., 2014), and perhaps helping them stay quit when these messages are present or are thought about at points where the person is at risk of relapse (Partos, Borland, Yong, Thrasher, & Hammond, 2013; Wakefield et al., 2013). The evidence is now clear for smoking that **negative messages, that is, those focussing on the harms, are more effective** than those focussing on the benefits of not smoking. This is as predicted by CEOS theory, but not by some other theories of communication/persuasion. According to CEOS, behaviours that are desired can be best promoted by positive messaging,

while things not to do are more sensitive to negative messages; i.e., of reasons not to act rather than of the benefits of not acting.

How might this work for gambling? If it were possible to **identify points in gambling episodes** which reflect the **switch from recreational activity to high risk of financial loss**, then it might be possible to generate affectively charged messages around such points. Possible points include loss chasing, and borrowing money either to gamble or because of the losses that gambling has generated.

It is possible that part of the problem with gambling is that much of the pleasure is obtained from imagining the possibility of a win, at least in early stages of the development of harm. Any explicit consideration of odds is likely to lead to reality checks and thus reduce the potential value of the activity to the individual. That is, to get pleasure out of gambling in initial stages, one has to believe that one can win. As a result, the gambler is motivated to ignore signs to the contrary. Thus, **if warnings are to have any impact**, they will need to be designed in ways that they are **difficult to miss**, such that if the person does not want to confront the message, he/she needs to **actively avoid processing them**. The research on avoidance of health warnings about smoking is that it is, over time, associated with increased quitting activity, mediated by increased consideration of the harms, albeit not on the specific occasions when this concern is avoided. This is likely because **continual avoidance is difficult** while continuing to smoke, and thus **it is a sign of unease** which when the person feels able, **may translate into action**.

One feature of most anti-smoking advertising has been an explicit attempt to **focus on the behaviour** (smoking) and **not demonise the individual** (smoker). This has proved most difficult in developing messages around passive smoking, as it focussed attention on behaviours of smokers that were problematic to others (non-smokers) who were being encouraged to support smoke-free policies. This may become an issue where the focus of gambling control messages is on the impacts of gambling on gamblers' families. The idea that people may be harming others is a more threatening topic for public discourse than messages that they are harming themselves.

Along with paid media, one other important tobacco control strategy has been to promote relevant research, as it emerges, to journalists, often by way of press releases. This helps keep the issue on the public agenda and allows for similar stories to be recycled as new research comes out.

One other feature of mass media is that it affects social norms about smoking and is a good way of influencing decision makers. In a democracy, **political leaders are sensitive** to issues that are in the **mass media**. By keeping an issue in the mass media it increases the chances that there will be enough political interest for action to occur. Also, it is difficult to get in to see senior decision-makers face-to-face, but most of them monitor key news and current affairs programs, and the main pages of the daily newspapers very carefully, so getting the message presented there is sometimes an effective way of getting it to the decision-makers.

Changing the context

It is useful to consider two types of environmental change. First, **macro-environmental** changes, such as those produced by **regulation and cultural** factors. These include socially generated expectations about how to behave; where one can engage in the behaviour; and changes in the nature of the settings whether behaviour occurs.

Second is the availability of requisites and aids which includes **changing the focal product** (tobacco product or gambling device) and/or other related **products that facilitate the behaviour** (e.g., availability of places to smoke where the person is gambling). It also involves interventions

that can change the mode of engagement; including the incentive structure and the relationship between the person and the objects involved in the behaviour. We first focus on **interventions that change the broader context** and then moved to ones that are more relevant to the immediacy of the behaviour. However, in many areas, there are elements of both.

Restrictions on advertising and promotion

Advertising and promotion can occur in just about any context. It is useful to make a distinction between **push advertising**, that which is broadcast out to an audience who are not necessarily seeking it; and **pull advertising** where the target person actually needs to seek out the material. Another useful distinction can be made between advertising that occurs in the context of engaging in the behaviour, or in important precursor activities, such as buying cigarettes; and advertising that occurs outside of those contexts. In some countries, such as Australia, advertising has been almost completely eliminated, whereas in other advanced countries such as the United States, because of its Second Amendment rights, more forms of advertising are allowed.

That progress in tobacco control has been similar in countries with and without strong restrictions on advertising **suggests that advertising is only one** of a number of important influences on smoking. The main effects of advertising appear to be in recruiting new users, in encouraging brand shifting, and in reassuring existing users that what they are doing is socially acceptable or otherwise valuable. In the present context, I suspect the role of advertising around tobacco has changed from attempting to enhance desired features to one of **attempting to mitigate some of the negativity** associated with the products. By contrast, **gambling advertising is still primarily around enhancing positives**, so is **designed to grow the market**, rather than to slow its decline.

At the core of modern advertising is the truth proposition. This is the element of the advertising that is true. The trick of modern advertising is to have a truth proposition that is desirable and to assiduously distract the audience from any consideration of potential downsides. Where these downsides are serious, there is a potential for major problems.

There is currently debate within tobacco control circles as to the desirability of allowing limited promotion of harm reduced nicotine products in the context of virtually complete restrictions on the promotion of cigarettes. Consideration could be given to **differential restrictions on advertising** as a function of the harmfulness of the gambling product. There is also a need to ensure that problematic aspects of advertising are constrained; for example, use of young aspirational role models and an **overfocus on the potential gains**. In the case of gambling, it might also include requirements that when an ad raised the possibility of winning (something such advertising regularly does), it should also mention the likely magnitude of losses, as over time in there is a near certainty of loss. This could be in the form of the percentage return to the gambler. However, such information needs to be carefully and accurately presented, e.g., as an average cost rather than 'return to player'.

There is limited research on the implications of **advertising at point of sale** but there is some evidence that **eliminating such advertising** reduces impulse purchases (L. Li et al., 2013), and strong warning messages at point of sale may similarly have a small positive effect (L. Li et al., 2012).

Within tobacco control, one well-known attempt to constrain a particular form of promotion was to ban descriptive terms such as "light" and "mild". This policy initiative has been largely unsuccessful (Yong et al., 2011). This is because the technology that created the differential sensory experience, which was interpreted in terms of potential harmfulness, was not affected by the ban on the terms

used to describe it. Smokers either continued to use the old terms or adopted new ones to make the same distinctions in perceived strength. Where there exist meaningful differences between products, consumers will discover them, regardless of whether there is a pre-existing terminology to describe them. This failing in tobacco control highlights the need to **ensure that people's experiences of the risks of gambling are commensurate with the known risks**. Achieving this might include both providing gamblers with information on the average cost for each form of gambling, and regulation of forms of gambling that are perceived as better deals than they actually are.

Regulating the context in which the behaviour occurs: Since the discovery that passive smoking was harmful, there have been systematic and successful efforts to eliminate smoking from the vast majority of indoor work workplaces, public places and, by other mechanisms, people's homes. This is also extended to some types of outside venues, particularly those frequented by children and/or where people are crowded together such as sporting stadiums. The evidence clearly shows that **extensive restrictions are generally complied with**, and they **result in reductions in cigarette consumption**, but there is no clear evidence that they actually lead to increased smoking cessation (International Agency for Research on Cancer, 2009).

Tax, price and financial incentives

Price is a powerful influence on tobacco use (International Agency for Research on Cancer, 2011). Typically, if the price of something is increased, it leads to reduced use. There are exceptions, including the market for luxury goods where the price is essential to the depiction of its luxury status and exclusiveness. Gambling may be another area. Because of the complicated and essential relationship between gambling and money, taxing and pricing policy is potentially more complicated than for a commodity such as tobacco. If financial incentives don't work in a simple way with gamblers, sometimes lower returns are associated with higher expenditures. However, **simple price signals are still likely to work with the organisations that profit from gambling**. Altering the taxation mix, in conjunction with minimum rates of return to the gambler, such that it reduces the profitability of the more problematic forms of gambling would be one way of reducing the magnitude of the problem because it would **reduce the incentives on proprietors to differentially promote these forms**. It would make even more of a difference if the **additional taxes on the most harmful forms** were ploughed back into **programs to prevent and/or reduce problem gambling**.

Subtitles, alternatives, and aids

Until recently tobacco control has been constrained by the lack of readily achievable alternative or substitute behaviours for smoking. This has meant smokers have had to deprive themselves when they quit, something that is difficult to sustain, especially for those with a lack of other rewarding activities in their lives. Cessation aids typically only work during the period they are being used, so don't provide long term protection, as until recently none have been sufficiently desirable to use to sustain longer term use by more than a tiny minority. With the wide variety of gambling forms, there may be more potential to **shift people to less harmful forms**, as well as **modifying the existing forms** to make them less problematic.

The failure to consider how product engineering affects product attractiveness, and addictiveness is holding back tobacco control efforts, and this has relevance. The failure to ban filter venting, the basis of the Light and Mild fraud alluded to earlier, is a good example of how **lack of understanding of mechanisms** may lead to a failure to garner support for collective action. **Product-related regulation needs to start with adequate understanding of the technology**,

and this may mean requiring companies that market gambling platforms to provide **detailed information to competent authorities** as to how they work.

It is widely accepted that some forms of gambling, particularly the use of EGMs, represents a form of variable ratio conditioning. The relevant characteristic of this form of conditioning is that the person will **continue to engage** in the activity even though the **level of return can be reduced** considerably. Thus, to some extent gambling addiction may be exacerbated by low rates of return at the point of engaging in the behaviour, while a low rate of return, if known and considered, may have a rational influence in terms of discouraging the person from engaging in the behaviour in the first place, or at least tempering their expectation of winning. Countering this, at an industry level, higher house returns are likely to lead to increased profits and increased advertising and other promotional activity to encourage punters to engage in such activities.

Therapy

Even when encouraged by extensive public education, it has proved difficult to get smokers to actively seek out and use the most powerful possible resources to help them to quit. Services to assist smokers to quit have notoriously low uptake rates, especially when the impetus is put on the smoker to seek out the help. A partial solution to this has been to have health professionals refer smokers to help services (in Australia, Quitlines). When they refer, which is not often enough, there is a high take-up of services. Delivering Quitline call-back counselling interventions to smokers is both effective and cost-effective. Some less dependent smokers can also benefit from automated programs, which can be even cheaper to deliver (even including development costs) (West et al., 2015). The challenge remains getting smokers to the services.

A similar and perhaps even greater problem is likely for encouraging gamblers to seek help. The majority of gamblers who reach services do so as a result of catastrophic events in terms of major economic threats to well-being as a result of the major losses incurred, or in some cases as result of criminal prosecution. Clearly, it is desirable to prevent gambling problems escalating to this extent. This requires strategies of early intervention, including structural changes that have the same effect. However, finding appropriate people, sufficiently aware of early signs, is difficult. Those who might have access to early warning of risk, do not typically have the professional responsibilities of health professionals to offer help or knowledge to refer to appropriate sources of help. Indeed, those employed by gambling venues are likely to be motivated to **avoid confrontation**, both out of a **fear of being rebuffed** and a concern of **alienating customers**.

Interrelationships with other behaviours

The interrelationships between behaviours is thus an important area to consider. The interrelationships can be due to the other behaviour being enhanced by the target one, the other enhancing the target, or the other affecting the capacity of the individual to control their behaviour (e.g., need for a cigarette disrupting a gambling-induced trance).

Of direct relevance to gambling, **bans on smoking in gambling venues** have been associated with marked reductions in gambling levels. The introduction of smoking bans in gambling venues, was associated with large an immediate reduction in gambling revenue in Victoria (Lal & Siahpush, 2008). It is my understanding that venues have gone to considerable expense to **overcome the barriers not being able to smoke** placed in the way of sustained gambling sessions. These include making it possible to keep an eye on your machine while having a smoke, positioning machines in technically open-air, but largely contained spaces, and allowing for machines to be saved, so the session could resume once the person returned, rather than having to start a new session.

Summary: A comprehensive and strategic approach

Part of the success of tobacco control initiatives is the way in which the problem has been **systematically addressed**. First, the movement has taken a broad comprehensive and strategic approach, identifying the range of possible interventions, and working systematically to achieve them. It has not attempted to do this all at once, but has taken them largely issue by issue, at least in part a function of the perception of which are most **politically saleable** at the time.

A second approach has been the extensive use of the mass media. Some of the mass media has been targeted at influencing decision-makers at least as much as influencing the general population, or smokers in particular. The media also plays an important role in building a common understanding of the problem in the community. This both helps build support for change and even where it is not supported, acceptance of the need for some remedial action.

Third, up until recently, there was a general consensus on the tobacco control agenda, and thus very little dissent from within tobacco control circles. This has meant that the movement have been able to speak with a united voice. As noted earlier the re-emergence of harm reduction possibilities has split the movement, and as a result there is political inaction around contentious issues. Areas of disagreement need to be confronted and a resolution attempted if progress is to be made. Creating a false consensus or avoidance of the issue is unlikely to be effective in the long term.

Four, for the most part the tobacco control movement have been directed by a **scientific approach**, taking the **evidence seriously** and pursuing approaches based on the **best available evidence**. Where there have been exceptions, such as attempting to ban terms like light and mild, rather than the mechanism by which the deception was created, the policy changes that have been achieved have been far less successful. It is important to realize that **tobacco control has not taken a position of saying “we cannot act until sufficient evidence is in”**, because in social issues **new policies can never be demonstrated to work before they’ve actually been put in place**. Therefore, the analysis needs to **proceed on the basis of whatever evidence is available** and the **plausibility of the case** in relation to that evidence.

Further, as noted earlier, in relation to the evidence-based strategy, the tobacco control movement has been active in ensuring that it gets the **information** it needs **to both document the problem, and document the effectiveness of the strategies** that are put in place to address the problem.

All these factors appear to have contributed to the success of tobacco control. It would seem that most, if not all of this thinking, can be translated to be used for gambling control efforts. However, this will rarely be a direct transfer. Rather it will be through the development of related strategies based on the same kind of empirically grounded theoretical understanding of mechanisms and of possible intervention points. The interventions themselves will generally be very different in forms.

Opportunities and relevant issues

Concentration of industry power

Both tobacco and gambling businesses are concentrated, to varying degrees. The tobacco industry is dominated by a small number of global firms. Gambling businesses range from large global corporations to small businesses (including corner stores and newsagents selling lottery products, for example). However, larger scale gambling operators (such as hotels and club gambling venues) are also usually allied via associations such as the Australian Hotels Association or

ClubsNSW/ClubsAustralia. There are also a small number of large casino operators, and the wagering industry is rapidly consolidating. This means the industry in both cases is relatively powerful, with significant revenues and resources to resist reform and improved regulation. Some approaches to addressing this may include reform of political donations and lobbying regulations, and greater transparency in policy processes. The sheer scale of tobacco interests did successfully resist reform for a considerable period, and in many jurisdictions continues to do so. However incremental and evidence-based reforms have succeeded in considerable diminution of tobacco related harm, and could be expected to achieve similar harm diminution in the gambling field.

Population health priorities

The tobacco control movement has largely comprised of public health and population health specialists, rather than clinicians. The approach adopted by these specialists has been more focused on population level interventions, although clinical services for smoking cessation operate. This is arguably distinct from the gambling field, where, although 'public health' approaches have been articulated since at least 1999, the research and policy field has arguably been dominated by clinical and psychological understandings of the 'problem'. Adoption of a more consciously population/public health approach to gambling harm prevention and minimisation is well underway but framing of the issue and broad understanding of it remains largely trapped in an individualist paradigm. This can be altered but requires reframing of the issue.

Social context

The social context of consumption of tobacco has been dramatically altered over time by restrictions on advertising and promotion, by prohibition on where and by whom the product may be purchased or consumption may occur, and by development and transmission of key messaging around the harms associated with consumption. Gambling consumption remains contextualised as an increasingly normalised activity, and is available ubiquitously via widespread terrestrial venues and mobile technology (analogous to earlier unrestricted consumption of tobacco). Modifying the social context of gambling is possible via restrictions on advertising (and by allowing some products to be advertised, but restricting others, based on evidence of associated harms). It is also about providing information about the risks and harms of gambling that are evidence based, accurate and readily comprehensible. This requires some consideration but is achievable.

Product modification and differentiation

In both tobacco and gambling, the most profitable forms of the product are also the most harmful (cigarettes and EGMs). Tobacco control is currently divided over the issue of whether to permit and indeed promote vaping as an alternative lower risk product, or to continue to pursue prohibition of all forms of tobacco/nicotine consumption. This is perceived as at odds with harm reduction approaches. EGMs are indeed both highly profitable and appear to be very strongly associated with gambling harm, however there is considerable scope for product modification for purposes of harm prevention or minimisation. This is also associated with the need for better technical understanding. Regulators and researchers concerned with preventing or minimising harm require better access to technical and other data describing the characteristics of products and their consumption patterns. This will allow significant improvements in the capacity of regulation to produce less harmful products. This is a major step in adopting a 'harm reduction' paradigm. Similarly, this may also assist in decisions around the relative promotion of less harmful products and increased restriction of more harmful products.

Regulatory fragmentation

As with tobacco gambling regulation is subject to a degree of fragmentation. Although gambling regulators may have scope for some harm prevention or minimisation actions via regulation, they remain ultimately dependent on a legislative framework, which is often cumbersome, subject to political vagaries and competing with multiple other priorities for attention. It is also the case that some legislative priorities may be at odds with harm prevention or reduction – e.g., the corporate regulatory framework, or revenue priorities of government, may not always be compatible with that for harm prevention. A whole of government approach would support gambling harm prevention and minimisation – that is, some degree of horizontal and vertical integration of priorities. The interests of corporations lie in maintaining and expanding revenue. They are not directed to harm prevention or reduction, but arguably the opposite. That is an important consideration in regulatory decision-making but appears to not be well understood.

Revenue and internalisation of costs

Most of the costs of gambling consumption are externalised – that is, they are not captured in the immediate transaction, but offloaded to the consumer or their dependents, associates, or the broader society. Increased taxation of tobacco products has captured many such costs and greatly assisted in reducing consumption. Increasing taxation of more harmful products, or otherwise modifying the costs to the operator of providing specific products may be an effective tool to reduce more harmful consumption. Given that the price of gambling is not well understood, and that consumption is price inelastic, ‘price signals’ may be best conveyed at the operator level. Additional revenue generated could be diverted to increased and well-marketed treatment and social marketing, and/or to population/public health focused harm prevention and minimisation research.

Data collection

There are multiple data needs for gambling research in harm prevention and minimisation. These include technical information and data as discussed above, but also consumption data at a disaggregated level, and population monitoring data. Population monitoring provides regular intelligence on patterns amongst those consuming the product, rather than attempting to estimate the prevalence of specific behaviours or of responses to a gambling problem scale. In an environment where new technologies and rapidly evolving forms of gambling proliferate, monitoring is likely to provide very useful information to frame social marketing campaigns, assist with intervention design, and support population-based programs.

Targeting interventions

Interventions are most likely to be effective if designed to counter the valence of the ‘operating system’ – that is, the collection of feelings that generally guides human activities. This means they need to provide effective information to support the ‘executive system’, that element of the affective system that pursues more rational decisions and actions. Pre-commitment systems are an example of this, and so are interventions that occur at the point where affect is driven by the operating system; for example, when a specific pattern of harmful behaviour occurs. Effective pop-up messaging triggered by a specific pattern or patterns of use is an example. Such interventions require monitoring and feedback of activity, and rely on algorithms that identify harm. As discussed in an earlier section, this is feasible and supported by the theoretical discussion contained in this section.

Advertising, marketing and knowledge transfer interventions

Interventions using advertising and marketing may support behaviour change, and may also develop public support for regulatory and legislative change. These however require design based on specific considerations, i.e., whether the message is negative or positive (negative messages, for example, are thought to be effective in preventing harmful behaviour, and positive messages for supporting harm reducing or preventing behaviour). Knowledge transfer activities are useful for maintaining public interest and that of policy and decision makers in support of reform.

Standard of evidence

Population/public health interventions are, by their nature, generally untestable until deployed at a population level. Demands by industry and others for 'gold standard' evidence prior to implementation are unreasonable, and a delaying tactic. However, all interventions and policy should rely on the best available evidence, have some theoretical support, and be plausible. This appears to be a clear lesson from the tobacco control experience.

Gambling reform concordance

Successful gambling reform is likely to rely on a reasonable degree of concordance between those interested in pursuing harm prevention and minimisation. This appears to be a further clear lesson from tobacco control. Support for developing a coherent and agreed agenda for reform is likely to be a useful intervention. An iterative and reflexive approach to reform is likely to be most successful, with a focus on addressing the systems that define and frame the consumption of gambling.

RQ2.3 Evidence from other public health fields: Obesity & physical activity

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Introduction

This section provides a critical assessment of evidence of effectiveness of policies to control overweight and obesity, and to identify lessons that might be learnt from this to assist in the prevention, or minimisation, of gambling harm. This review examines five major areas of policy action in relation to physical activity and dietary intake: environmental modification; organisational policies; price policies; information provision; and industry restrictions.

Overweight and obesity now reportedly affects over 600 million adults globally (World Health Organization, 2016). Like gambling, this is a public health issue that has been emerging over the last 30 years or so. The industrialisation of food production, and concurrent declines in physical activity due to technological and social changes, has seen the prevalence of overweight and obesity rise markedly. Since 1980, global obesity rates have more than doubled, and 13% of the global population were reported to be obese in 2014 (World Health Organization, 2016).

Unhealthy weight status is an issue that has been found to disproportionately affect people of lower socio-economic status. In 2011-12, 66% of Australian adults in the lowest socio-economic quintile (highest disadvantage) were above the healthy weight range compared with 57% of those from the highest quintile (least disadvantage) (Australian National Preventive Health Agency [ANPHA], 2014). People living in regional and remote locations, and those of Aboriginal and Torres Strait Islander origin, are also at elevated risk (ANPHA, 2014). These trends are similar to those seen for other chronic health conditions and consumption of harmful products such as tobacco, alcohol, and gambling.

Like gambling, public health efforts to tackle overweight and obesity entail confrontation with significant commercial interests, in this case the food industry and its lobbying groups. The food industry has shown itself to be highly organised, and has endeavoured to adopt the 'energy balance' argument to pass the responsibility for weight control onto individuals, emphasising that inadequate physical activity rather than excess energy intake is where authorities should focus their efforts

A repercussion of the focus on personal responsibility for body weight is that overweight and obesity become stigmatised conditions, and this too is an area of similarity between this issue and problem gambling. Discrimination against people who are overweight or obese has been reported in workplaces (Rudolph, Wells, Weller, & Baltes, 2009), health care settings (Phelan et al., 2015) and social contexts (Puhl & Brownell, 2001). Recent research concerning 'fat shaming' has found that this has contributed to worsened health outcomes for those who are overweight or obese (Pearl et al., 2017).

Overweight and obesity is a complex issue that is influenced by environmental, economic, social and cultural factors. There is significant scope for policy interventions that address important determinants of physical activity and dietary intake to play a role in tackling this at the population

level. This review reports on the effectiveness of these interventions, in order to generate insights about analogous actions that might be adopted in efforts to address problem gambling in Australia.

Methods

This section provides a synthesis of the evidence from reviews published in English between January 2007 and January 2017. To identify this literature key review databases including the Cochrane Library, Centres for Disease Control and Prevention (CDC) Community Guides, National Institute for Health and Care Excellence (NICE, UK reviews), NHS Centre for Reviews and Dissemination, and Health Evidence Canada were searched. A preliminary scoping search identified the following key policy areas:

- Environmental modification;
- Organisational policies;
- Price policies;
- Information provision; and,
- Industry restrictions.

Search terms relating to 'physical activity', 'exercise', 'diet', 'nutrition', and 'obesity prevention' were included for all key policy areas. Additional search terms were: 'environment', 'schools' and 'workplaces'; 'tax', 'subsidies', and 'fiscal'; 'education', 'social marketing', 'campaigns'; and 'marketing/advertising restrictions', 'nutrition/food standards', and 'product formulation'.

Review articles were screened for suitability, particularly whether they reported on policy interventions at the broad population-level or within settings (e.g., schools, workplaces). Reviews on the treatment rather than the prevention of overweight or obesity were excluded. Further, reviews examining one-on-one interventions only (e.g., food counselling, personal training, etc.) were excluded. No reviews were excluded based on quality. Where possible, systematic reviews were prioritised, however narrative and policy reviews, as well as discussion papers were also included where these were not available.

To assess the quality of the reviews the McMaster University Health Evidence Quality Assessment Tool was applied where possible. Applying this, the strength of evidence concerning different policy interventions was categorised as follows:

- insufficient – there is no evidence of association or the evidence is limited and indicates a weak or inconsistent association;
- limited – there is evidence of association from one review or the evidence from 2+ reviews indicates a weak or inconsistent association;
- some – there is evidence of association from 2+ reviews and this evidence indicates a weak to moderate relationship overall;
- good – there is evidence of association from 2+ reviews and this evidence indicates a moderate-strong relationship; and,

- strong – there is evidence of association from 3+ reviews and this evidence indicates a strong relationship overall.

Results

A total of 91 reviews were included, reporting 17 types of intervention to promote physical activity or healthy dietary intake. These have been grouped under five headings, namely: environmental modification; organisational policies; price policies; information provision; and industry restrictions.

Environmental modification

The review identified a number (n=17) of interventions pertaining to environmental modifications. These were most commonly related to promoting physical activity (n=14), and to a far lesser extent dietary intake (n=4).

Physical activity interventions

Transport interventions

Overview

Transport interventions to increase physical activity included those which aim to promote active transport, increase public transport use, reduce road traffic, and improve road safety. Ten reviews described these interventions including six systematic reviews (Audrey & Batista-Ferrer, 2015; Baker, Francis, Soares, Weightman, & Foster, 2015; Fraser & Lock, 2011; Mayne, Auchincloss, & Michael, 2015; Stewart, Anokye, & Pokhrel, 2015; Yang, Sahlqvist, McMinn, Griffin, & Ogilvi.e., 2010), two public health guidelines (National Institute for Health and Care Excellence, 2008a, 2012), and two discussion papers (Giles-Corti, Foster, Shilton, & Falconer, 2010; Wood-Gush & Bull, 2015). These reviews included 12 (Stewart et al., 2015) to 37 studies (Mayne et al., 2015) and primarily described interventions in the general population. However, one focused on children and young people (Audrey & Batista-Ferrer, 2015), and another on adults only (Stewart et al., 2015). Reviews were moderate (Audrey & Batista-Ferrer, 2015; Mayne et al., 2015; Stewart et al., 2015) or strong in quality (Baker et al., 2015; Fraser & Lock, 2011; Yang et al., 2010). Quality could not be formally assessed for the public health guidelines or discussion papers.

Quality of evidence

There was found to be some evidence that road traffic interventions (e.g., traffic calming measures, footpaths) improve participation in active travel (Audrey & Batista-Ferrer, 2015; National Institute for Health and Care Excellence, 2008a). The provision of high quality public transport close to residential areas has also been reported to increase active travel (Giles-Corti et al., 2010; Wood-Gush & Bull, 2015). There is good evidence that the provision of bike paths and bike lanes is effective in promoting cycling (Fraser & Lock, 2011; National Institute for Health and Care Excellence, 2008a; Yang et al., 2010).

Implementation considerations

The implementation of transport interventions appears to be more often framed in terms of public safety rather than increasing physical activity (Audrey & Batista-Ferrer, 2015; Fraser & Lock, 2011; Giles-Corti et al., 2010; National Institute for Health and Care Excellence, 2008a). As these interventions often involve the modification of infrastructure, it is optimal if they are incorporated into urban planning rather than be retrofitted. While the evidence of impact on vulnerable

populations was unclear, it is likely that benefits would be disproportionately distributed to those living closer to urban centres.

Interventions modifying the built environment

Overview

Built environment interventions included development of parks and 'greenspace', and installation of facilities and equipment to promote physical activity. Nine reviews were identified including five systematic reviews (Audrey & Batista-Ferrer, 2015; Baker et al., 2015; Hunter et al., 2015; Husk, Lovell, Cooper, Stahl-Timmins, & Garside, 2016; Soler et al., 2010), three public health guidelines (National Institute for Health and Care Excellence, 2008a, 2009, 2012), and one discussion paper (Wood-Gush & Bull, 2015). These reviews primarily focused on the general population. However, two focused on children and young people (Audrey & Batista-Ferrer, 2015; National Institute for Health and Care Excellence, 2009), and one on adults only (Husk et al., 2016). The reviews included 12 (Hunter et al., 2015) to 33 studies (Audrey & Batista-Ferrer, 2015; Baker et al., 2015). They were of moderate (Audrey & Batista-Ferrer, 2015; Hunter et al., 2015) or strong quality (Baker et al., 2015; Husk et al., 2016; Soler et al., 2010), however, it was not possible to formally assess the quality of the public health guidelines or discussion paper.

Evidence

The evidence for built environment modifications is not as strong as for transport interventions. There is relatively good evidence that increased access to greenspace increases population physical activity (Hunter et al., 2015; National Institute for Health and Care Excellence, 2008a; Wood-Gush & Bull, 2015), and limited evidence that community physical activity interventions with environmental components promote walking (Baker et al., 2015). However, the evidence for park and facility upgrades is somewhat conflicting. While public health guidelines have recommended providing spaces, facilities and equipment to support physical activity among children and young people (National Institute for Health and Care Excellence, 2009), two systematic reviews have found inconclusive evidence about the impact of environmental modifications and upgrades (Audrey & Batista-Ferrer, 2015; Husk et al., 2016).

Implementation considerations

As with transport interventions, the catalyst for built environment modifications is usually not the promotion of physical activity. When it comes to greenspaces, this is likely to be driven by concerns about neighbourhood aesthetics and liveability. Implementation of these interventions requires collaboration across sectors, and is likely to be most effective when incorporated into neighbourhood planning rather than being adapted to existing localities.

Diet interventions

Local planning

Overview

Local planning interventions to improve dietary intake address food access and retail availability. The evidence is relatively limited concerning these interventions, with two systematic reviews (Mayne et al., 2015; Walker, Keane, & Burke, 2010), a narrative review (Faith, Fontaine, Baskin, & Allison, 2007), and a discussion paper (Swinburn et al., 2013) identified. The evidence from two reviews was assessed as of moderate quality (Faith et al., 2007; Mayne et al., 2015), while quality

could not be determined for the remaining reviews. The reviews reported on studies conducted with general populations. Two reviews included 37 and 31 studies respectively (Mayne et al., 2015; Walker et al., 2010), and the number of studies was not stated for the other two reviews (Faith et al., 2007; Swinburn et al., 2013).

Evidence

There is limited evidence that regulations for improving the food environment at a local government level, or in schools, leads to improvements in purchasing behaviours or self-reported dietary intake (Mayne et al., 2015). Similarly, there is limited evidence that food access influences food purchases or food intake (Faith et al., 2007). A review of the 'food deserts' literature in the USA recommended that local governments partner with stakeholders to ensure local access to affordable and nutritious food, and partner with supermarkets to bring these into underserved areas (Walker et al., 2010). Similarly, a proposed Government Healthy Food Environment Policy Index outlined recommendations for food provision and food retail (e.g., zoning restrictions, in-store restrictions, and encouraging health food retail in disadvantaged neighbourhoods) (Swinburn et al., 2013). However, a review of studies evaluating the effect of retail availability through supermarkets in underserved areas found no effects (Mayne et al., 2015), and the evidence for local planning interventions on improving diets for vulnerable groups is also lacking.

Implementation considerations

Whilst some literature suggests benefits of planning interventions for vulnerable and low socio-economic groups, the evidence for this is limited. These policies would require careful evaluation to ensure that they are not worsening inequities.

Organisational policies

Organisational policies were the most frequent types of intervention identified, with a total of 44 evidence reviews examining these. These primarily examined school and workplace policies, however one addressed policies in tertiary education settings (Roy, Kelly, Rangan, & Allman-Farinelli, 2015). Many (n=20) of the reviews considered both diet and physical activity interventions, however 10 focussed on physical activity interventions specifically, and a further 14 focussed on dietary intake only.

Physical activity interventions

Provision of facilities

Overview

Evidence for the provision of physical activity facilities in schools and workplaces is relatively limited. There were four reviews identified: three strong systematic reviews (Parrish, Okely, Stanley, & Ridgers, 2013; Shrestha et al., 2016; To, Chen, Magnussen, & To, 2013), and one discussion paper of unclear quality (Pronk & Kottke, 2009). The interventions focused on children and adolescents in schools (Parrish et al., 2013) and adults in workplaces (Pronk & Kottke, 2009; Shrestha et al., 2016; To et al., 2013).

Evidence

There was limited and inconsistent evidence concerning the effectiveness of the provision of facilities for promoting physical activity. Parrish et al. (2013) found insufficient evidence for school-

based recess interventions for children and adolescents. There was also limited evidence for workplace interventions, including the provision of stand-up desks (Shrestha et al., 2016) and strategies incorporating pedometers, social activities and online delivery methods (To et al., 2013).

Implementation considerations

Whilst it is unclear from this review what supports interventions in school settings, implementation in workplaces appears to be enabled by commitment to worker health for the purpose of improving business performance.

Physical activity education

Overview

There were 26 reviews of school-based (n=16) and workplace-based (n=10) educational strategies to promote physical activity. These included 21 systematic reviews, five of which incorporated meta-analyses (Katz, O'Connell, Njike, Yeh, & Nawaz, 2008; Wang et al., 2013; Harris, Kuramoto, Schulzer, & Retallack, 2009; Sobol-Goldberg, Rabinowitz, & Gross, 2013; Verweij, Coffeng, van Mechelen, & Proper, 2011), two reviews of systematic reviews (T. Brand et al., 2014; Hendrie et al., 2012), one public health guideline (National Institute for Health and Care Excellence, 2008b), and two narrative reviews (Kahn-Marshall & Gallant, 2012; Shaya, Flores, Gbarayor, & Wang, 2008). Fifteen of the reviews were of strong quality, five were graded as moderate (T. Brown & Summerbell, 2009; Gudzone, Hutfless, Maruthur, Wilson, & Segal, 2013; Hendrie et al., 2012; Sobol-Goldberg et al., 2013; Wang et al., 2013), one was graded as weak (Robertson-Wilson, Dargavel, Bryden, & Giles-Corti, 2012). Quality was not able to be assessed for five of the reviews (Archer et al., 2011; Kahn-Marshall & Gallant, 2012; Katz et al., 2008; National Institute for Health and Care Excellence, 2008b; Shaya et al., 2008).

Evidence

There is strong evidence that school-based physical activity lessons can significantly increase physical activity levels among students (Bonell et al., 2013; T. Brand et al., 2014; De Meester, van Lenthe, Spittaels, Lien, & De Bourdeaudhuij, 2009; Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Robertson-Wilson et al., 2012). Further, there is moderate-quality evidence that school-based physical activity education can reduce the prevalence of overweight and obesity (Katz et al., 2008; Wang et al., 2013). There is also some evidence that combined educational and environmental strategies are more effective than education alone (De Bourdeaudhuij et al., 2011; Hendrie et al., 2012). However, there is limited evidence as to the long-term effectiveness of education programs on physical activity, fitness, fundamental movement skills, and body mass (T. Brown & Summerbell, 2009; Harris et al., 2009; Lai et al., 2014; Shaya et al., 2008; Waters et al., 2011).

There is inconsistent evidence concerning the impacts of workplace educational interventions to increase physical activity (Benedict & Arterburn, 2008; Feltner et al., 2016; Groeneveld, Proper, van der Beek, Hildebrandt, & van Mechelen, 2010; National Institute for Health and Care Excellence, 2008b; Pronk & Kottke, 2009; Verweij et al., 2011). One systematic review of 136 studies proposed the following six promising worksite practices: enhanced access to opportunities for physical activity combined with health education; exercise prescriptions alone; multi-component educational programs; weight loss incentives; and behavioural incentives (Archer et al., 2011). Consistent with this, two reviews provided some evidence that multi-component interventions in workplaces (e.g., targeted education, environmental modification, policy interventions) focusing on

both nutrition and physical activity (Gudzune et al., 2013; Kahn-Marshall & Gallant, 2012) are effective.

Implementation considerations

School-based physical activity interventions are likely to be effective due to their 'captive audience' and the compulsory nature of many activities. It is now a social expectation that children are physically active during school hours, with national standards around minimum durations of physical activity education and opportunities for independent activity (e.g., during lunch and recess). The case for 'protecting children from obesity' appears to have strong political and social support. In workplaces, the argument for physical activity education is largely driven by interests in promoting productivity and reducing absenteeism.

Diet interventions

Food availability and provisions

Overview

Thirty-two reviews examined food availability interventions in schools (n=18), workplaces (n=11), or both (n=3). Reviews were primarily of moderate (n=10) or strong quality (n=14), with one weak narrative review (Brambila-Macias et al., 2011), and four reviews where quality could not be determined (Archer et al., 2011; Kahn-Marshall & Gallant, 2012; Katz, 2009; Shaya et al., 2008). The included reviews were systematic reviews (n=25) including two with meta-analyses (Katz et al., 2008; Wang et al., 2013), reviews of systematic reviews (n=2) (T. Brand et al., 2014; Hendrie et al., 2012), meta-analyses only (n=2) (Sobol-Goldberg et al., 2013; Verweij et al., 2011), and narrative reviews (n=3) (Brambila-Macias et al., 2011; Kahn-Marshall & Gallant, 2012; Shaya et al., 2008). Review populations primarily included children and adolescents, and workers, however one study included tertiary education students and employees (Roy et al., 2015).

Evidence

There is strong evidence that modifications to school food environments (e.g., removing, or reducing portion sizes, of sweets, soft drinks and fried foods, and increasing access to fruit and vegetables in canteens, snack bars and vending machines) promote healthy eating (Brambila-Macias et al., 2011; Driessen, Cameron, Thornton, Lai, & Barnett, 2014; Ganann et al., 2014; Jaime & Lock, 2009; McGill et al., 2015; Niebylski et al., 2014). There is limited evidence that initiatives to subsidise the cost of fruit and vegetables in schools improve students' intake of these items (Jaime & Lock, 2009). There is good evidence that similar food environment modifications are effective in workplaces (Brambila-Macias et al., 2011; McGill et al., 2015; Niebylski et al., 2014). In tertiary education settings, there is limited evidence that increasing the availability of health foods, decreasing portion sizes of unhealthy foods, and nutrition education have a positive effect on nutrition-related outcomes (Roy et al., 2015).

Implementation considerations

School-based diet and nutrition interventions are likely to be effective due to dependence of many children on school-based food options. It is now also a social expectation, and in some cases a legal requirement, that schools have nutrition policies.

Nutrition education

Overview

Nutrition education interventions were examined in both school (n=12) and workplaces (n=10). There were 18 systematic reviews of this evidence, including four meta-analyses (Katz et al., 2008; Wang et al., 2013; Sobol-Goldberg et al., 2013; Verweij et al., 2011), two reviews of systematic reviews (T. Brand et al., 2014; Hendrie et al., 2012), and two narrative reviews (Kahn-Marshall & Gallant, 2012; Shaya et al., 2008). Thirteen reviews were of strong quality, five were of moderate quality (T. Brown & Summerbell, 2009; Gudzone et al., 2013; Hendrie et al., 2012; Sobol-Goldberg et al., 2013; Wang et al., 2013), and four where quality was not able to be assessed (Archer et al., 2011; Kahn-Marshall & Gallant, 2012; Katz, 2009; Shaya et al., 2008).

Evidence

There is some evidence that nutrition education interventions in school settings are more effective at improving dietary intake when paired with supportive food environments (Avery, Bostock, & McCullough, 2015; Sobol-Goldberg et al., 2013; Van Cauwenberghe et al., 2010; Wang et al., 2013). Overall there is limited evidence for the effectiveness of stand-alone nutrition education programs in schools (Avery et al., 2015; Dudley, Cotton, & Peralta, 2015; Van Cauwenberghe et al., 2010). There is limited evidence that experiential learning strategies may achieve the largest effects in reducing food consumption and energy intake and increasing nutritional knowledge and fruit and vegetable intake in schools (Dudley et al., 2015). In workplaces, there is some evidence that education (e.g., counselling, diet plans, shopping tours, etc.), environmental modification (e.g., menu reformulation, vending machines, etc.), or combinations of these lead to positive changes in fruit, vegetable and total fat intake (Maes et al., 2012; Ni Mhurchu, Aston, & Jebb, 2010).

Implementation considerations

Nutrition education appears to be less efficacious than physical activity education. Given the evidence that education is most effective when paired with supportive environmental changes, strategies to prevent obesity should incorporate both. As described in previous sections, advocacy for these policies should be tailored to the setting and priorities of the organisation.

Price policies

Price policies included taxation and subsidies. Thirteen reviews analysed the impact of price policies on the prevention of overweight and obesity. These reviews mostly addressed dietary intake (n=12) rather than physical activity (n=1).

Physical activity interventions

Only one weak quality review provided evidence for the effect of price policies on physical activity (Martin, Suhrcke, & Ogilvie, 2012). This review found limited evidence for the impact of price policies on active transport levels. Price policies included subsidised public transport passes, payments based on exercise levels, and road use payments/congestion fees, among others.

Diet interventions

Food taxes

Overview

Food taxation interventions have been applied on the basis of nutrient content, such as levels of sugar, salt, or fats. In total, 10 reviews including five systematic reviews (Alagiyawanna et al., 2015; McGill et al., 2015; Niebylski, Redburn, Duhaney, & Campbell, 2015; Thow, Downs, & Jan, 2014; Thow, Jan, Leeder, & Swinburn, 2010), two narrative reviews (Brambila-Macias et al., 2011; Powell & Chaloupka, 2009), one text analysis (Bødkera, Pisingera, Tofta, & Jørgensena, 2015), one fiscal report (Beck et al., 2016), and one commentary (Caraher & Cowburn, 2015) were included. Reviews focussed on the general population, including one reporting on a fat tax in Denmark (Bødkera et al., 2015) and one commentary on policies in the USA (Powell & Chaloupka, 2009). Four reviews were of moderate quality (McGill et al., 2015; Niebylski et al., 2015; Thow et al., 2014; Thow et al., 2010) and two were of weak quality (Brambila-Macias et al., 2011; Powell & Chaloupka, 2009). Quality was not able to be assessed for the remaining four reviews (Alagiyawanna et al., 2015; Beck et al., 2016; Bødkera et al., 2015; Caraher & Cowburn, 2015).

Evidence

There is good evidence that food taxes (e.g., taxes on fast foods and snacks) (Alagiyawanna et al., 2015; Thow et al., 2010) and beverage taxes (primarily on soft drinks) (Alagiyawanna et al., 2015; Thow et al., 2014; Thow et al., 2010) reduce the consumption of these unhealthy food items. There is some evidence that taxes must be set at least 20% to have the best effect (Caraher & Cowburn, 2015; Niebylski et al., 2015), and good evidence that taxes should be paired with subsidies to be most effective (Caraher & Cowburn, 2015; McGill et al., 2015; Niebylski et al., 2015; Thow et al., 2010). There is limited evidence that taxes might be most effective in groups of low socio-economic position (McGill et al., 2015).

Implementation considerations

Soft drinks appear to be the most commonly taxed food item. This could be because they provide little nutritional content and are therefore easier to target and tax, without strong public opposition. Taxes appear to be most successful when their purpose is to benefit health rather than to generate income, when they are created in consultation with health experts, and when there is strong political will and community support (Bødkera et al., 2015).

Food subsidies

Overview

Food subsidies have been applied to fruits, vegetables, and items low in nutrients such as salt, sugar and fats. Nine reviews, including six systematic reviews (Alagiyawanna et al., 2015; An, 2013; McGill et al., 2015; Niebylski et al., 2015; Thow et al., 2014; Thow et al., 2010), two narrative reviews (Brambila-Macias et al., 2011; Faith et al., 2007), and a commentary (Caraher & Cowburn, 2015) were examined. All reviews described interventions in the general population. Six reviews were of moderate quality (An, 2013; Faith et al., 2007; McGill et al., 2015; Niebylski et al., 2015; Thow et al., 2014; Thow et al., 2010), one was of weak quality (Brambila-Macias et al., 2011), and quality was not able to be assessed for two reviews (Alagiyawanna et al., 2015; Caraher & Cowburn, 2015).

Evidence

There is some evidence that subsidies increase the consumption of fruits and vegetables (Alagiyawanna et al., 2015; An, 2013; Brambila-Macias et al., 2011; Faith et al., 2007), however the effect of subsidies on total calorie intake appears unclear (Thow et al., 2014), as is the overall health impact that these have (Alagiyawanna et al., 2015; Faith et al., 2007; Niebylski et al., 2015). There is insufficient evidence concerning the level of subsidy that is required for these policies to be effective (An, 2013), and limited evidence of the impact of subsidies in groups of low socio-economic position (McGill et al., 2015).

Implementation considerations

Subsidies appear less politically favourable than taxes as they are about spending money rather than gaining revenue in the short term. The long-term economic argument would likely need to be made strongly in order to get adequate political support for these policies.

Information provision

There were 16 reviews of interventions concerning information provision that were identified. These most frequently examined dietary interventions (n=12) rather than physical activity interventions (n=4).

Physical activity interventions

Physical activity campaigns

Overview

Public campaigns entailed mass media and social marketing to promoting physical activity and were examined in two systematic reviews, including one of high quality (Ogilvie et al., 2007) and another of moderate quality (D. R. Brown et al., 2012). The interventions in both reviews focused on the general population, and the reviews included 48 (Ogilvie et al., 2007) and 16 studies (D. R. Brown et al., 2012), respectively.

Evidence

The moderate quality review concluded that there is insufficient evidence to determine the effectiveness of stand-alone mass media campaigns to increase physical activity (D. R. Brown et al., 2012). The review of interventions to promote walking found that the strongest evidence of effectiveness was for community-level interventions with a substantial mass media component conducted in geographically defined communities, however it concluded that evidence for effectiveness was still uncertain (Ogilvie et al., 2007).

Implementation considerations

Mass media and social marketing interventions appear to be favoured for the promotion of physical activity, despite unclear evidence of effectiveness. These interventions tend to emphasise personal responsibility for physical activity and health overall, and target broad audiences.

Point-of-decision prompts for physical activity

Overview

Point-of-decision prompts to promote physical activity primarily include reminders to use stairs (e.g., posters beside lifts). These interventions tend to be minimalist; however, can also include enhancements to stairwells. Two reviews, including a high-quality systematic review (Soler et al., 2010) and an un-appraised discussion paper (Task Force on Community Preventive Services, 2010), examined the impact of point-of-decision prompts for stair use.

Evidence

There is good evidence that point-of-decision prompts are effective in increasing the use of stairs (Soler et al., 2010; Task Force on Community Preventive Services, 2010). However, there is insufficient evidence to determine whether enhancements to stairs or stairwells (e.g., beautification efforts such as painting, carpeting, music, etc.) are an effective addition to these strategies.

Implementation considerations

As these interventions are relatively low intensity and low cost they readily attract support. These prompts have also been noted to promote energy saving and environmental responsibility through the use of stairs.

Diet interventions

Healthy eating campaigns

Overview

As with the physical activity campaigns described above, campaigns to promote healthy diet include social marketing and mass media interventions directed at broad populations. Two systematic reviews including 36 and 46 studies respectively (Boylan, Loui.e., & Gill, 2012; McGill et al., 2015) and a narrative review (Brambila-Macias et al., 2011) were identified. These were of weak (Boylan et al., 2012; Brambila-Macias et al., 2011) and moderate quality (McGill et al., 2015), and all focused on the general population.

Evidence

There is limited evidence for the effectiveness of public campaigns to promote healthy eating. These campaigns have been recommended for the promotion of understanding of dietary guidelines (Boylan et al., 2012), however evidence for this is limited. There is also limited evidence that these campaigns may increase population-wide fruit and vegetable intake (Brambila-Macias et al., 2011), and these benefits have been reported to disproportionately benefit people of higher socio-economic position (Brambila-Macias et al., 2011; McGill et al., 2015).

Implementation considerations

There appears to be broad community support for public campaigns for the promotion of healthy diets. These interventions emphasise personal responsibility rather than broader determinants of dietary intake.

Point-of-decision prompts for dietary intake

Overview

Point-of-decision prompts related to dietary intake include menu and food labelling (e.g., calorie labelling, 'traffic light' labelling), which aim to influence food choices at the point of purchase. There were nine reviews identified which examined these interventions, either in isolation or in combination with other strategies. These included three strong quality meta-analyses (Littlewood, Lourenco, Iversen, & Hansen, 2016; Nikolaou, Hankey, & Lean, 2015; Sinclair, Cooper, & Mansfield, 2014), four systematic reviews of moderate quality (Escaron, Meinen, Nitzke, & Martinez-Donate, 2013; Sarink et al., 2016; Skov, Lourenco, Hansen, Mikkelsen, & Schofield, 2013; Swartz, Braxton, & Viera, 2011) and one of weak quality (Harnack & French, 2008), and one narrative review of weak quality (Brambila-Macias et al., 2011). The reviews predominantly examined interventions for the general population, with the exception of two that focused on young adults (Nikolaou et al., 2015; Sinclair et al., 2014). Reviews included between six (Harnack & French, 2008) and 58 studies (Escaron et al., 2013), however, the narrative review did not indicate the number of studies examined (Brambila-Macias et al., 2011).

Evidence

The reviews included here found evidence both for (Escaron et al., 2013; Harnack & French, 2008; Littlewood et al., 2016; Skov et al., 2013) and against (Nikolaou et al., 2015; Sinclair et al., 2014; Swartz et al., 2011) the effectiveness of menu labelling. It was notable, however, that none of these reviews found strong supporting evidence of effectiveness, and that two of the meta-analyses found no overall effect of this intervention. As such, there is, limited evidence for the effectiveness of point-of-decision prompts in improving food choices. One moderate quality review found that people of lower socio-economic position have less comprehension of energy labelling and weaker intentions to use this than other groups (Sarink et al., 2016).

Implementation considerations

Menu labelling and point-of-decision prompts used to promote healthy food choices have risen to prominence in recent years. Despite limited evidence for these, these interventions appear to be highly acceptable as they provide information about the nutrient content of menu items and promote individual responsibility over food choices. Indeed, corporations such as McDonald's seem to have capitalised on this. These minimalist interventions (e.g., a small sign or traffic light symbol alongside food items) appear to be relatively simple to adopt.

Industry restrictions

The review identified a number (n=11) of overweight and obesity control interventions pertaining to industry restrictions and, as might be expected, all of these examined food industry restrictions.

Diet interventions

Advertising and marketing restrictions

Overview

The advertising and marketing restrictions examined primarily entailed banning or controlling the promotion of foods with certain nutrient profiles (e.g., high fat, high sugar, high sodium) to specific populations (e.g., children, infants). Seven review articles described these restrictions including two systematic reviews (Chambers, Freeman, Anderson, & MacGillivray, 2015; McGill et al., 2015), two

narrative reviews (Brambila-Macias et al., 2011; Piwoz & Huffman, 2015), two policy reviews (Brinsden & Lobstein, 2013; Ofcom, 2010), and a discussion paper (Swinburn et al., 2013). For the most part, the reviews focused on the general population, however three also focused on children (Chambers et al., 2015; Ofcom, 2010; Swinburn et al., 2013). Due to the nature of four of these reviews the quality assessment tool could not be applied, and the remaining reviews were of weak (Brambila-Macias et al., 2011) or moderate quality (Chambers et al., 2015; McGill et al., 2015).

Evidence

Overall there was insufficient evidence for the effect of advertising or marketing restrictions on dietary intake. However, there is good evidence that banning advertising of foods high in fat, salt and sugar during children's viewing time reduces their exposure to the promotion of these product (Brambila-Macias et al., 2011; Chambers et al., 2015; Ofcom, 2010). These bans are often recommended to protect children from the marketing tactics of food companies (Brambila-Macias et al., 2011; Chambers et al., 2015; Ofcom, 2010; Swinburn et al., 2013). In terms of regulating these bans, there is limited evidence that industry-led nutrient profiling schemes are less effective in restricting the advertising of energy-dense foods, compared with government-led models (Brinsden & Lobstein, 2013). Further, one review found that industry funded evaluations of industry-led regulations was more likely to find them to be effective than those funded independently (Chambers et al., 2015). The most universal advertising restrictions are those placed on breast milk substitutes for infants. However, breaches to these restrictions are common (Piwoz & Huffman, 2015).

Implementation considerations

Bans targeted at protecting children and infants appear to have the greatest political and public support. This can be seen in the prominence of junk food marketing bans for children and the universal breast milk substitute ban for infants. By contrast, adults are likely to be viewed as autonomous and responsible for their own health, and therefore not in need of the same protections afforded to children.

Product reformulation

Overview

Product reformulation relates to the design and production of processed foods. This can include limits on specific nutrients such as sugar, salt, or types of fat. Outside of school environments these policies appear relatively scarce. This review identified four reviews that described product reformulation. These included one Cochrane review (McLaren et al., 2016), two moderate-quality systematic reviews (Downs, Thow, & Leeder, 2013; McGill et al., 2015), and one low-quality narrative review (Brambila-Macias et al., 2011).

Evidence

The evidence for these policies is largely yet to be developed. Reviews have suggested that these policies may be effective in reducing population-wide consumption of specific nutrients such as trans-fat (Brambila-Macias et al., 2011; Downs et al., 2013) or sodium (McLaren et al., 2016). However, population-wide evaluations of nutrient limits and product reformulation appear scarce (McGill et al., 2015). Only one moderate quality review found that bans of trans-fatty acids at national and local levels were effective in eliminating trans-fatty acids from the food supply, whereas mandatory labelling and voluntary limits had varying degrees of success (Downs et al., 2013).

Implementation considerations

Product reformulation interventions would likely be highly dependent on industry compliance and government regulation. At present, there seems to be no real leadership in this area. Further, it could be anticipated that the food industry would be highly resistant to additional regulation. Again, it seems that the onus is placed on individuals to understand, monitor and regulate their consumption of specific nutrients within processed foods.

Accountability frameworks

Overview

Accountability frameworks are described as the mechanism through which industry restrictions could be regulated and enforced. Two discussion papers proposed accountability frameworks (Kraak, Swinburn, Lawrence, & Harrison, 2014; Swinburn et al., 2015). The quality of these was not formally assessed.

Evidence

The accountability frameworks proposed in the reviewed papers are as yet untested. These frameworks advocate for features such as government leadership, good governance, transparency, protection from vested commercial interests, protection of national sovereignty and enforcement of compliance by independent bodies (Kraak et al., 2014; Swinburn et al., 2015).

Implementation considerations

At present the proposed accountability frameworks are largely hypothetical. However, it could be anticipated that such structures would be highly opposed by industry bodies.

Discussion

Physical activity and dietary intake are the primary intervention targets in these efforts and, given that these are embedded lifestyle habits that are shaped by psychological and environmental factors, there is substantial complexity entailed in identifying actions that can modify the optimal mix of behavioural determinants and have wide population reach.

This review found that policy interventions in bounded and regulated environments, notably schools, are supported by strong evidence.

Interventions that alter the conditions in which behaviours are likely to be performed, particularly the effort, risk, enjoyment and cost entailed in these, were also supported by a number of evidence reviews. Installation of dedicated bike paths and improvements to green space in neighbourhoods, have been found to increase physical activity. In the case of dietary intake, there are promising findings concerning the impact of taxation that increases the cost of foods with poor nutritional ratings.

This review found good evidence that restrictions to advertising of unhealthy foods significantly lowers children's exposure to this. Strong government regulation appears to be more successful in modifying advertising practices than industry codes of conduct.

Information and education strategies have been widely adopted within policies to address overweight and obesity. The intervention most strongly supported by the evidence was the point of

decision prompt to use the stairs, rather than the lifts. There was less evidence that food or menu-labelling has an impact on dietary choices. There was little evidence that mass media campaigns can influence physical activity and dietary behaviours, but in the case of the former some evidence that these can be effective when they are conducted at the community level and supported by environmental modifications. In the case of educational interventions in schools and workplaces, it was also found that these are more effective for promoting both physical activity and healthy eating when there are complementary environmental modifications.

Another observation was that policies that address priorities other than health only, including safety, liveability, environmental sustainability and workplace productivity, may be more readily adopted.

Opportunities and relevant issues

Tax and fiscal incentives

The review found evidence for effects in increasing the price of high-energy foods (especially high fructose carbonated drinks), and little efficacy for subsidising high nutrient foods. Given the difficulty in assessing the price of gambling games (particularly EGMs) it is unlikely that price increases for gambling products will reduce demand for more harmful gambling forms. However, as previously discussed, differential and progressive tax rates may be an important lever for dissuading the operation of the most harmful gambling forms.

Advertising restrictions

Restriction of advertising has not been associated with improvements to diet, although it has been effective in limiting the exposure of children to such promotions. Where this has been implemented by regulation (as opposed to industry self-regulation) there is evidence of greater adherence. The plausibility of such interventions is good (i.e., there is logic to support them), and restrictions intended to protect children are well supported (as appears to be the case with gambling advertising). Multiple factors affect the dietary habits of children and advertising restrictions alone are unlikely to be efficacious.

Media and social marketing campaigns

Media and social marketing campaigns are widely utilised as a response to public concern, but are not of demonstrated effectiveness unless conducted at a community level and/or supported by other activities such as environmental modifications, or within controlled environments.

Product reformulation

There is some limited evidence of the efficacy of interventions intended to reduce potentially harmful characteristics of food and drink. This appears to be a nascent intervention, and currently relies on co-operation with industry, and on technical issues around manufacturing and composition. Such interventions appear effective in specific environments (e.g., schools). There are strong parallels with some gambling products.

Point-of-decision prompts

There is evidence that point-of-decision prompts are effective in encouraging use of options to increase physical activity (e.g., stairs). Information provided at the equivalent point of choice for gambling decisions is currently focused on 'responsible gambling' messages rather than encouraging a particular course of action, or otherwise requires action to access (e.g., choosing to

view the information screen on an EGM, or seeking out the game rules for a table game). The better analogy for EGMs or online wagering modes may be the regular provision of information about expenditure or time on device to encourage a conscious decision to continue or stop the activity. Simplifying the decision may be an important lesson from this intervention.

Product information

Information about products has limited demonstrated efficacy, although it is a potentially straightforward intervention with relatively low costs. It is not clear from the literature whether simple messages have more efficacy than providing complex information. There is some evidence that people from disadvantaged backgrounds are less likely to comprehend more complex messages involving nutritional information. Providing straightforward information about gambling types, their probabilities and costs, and the relative risks of these is challenging. However, it may be reasonable to require that average price information for gambling types should be presented more clearly. Price information is a basic requirement for decision-making and is largely absent in a comprehensible form on most gambling types at present. Further, for EGMs and online wagering products, information about the structure and characteristics of types of products is difficult to comprehend and requires some effort to acquire. Provision of more clear and comprehensible product information is likely to have some efficacy and should not be difficult to implement, especially on computerised forms of gambling.

Place-based promotion of healthy eating and physical activity

There is good evidence of the efficacy of school-based activities promoting healthy eating and physical activity, and some evidence of efficacy in tertiary education settings. There is also good evidence of the efficacy of interventions to the physical environment for specific purposes (e.g., bicycle paths). Translating these to gambling environments may be challenging. However, the evidence from this section suggests that environmental changes may be important in assisting behaviour change. This may be applied to gambling environments, for example by pursuing characteristics that encourage a less intense focus on more harmful activities, and greater and more accessible opportunities for alternative activities.

Educational activities

The evidence suggests that stand-alone educational activities are ineffective. However, educational activities coupled with other interventions (provision of a supportive environment, active interventions to encourage physical activity, etc.) are likely to be more effective.

Multi-faceted interventions

The evidence from this section strongly supports the improved efficacy of integrated multi-modal interventions. That is, more systematic interventions and policies appear more likely to be effective than stand-alone interventions, with some exceptions (such as school-based physical activity programs). Although it is unsurprising that systematic approaches to complex problems are now regarded as most likely to have improved efficacy (Haddon Jr, 1980) this is an important and clear lesson from the evidence examined in this section.

RQ2.4 Evidence from other public health fields: Blood-borne viruses & sexually transmitted infections

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Public health lessons for gambling

This section explores the harm reduction policy measures and interventions related to blood borne virus (BBV) and sexually transmitted infection (STI) prevention relevant to reducing the harms associated with gambling. The section is divided into sub-sections that detail (i) specific harm reduction initiatives addressing BBV transmission among at-risk populations, (ii) relevant analogues to gambling initiatives, and factors that may influence their successful implementation, and (iii) obstacles involved with implementing these initiatives. We will highlight harm reduction initiatives for three key affected populations: people who inject drugs (PWID), men who have sex with men (MSM) and commercial sex workers (CSW). This section will also focus on how public perception of behaviours around BBV transmission has changed, due to the need to influence public opinion in regard to gambling.

Analogues between gambling and other public health priority areas with regulated markets such as alcohol and tobacco are more readily apparent than the domains we consider related to the populations above. For example, in relation to PWID, there is no industry such as the alcohol industry that is responsible for various elements of the environments in which illicit drug use occurs. Also, in relation to PWID, MSM and CSW, there are no revenues to government (outside of proceeds of crime). Despite these variations in regulatory environment, there are insights from harm reduction initiatives around BBV/STI transmission among all three affected populations.

Interventions and initiatives

BBV prevention among PWID

Australian drug policy has shifted over the past three decades from viewing injecting drug use as predominantly a law enforcement issue, to being seen as a community and public health issue. Key national and state strategies have been developed and implemented in response to harms related to injecting drug use including community needle and syringe program (NSP) provision, the availability of opioid substitution therapy (OST) in the general and prison communities, and the provision of opioid overdose reversal training and interventions (including take-home naloxone). The media, political leadership, civil disobedience and support from the medical community have contributed greatly to this change in public perception, as has the determination of researchers to understand models of policy-making and maximising the uptake of opportunities to reform drug policies (Ritter & Bammer, 2010). This section highlights the history and focus of harm reduction initiatives in Australia in preventing BBV transmission between PWID, including NSP provision and its combination with OST, and provides evidence supporting their implementation.

Available data show that community-based NSPs were active in 86 countries in 2012 (Harm Reduction International, 2012). NSPs operate to increase user understanding and perceptions of risk, by influencing the uptake and use of sterile injecting equipment, and education. In Australia,

sterile injecting equipment can be obtained through 'primary' and 'secondary' NSP sites, pharmacies, vending machines and mobile outreach (National Centre in HIV Epidemiology and Clinical Research, 2009). Primary NSPs are specifically established to provide injecting equipment and connected harm reduction programs. Secondary NSPs offer injecting equipment in broader community health, or tertiary hospital settings (National Centre in HIV Epidemiology and Clinical Research, 2009). Pharmacies are additional key access points for the program (Aitken et al., 2016). Injecting equipment provided through NSP generally includes not only needles and syringes, but also other paraphernalia such as sterile swabs and water (sometimes at a cost to the consumer).

Providing sterile injecting equipment reduces sharing of needles/syringes between PWID (MacArthur et al., 2014) and it is the implementation of community-based NSPs early in the HIV epidemic that has been widely credited with keeping the prevalence of HIV among PWID very low in Australia (Mathers et al., 2008). However, while there is evidence for the effectiveness of NSPs in preventing HIV transmission among PWID in community settings, the evidence regarding HCV (hepatitis C) prevention is more mixed (Hagan, Pouget, & Des Jarlais, 2011; MacArthur et al., 2014; Vickerman, Martin, Turner, & Hickman, 2012). Nevertheless, modelling has indicated that in countries such as the UK and Australia, where coverage of NSP is high, a considerable number of HCV infections have been averted (Kwon et al., 2012; Vickerman et al., 2012). Further, in order to maximise any reduction in BBV transmission at a population level, PWID need high levels of access to injecting equipment to cover the number of injecting episodes in which they engage, and the intervention needs to be combined with complementary strategies such as OST (Turner et al., 2011; Vickerman et al., 2012).

The implementation of NSPs in prisons remains rare around the world and consequently there are few studies reliably reporting on their effectiveness. PWID are over-represented in Australian prisons, with up to 58% of prisoners reporting a lifetime history of injecting (Reekie et al., 2014). In 2014 only thirteen countries had implemented NSPs in prisons (United Nations Office of Drugs and Crime, 2014), and Australia is yet to do so. A number of prison systems make bleach or other disinfectants available to prisoners to provide the means to sterile used needles/syringes, particularly where there has been strong opposition to the implementation of NSPs (World Health Organization, 2007). There is insufficient evidence to evaluate the effectiveness of disinfecting needles/syringes in preventing BBV transmission in all 'real-life' settings, in particular in the absence of NSPs in custodial settings in Australia (Hagan et al., 2011).

NSP works best in combination with education and OST as an integrated biomedical public health intervention (Vickerman et al., 2012), and many community-based NSPs either provide these services or can facilitate access to them. Education includes providing information on self-management skills, condom use and drug education, and reduces injecting related risk behaviours when provided with the delivery of injecting equipment (MacArthur et al., 2014). OST involves dispensing pharmaceutical opioids (mostly methadone and buprenorphine) as substitutes for illicit opioids such as heroin to prevent withdrawal among opioid-dependent individuals. OST reduces injecting risk behaviour in terms of the number of episodes of injecting and risky episodes of injecting (MacArthur et al., 2014).

Despite evidence for the increase in public safety due to the implementation of NSPs, public perception of safety is generally reduced, with local communities' concern for the proximity of an NSP to a school (Rabar, 2014) or the perception of risk of implementing NSPs in prison (McIlroy, 2014). Nevertheless, perception of harm has changed within the at-risk community itself, which has led to the normalisation and uptake of using sterile injecting equipment through NSP and community mobilisation through state and national drug user groups (Bowtell, 2005).

Relative success and strength of the initiative and available evidence

At the individual level, NSP and OST also have a direct prevention impact for HCV transmission; however, evidence for population-level prevention impact is mixed (Coutinho, 1998; N. K. Martin, Hickman, Hutchinson, Goldberg, & Vickerman, 2013). This is largely due to HCV being more efficiently transmitted through blood than HIV (Coutinho, 1998), and having been prevalent in Australia since the 1970's, a decade before the introduction of NSPs (Australian Government Department of Health, 2008; Memedovic, Iversen, Geddes, & Maher, 2017). □

Implementing high coverage NSP provision and OST is necessary to reduce the incidence and prevalence of HCV (N. K. Martin et al., 2013). Research suggests that interventions combining the two strategies (combination prevention approaches) is more effective (Hagan et al., 2011; N. K. Martin et al., 2013; Sendziuk, 2007; Van Den Berg et al., 2007), and furthermore, that combining more interventions (such as antiviral treatment) is needed on top of the combination approach, in order to achieve substantial reductions in HCV prevalence (N. K. Martin et al., 2013).

Strength and weaknesses of implementation of initiatives

NSPs were implemented early in the HIV epidemic, with bipartisan political support (Victorian Department of Human Services, 2010), which helped contain HIV infections among PWID in Australia. This implementation was rapid and has been successful, and Australia has maintained very low levels of HIV (Memedovic et al., 2017) due to this rapid investment in NSPs since the 1980's (Sendziuk, 2007). Key affected populations mobilised quickly, formed drug user organisations and pushed for involvement in government discussions around the national response and the creation of national and state strategies (Bowtell, 2005). This involvement has been critical to forming an appropriate response to reducing HIV transmission.

Conversely, despite the prompt implementation of NSPs in the 1980's due to HIV, prevalence of HCV infection was already high within Australian PWID (Memedovic et al., 2017). Today, this prevalence remains high amongst PWID. However, incidence is falling and prevalence is expected to decline dramatically with the widespread implementation of new antiviral treatments (Aitken et al., 2016). HCV prevalence is high among Australian prisoners (Reekie et al., 2014), where NSPs have not yet been introduced.

Gaps and challenges occur in accessibility and flexibility in the process of implementation of NSPs and OST in Australia. Despite a clear overarching National Drug Strategy there is at times a lack of public support and understanding around harm reduction services. Further, challenges emerge from stigma and discrimination directed towards PWID from a range of sources (including health professionals), local neighbourhood resistance (Rabar, 2014), and concern for safe disposal of injecting equipment (Dolan, MacDonald, Silins, & Topp, 2005). These limitations are dependent on the model, location and surrounding environment of the NSP service. Despite varying opening hours of fixed site services, and the implementation of mobile outreach, mailing services and vending machines, PWID often still report difficulty in accessing services (McCormack, Aitken, Burns, Cogger, & Dietze, 2016).

Relative cost and effectiveness

The evaluation of the Australian NSP service, published in what is commonly termed the Return on Investment Report (Coutinho, 1998) indicates that for every dollar invested in NSPs, more than four dollars were returned in healthcare cost-savings in just the short term (Coutinho, 1998). NSPs were estimated to have directly averted 32,050 new cases of HIV and 96,667 new HCV infections, between 2000 and 2009 alone (Bryant et al., 2010). Furthermore, modelling a further scale-up of harm reduction interventions (both NSP and OST) show that HCV prevalence could be reduced by

a third (Turner et al., 2011). The implementation of NSP has resulted in large numbers of HCV infections averted, and modelling of the scaling-up of harm reduction initiatives projects a clear cost-benefit in reduction of future healthcare costs (Scott, McBryde, Thompson, Doyle, & Hellard, 2017).

HIV prevention among MSM

Alongside the success of the national NSP program in preventing an HIV outbreak among PWID, Australia's HIV prevention response is recognised internationally in the context of the strong gay community response and the partnership approach forged between community, government, research and clinical sectors. The galvanisation of the gay community in response to HIV was the primary impetus behind the establishment of state-based peak community organisations. This further enabled a political environment in which key affected populations successfully encouraged governments to involve them in the national response (Bowtell, 2005), highlighting the importance of peer involvement in HIV strategies. Collective community activism on gay rights also led to governments recognising basic human rights and overturning legislation that discriminated on the grounds of sexual orientation and HIV-status and criminalised gay sex (Bowtell, 2005). These early successes played a crucial role in supporting stigma reduction as a key HIV prevention tool in key populations. HIV and gay community organisations also played a pivotal role in developing Australia's first national HIV strategy in 1989 (one of the first countries to do so) and have been pivotal in informing subsequent national and state strategies that have guiding responses to HIV prevention in Australia.

Structural interventions reducing HIV transmission in MSM and their intersection with strong grassroots networks and gay community mobilisation have been highlighted in successive national and state strategies on HIV (Bowtell, 2005). Key policies involved in the government response to this mobilisation have included timely, peer-based and direct education campaigns targeting high-risk groups including MSM, general advocacy of the need to adopt safer sexual practices and condom use, and ensuring availability of condoms (Bowtell, 2005). An environment was produced in which people could access HIV treatment at an affordable price. Working together with community groups, governments provided direct, imaginative and explicit targeted education campaigns towards high-risk groups (Bowtell, 2005).

Early in the HIV epidemic in Australia, which was characterised by very high rates of sexual transmission of HIV among MSM, prevention of sexual transmission relied almost exclusively on condoms. This prevention emphasis continued for much of ensuing decades. The highly visible impact of HIV as an incurable sexually transmitted infection that almost inevitably resulted in mortality within the gay community resulted in a rapid normalisation of condom use among MSM. While the highly successful (and controversial) "Grim Reaper" campaign in the 1980's raised the prominence of HIV in the general community (and arguably contributed to the limiting of HIV transmission on the general heterosexual community) (C. Newman & Persson, 2009), it was the promotion of condoms and lube and HIV testing targeted towards the gay community that formed the focus of HIV prevention through much of the first two decades of the epidemic.

More recently, non-condom-based HIV risk reduction practices have emerged. These were largely community driven, such as sero-sorting (seeking HIV seroconcordant sex partners) and strategic positioning (reducing HIV infection risk by being the insertive sex partner). These strategies rely on knowing one's correct HIV status, alongside the modification of risk practices following a HIV diagnosis (Fox et al., 2009), and so contributed to the increasing prominence of HIV testing in reducing HIV transmissions at a population-level.

Treatments that were effective in suppressing the HIV virus revolutionised treatment in the mid-1990s, as the disease transitioned from one associated with high rates of mortality into one considered a long-term manageable condition (Altice & Friedland, 1998; Palella et al., 1998). The success of these treatments has more recently seen the emergence of the notion of HIV treatment as a prevention method (TasP). TasP has been widely promoted since strong evidence emerged in 2011 that HIV viral suppression virtually eliminated HIV transmission risk in sero-discordant couples (Cohen et al., 2011). TasP has again resulted in a renewed emphasis on early detection through frequent testing and accelerating people diagnosed on to treatment (Department of Health, 2014). The HIV cascade – the proportion of people living with HIV who are diagnosed, the proportion diagnosed who are on treatment and the proportion who are on treatment who are virally suppressed – now form key prevention targets in Australia and globally (Department of Health, 2014; UNAIDS, 2014). More recently, Pre-Exposure Prophylaxis (PrEP), the use of HIV treatment drugs by HIV negative people at high risk of infection, has expanded considerably in Australia through large state-based demonstration projects that have targeted high-risk gay and bisexual men.

Relative success and strength of the initiative and available evidence

As with many multi-faceted public health strategies, it is difficult to attribute success to specific elements of the multi-pronged response. The overall success of Australia's response to HIV is exhibited in the very low rates of new HIV infection relative to comparable countries such as the USA and some Western European countries (Bowtell, 2005). While behavioural surveys point to a decline in the use of condoms over the past decade, condom use may no longer be central to HIV prevention in the era of TasP and PrEP and recent data from the HIV care cascade shows declines in undiagnosed HIV and increases in the proportion of people living with HIV who are on treatment and virally suppressed; HIV cascade indicators show that Australia is doing as well as anywhere in the world on these metrics and has met global cascade targets (Department of Health, 2014). The rapid scale-up of PrEP to high-risk gay and bisexual men in Australia through large demonstration projects has also emphasised the strong local partnerships that exist between community, research, clinical and government sectors that has been the hallmark of Australia's HIV response (Holt, 2017).

Strengths and weaknesses of implementation of initiatives

A key strength of the HIV prevention response among MSM is the combination of a strong community and largely bipartisan government approach to HIV that was established early in the epidemic (Victorian Department of Human Services, 2010). Successive national and jurisdictional governments have worked with peers, community and civil society organisations, researchers and clinicians to develop policies and responses founded on sound health promotion, education, community engagement, treatment, and research principles (Bowtell, 2005). The HIV care response was founded on the strong platform provided by Australia's universal health system and governments were quick to publically subsidise the provision of HIV anti-retroviral treatments. More recently, community, research and clinical advocacy has led to jurisdictional governments supporting the scale-up of PrEP in advance of impending Commonwealth subsidy of generic PrEP.

The increases in HIV among MSM seen since 1999 (Kirby Institute, 2016), underscore a potential weakness in Australia's HIV prevention response. While the drivers of this increase are complex, declines in condom use among gay men in Australia have been observed and potential HIV complacency stemming from significant improvements in HIV therapies has been noted. A decline in the median age of HIV notifications has also been observed, which has been attributed to HIV being perceived as easily managed with effective treatments and younger gay men being less gay

community attached and with more limited exposure to targeted health promotion messages (El-Hayek et al., 2010).

Relative cost and effectiveness

There have been no formal cost-effectiveness analyses on investment in specific HIV prevention strategies targeting MSM in Australia.

HIV and STI prevention among sex workers

Australian CSWs generally have very low rates of HIV and other STI compared to the broader sexually-active population and CSW populations in other countries. Vulnerability to HIV and STI transmission is, however, distinguished by whether a CSW works in the regulated versus unregulated sex industry and influenced by the type of sex work and the locations that sex work occurs. Compared with CSW that work in brothels, as escorts or work privately (e.g., online-based), street-based sex workers comprise the most vulnerable part of the sex industry (Donovan et al., 2010; Harcourt, Egger, & Donovan, 2005). Street-based sex work is criminalised and because of the physical environment in which street-based sex work occurs, these CSW are more susceptible to violence and sexual assault (Crofts & Summerfield, 2007; Rowe, 2011). Dependent drug use is also over-represented in street-based CSW and the financial burden of drug use can influence the ability for CSWs to negotiate safe sex (Rowe, 2011).

Legislative responses to sex work in Australia is the responsibility of states and territories. There are three legislative frameworks that exist in Australia: decriminalisation, licensing and registration, and criminalisation (Crofts & Summerfield, 2007; Inner South Community Health Service, 2009). Decriminalisation and regulation of sex work were largely a pragmatic decision designed to limit the public health and individual health impact of HIV and other STIs and enhance the safety and rights of CSW. It is generally accepted that criminalisation of sex work results in greater risk and vulnerabilities for CSW. Decriminalisation of sex work removes criminal sanctions and enables regulation through means such as workplace occupational health and safety and public health practices (Morton et al., 2002). Brothels under a decriminalised framework become subject to planning laws that are administered by local governments. The licensing and registration model involves the removal of criminal sanctions but imposes licensing restrictions or registration requirements, whereby establishments or individuals apply for and secure a license to operate. A range of additional stipulations can be attached to the licence, such as the requirements for CSW to undergo regular sexual health examinations and provide proof of such in order to work in licensed premises. A licensing and registration model is the most common legislative approach to sex work in Australia (Harcourt et al., 2005; Morton et al., 2002).

Relative success and strength of the initiative and available evidence

Strategies associated with decriminalisation and licensing and regulation of sex work have been highly successful in limiting HIV and other STIs among CSW. Prevalence of HIV is estimated at <0.1%, which includes prevalent cases attributed to injecting drug use (Kirby Institute, 2011). A review of patient records at the Melbourne Sexual Health Centre found that sex workers were 10 times less likely than non-sex workers to test positive for an STI (Fairley & Fehler, 2008). There is also evidence to suggest a steady decline in STI among sex workers and their clients over time, which has been acknowledged to be a result of the consistent use of condoms by sex workers (Donovan et al., 2010; Harcourt, 1994; Vajdic, Middleton, Bowden, Fairley, & Kaldor, 2005). Early in the HIV epidemic, general awareness campaigns that curtailed heterosexual transmission of HIV (Bowtell, 2005) also had a significant impact on limiting HIV transmission to the sex worker community.

The strength of the evidence of the effectiveness of regulatory and harm reduction initiatives for sex workers is however, largely limited to data relating to sex workers working in regulated parts of industry. While the prevalence of HIV among street-based sex workers and those working in unlicensed brothels is limited, the relatively small number of locally acquired heterosexual HIV notifications in most Australian jurisdictions, alongside public health contact tracing surveillance activities, means that HIV in the unregulated sex industry in Australia is also likely to be low.

Strengths and weaknesses of implementation of initiatives

The key strength of the implementation of harm reduction initiatives for CSW is the decriminalisation and regulation of the sex work industry. Prevalence of HIV and STIs among CSW is very low, and HIV transmission has virtually been eliminated. Other key strengths include the community mobilisation of sex worker advocacy groups and provision of condoms and lubricant to sex workers through local community and health organisations.

Relative cost and effectiveness

There have been no formal cost-effectiveness analyses on investment in specific HIV prevention strategies among CSW in Australia.

Analogues relevant to gambling harm reduction and factors that may influence their successful implementation

Regulation and policy

The regulatory framework for gambling provides opportunities for intervention and control unavailable in relation to illegal behaviours such as illicit drug use or street-based sex work. However, in the case of regulated CSW there are clear analogues in the sense that gambling and CSW are regulated by state, rather than federal, governments. However, there is inconsistency across states ranging from continued criminalisation of sex work through to decriminalisation and full legalisation such as in Victoria. However, even in the states where it is legal, revenue generated through regulation of the sex work industry is very small compared to gambling. The provision of NSP is similarly linked to state policy, albeit with smaller variations mostly concerned with the types of services available (including peer-to-peer supply). In contrast, the provision of HIV treatment drugs is largely a federal issue given that these drugs are subsidised under the Pharmaceutical Benefits Scheme. Other initiatives such as condom distribution fall under the remit of state governments.

Despite state-level variations in policy and strategy in relation to PWID and MSM, there is strong national strategy, typically underpinned by bipartisan support, provided through overarching National Drug, HIV and Hepatitis Strategies that are all used to underpin service provision and, in the case of HIV and Hepatitis, these are complemented by state-level strategies. In none of these strategies is there a revenue incentive for government. In contrast gambling strategy is largely under the purview of the states, although this situation has changed with the emergence of online gambling and the National Gambling Reform Act (2012) that emerged as a result of community advocacy around gambling machines.

Community and individual context

The similarities of the risk environment related to BBV to prevention and gambling harm reduction vary according to the affected populations we have considered. Widespread adoption of 'harm reduction' practice has been accompanied by widespread support for these initiatives in the broader community, including NSP (Australian Institute of Health And Welfare, 2014). This support

reflects widespread community advocacy by service providers, researchers and the affected communities themselves; the involvement of peers in informing government responses and awareness campaigns has been instrumental in the implementation of these initiatives (Bowtell, 2005). The end result of this is a range of community and public health interventions to encourage PWID, MSM and CSW to access services and support, treatment and testing.

PWID, MSM and CSW who access BBV prevention services implicitly acknowledge that they are partaking in behaviours that carry BBV transmission risk. As a public-health oriented approach, the above harm reduction initiatives in this context acknowledge these risky behaviours, minimise any judgement of people accessing services, and simply focus on providing opportunity to minimise these risks (Carvell & Hart, 1990). These practices also provide potential referral into an array of relevant health services such as drug treatment and BBV testing (Kidorf & King, 2008). Current gambling harm reduction initiatives, such as pre-commitment and self-exclusion programs, are analogous in that they require gamblers to acknowledge that they are at risk. However, the analogy with NSP fails as these initiatives seek to place a limit on the behaviour where NSP does not. The initiatives are most analogous to condom use by MSM and CSW. In the case of MSM we have seen condom use decline with the advent of alternatives for managing HIV transmission. In the case of CSW financial incentives from clients can see some CSW fail to use condoms (Rowe, 2011). However, in the case of gambling initiatives considered above, many gamblers may not perceive that they are at risk of harm and so fail to take advantage of the interventions on offer. To support this, a model of peer or worker outreach could also be considered. As is the case with peers and health workers entering environments where injecting drug use or unsafe sexual practices may be likely to occur and using this as an opportunity to provide referral or support services, gambling venue staff are likely to see first-hand evidence of gambling problems occurring, which may provide an opportunity to intervene (Livingstone et al., 2014).

New technologies

New technologies such as mobile phones are changing the face of gambling behaviour and present as a new tool for engagement not only for the gambling industry but also present an avenue for health promotion (Gold et al., 2011). Health promotion messaging can be provided within mobile phone-based apps such as Grindr (a dating site for MSM) and online browsing systems with promotion of overall safe sex messaging or specific sexual health clinics having been undertaken on a fee-for-service basis. This type of messaging is analogous to responsible gaming messages disseminated in the advertising of gambling providers in that consumers are soon to engage in potentially risky behaviours. Advertising in-app opens an opportunity to directly and immediately engage with consumers with harm reduction messaging or promotion of referral and support services. Nevertheless, to our knowledge, the effectiveness of these strategies in reducing risk is largely unknown. Moreover, like gambling apps, dating sites enable new ways of engagement in the risk behaviour the messages seek to mitigate.

Obstacles, impediments and any factors that might be helpful in implementing the initiatives described, or aspects of these

Jurisdictional variations

Major obstacles to implementation of initiatives include poor coordination across jurisdictions meaning that not all services described above are available in all states and territories. For example, in the case of NSP, inconsistent regulation means that peer-to-peer distribution of sterile injecting equipment is legal in the ACT yet illegal in most other parts of the country. Similarly, syringe vending machines have only recently been installed in select locations in Victoria despite

their long-standing, and increasingly widespread, availability in New South Wales. Simply carrying used injecting equipment is an offence in certain circumstances and carrying either sterile or used syringes is an offence on public transport in Western Australia. These variations in service model exist despite clear overarching support for NSP articulated across a range of national policy documents. Similar variations exist in the provision of OST across Australia.

Stigma and discrimination

Stigma and discrimination directed towards the affected communities we have considered is also a major impediment to effective service delivery. While there has been a major shift in terms of community attitudes over time towards MSM, some stigma and discrimination towards MSM nonetheless persists and stigma and discrimination remain as constant themes in the lives of PWID and CSW. Stigma and discrimination impact service delivery and access for PWID and CSW and they have been one major driver of the establishment of specific health services for these populations such as specific primary care services. Further, policymakers' fear of wider community backlash has been a major impediment to progressive policy implementation for services including syringe vending machines or safe sex work zones in Victoria.

Funding models

Funding of some BBV health promotion activities remains problematic. Despite clear evidence of the effectiveness of NSP and OST, these services remain underfunded, meaning significant cost to a large proportion of OST consumers and user-pays systems for NSP in many circumstances (Ritter, McLeod, & Shanahan, 2013). These funding shortfalls occur despite significant public investment in drug-related initiatives, but the vast bulk of this investment is directed towards law enforcement activities that can be counter-productive to BBV transmission (Ritter & Stooze, 2016).

Political support

One major driver of successful BBV prevention has been bipartisan support for strategies and policies, specifically articulated as harm minimisation in the area of PWID, but as broader public health in relation to MSM and CSW. Since the late 1990s, however, bipartisan support has diminished in the area of injecting drug use, with support for new initiatives variable within and across both major parties. Nevertheless, established programs do not appear threatened by this shift away from bipartisanship.

Any concluding issues that may relate to transferability of the initiatives described to gambling issues

Most of the initiatives mentioned in this section are not directly relevant to gambling issues. Some of the most successful elements of the responses derive from the public health emergency and community panic brought about by the start of the HIV epidemic in Australia. This epidemic was accompanied by a mix of pragmatic strategies that all worked to minimise the impact of HIV, particularly in the case of PWID. Indeed, it is possible that the HIV epidemic set the grounding for the cultural shifts seen in relation to all of the key populations considered. Further, community mobilisation, made possible by HIV prevention related organisations (be they peer or service driven) a bipartisan political support underpin the major strategies that emerged since that time. However, in none of the instances we have considered has governments of any sort had a vested interest in the revenues associated with the activities involved. In this way, the initiatives considered have a fundamentally different framing to gambling harm reduction.

Opportunities and relevant issues

Stigma reduction

The advent of the HIV pandemic led to early engagement with high-risk groups – MSM, PWID and CSW. At the time of early engagement, all these groups were highly stigmatised, and in some cases involved illegal activities. However, the pragmatic public health response to the pandemic required, of necessity, engagement with these highly stigmatised groups in order to design and implement effective harm prevention and reduction strategies. It is highly likely that this engagement led to the decriminalisation of CSW, less punitive approaches to illicit drug users, and much broader understanding and acceptance of non-heterosexual people. People who experience harm from gambling are also highly stigmatised and accordingly less likely to acknowledge their situation and seek support and assistance. Stigma reduction activities are a key intervention to encourage help seeking and allow people harmed by gambling to better understand that the harm they experience is neither unique nor insurmountable. Indeed, greater awareness of the potential harms of gambling can arguably be better transmitted by peers, and/or with their input into messaging, than by other means.

Community engagement

A corollary of the de-stigmatising process referred to above required engaging with high-risk communities. This was necessary to develop resonant materials for education and awareness programs aimed to risk identification and harm prevention or minimisation. The benefit of this approach is that specific community members can become highly engaged with developing approaches that will more likely engage the attention of affected individuals and assist in transmitting important information and messages. With some exceptions, engagement with the affected community has not been achieved in gambling harm prevention or minimisation. It is highly likely that messages and strategies crafted with this input will be more effective and help at-risk people to identify the risks they face and implement strategies to prevent or reduce these.

Co-operation between researchers, agencies and community

The extent of co-operation in pursuit of harm prevention and minimisation in the BBV sector has been considerable. There is no real equivalent of this in the gambling sector. In BBV, this arose from a shared concern at the need to act expeditiously and co-operatively to forestall the rapid spread of HIV/AIDS, and the public health consequences of this. This sense of urgency has been lacking in the gambling sector, despite steadily increasing evidence of the harms associated with gambling. Engagement with affected communities for messaging and strategic purposes could be expanded to broader engagement between agencies (such as VRGF), affected members of the community, and the research community, to support advocacy to government for implementation of harm prevention and reduction strategies.

National policy strategy

Gambling policy remains pre-eminently a state matter. There are some exceptions to this, but each state adopts distinct technical and other standards for gambling regulation and approaches research and service provision distinctly. Development of a national strategy would assist in avoiding the 'race to the bottom', which has arguably characterised aspects of gambling policy in Australia (note the minimal regulation and very low rates of tax imposed by the NT government on online wagering providers). Uniform best practice regulation would assist in pursuit of good standards of harm prevention and minimisation, as compared to current practice where the reform

efforts of some states are undermined by the influence of powerful gambling actors operating elsewhere, providing an example adopted by other operators.

Peer outreach – education – harm reduction activity

Engagement with community and people affected by gambling harms would also assist in identifying and recruiting individuals with lived experience, who form a highly valuable resource for informing others of the potential risks and harms and gambling. Such people are also highly credible advisors on harm reduction activities. Some efforts in this area have been pursued but these programs could be expanded to provide peer-to-peer support, education, and advice on how to reduce risks and prevent or minimise harm.

Technological interventions via smartphones and other platforms

There is evidence to support the likely efficacy of some technological innovations for both EGMs and online wagering. In addition to pre-commitment and interactive messaging, other technological innovations (for example, real time contact with peers or counsellors) could be developed and implemented. Regular harm minimisation messaging or reminders could be adjuncts to pre-commitment.

Bi-partisan political support

At present, political leadership appears unaware of the full extent and nature of gambling harms. The HIV experience demonstrates the importance of achieving bi-partisanship in tackling public health issues. There is considerable work to be done to achieve this in the gambling sector. However, it would be an invaluable achievement to engage politicians' attention on a bi-partisan basis, with a view to pursuing effective harm prevention and minimisation initiatives.

Conclusions and recommendations

RQ3. What other areas of public health activity can tell us about preventing and minimising gambling harm?

This section draws together significant themes and opportunities identified via the preceding RQ1 and RQ2 sections. These themes are used to develop specific recommendations for action around harm prevention and minimisation policy and interventions. This includes, for the sake of completeness, some areas where actions recommended are underway in some form, but might be intensified or modified. It also identifies some cases where targeted research may be of assistance in developing more effective policy or interventions.

Structural characteristics of gambling products

Modification of technical requirements for EGM and other gambling structural characteristics was identified in RQ1 as likely to be an effective upstream measure, capable of providing a range of opportunities for the prevention and reduction of gambling harm. This is also supported by evidence from RQ2, for alcohol, where modification of the product (e.g., substituting beer for spirits or reducing the standard size of drinks) has been associated with reduced consumption and improvements in health. There is also evidence from the obesity/physical activity sector that product reformulation may be effective. Indeed, the success of OST (although undertaken in a recovery phase) indicates that substitution of less harmful forms of an addictive product is an important element in harm reduction.

There is considerable scope for EGM product modification. Better technical understanding would support this, and regulators and researchers concerned with preventing or minimising harm require better access to technical and other data, to allow significant improvements in the capacity of regulation to produce less harmful products. This would represent a major step in adopting a 'harm reduction' paradigm.

Key amongst these are modifications to reduce the very high reinforcement rates achievable on contemporary EGMs, via losses disguised as wins, uneven and starved reel configurations which permit regular appearance of 'near misses', and ubiquitous 'bonus rounds', also known as 'features'. The available evidence indicates that reduction of high reinforcement rates is likely to be effective in reducing the harmful potential of all gambling modes, including online wagering. Other structural characteristics where modification is supported by available evidence include stake reduction, modification or abolition of jackpots (as distinct from major prizes inherent to game maths), and better representation of the price of use (rather than the current provision of limited information on RTP or odds). Analogous interventions can be conceived (e.g., restricting spot betting) and have been partly implemented for online wagering (e.g., limiting or prohibiting in-play betting via mobile platforms).

Interventions and policy opportunities

There is substantial evidence to support modification of gambling products, using aspects of their structural characteristics as tools for this purpose.

The following interventions are recommended for EGM operation, could be phased in over a reasonable time period, and can be achieved via amendment to the National EGM Standards:

1. Abolition of congratulatory or other sounds accompanying a 'loss disguised as a win' – i.e., any game outcome where the result is an amount less than the amount wagered.*#
2. Further reduction in the maximum bet limit, ideally to one dollar per bet.*
3. Abolition of jackpots, particularly jackpots linked across sites.#
4. Abolition of 'game features', or 'bonus rounds'.
5. Requiring all virtual reels of a game to have an equivalent number of symbols in total.
6. Requiring as even as possible a distribution of winning symbols across all reels of a game.
7. Provision of accurate information about game characteristics via an unavoidable, clearly presented information screen. This should include the odds of winning the major prize, number of symbols on each reel, and number of winning symbols on each reel.*#
8. Provision of accurate average price information to game users, preferably via unavoidable information screens detailing average price of operation (e.g., 'on average this game is programmed to cost you 12.5% of your stake on each bet' or 'if you bet two dollars per spin this game will cost an average of 25 cents per spin') and median time on device for a given stake (e.g., 'half of the users of this game will spend a \$50 stake in six minutes or less betting two dollars per spin').*#

The following interventions are recommended for on-line wagering operations:

9. Continued restriction of in-play betting on mobile devices.*#
10. Abolition of spot bets.*#
11. Provision of accurate information via unavoidable information screens describing the operator's take out for each market offered to or selected by the user (e.g., 'the operator has factored in a profit margin of 16% when constructing markets for horse racing').*#

Pre-commitment and self-exclusion

Pre-commitment systems appear to offer considerable potential for harm prevention and minimisation of adopted in universal and binding forms. The evidence for voluntary pre-commitment, although arguably more extensive, strongly indicates a lack of perceptible effect. In part, this appears to be associated with the stigma occasioned by enrolment in a program perceived to be for people who need help to manage their gambling. Universal pre-commitment would address this issue. There is some developmental work at present related to a Smartphone based alcohol pre-commitment app, which periodically reminds users of their intentions during drinking episodes. This is partly analogous to pre-commitment, and partly related to concepts such as periodic, personalised pop-up messaging reminders.

In combination with harm detection algorithms, also linked to pop-up or more detailed messages or interventions, pre-commitment could be a highly valuable approach to the prevention of harm, its early detection, and effective referral of affected individuals to appropriate support. Technical

issues are not an impediment to such a system (particularly in Victoria, where a voluntary EGM pre-commitment system has been activated). The Australian Government, in partnership with Australian state governments, has also announced a proposal for a universal 'opt-out' pre-commitment system for on-line wagering, which could also be expanded to provide a universal system across providers.

A universal pre-commitment system would also make effective self-exclusion possible, by providing a platform for enforcement and effectiveness.

Interventions and policy opportunities

Pre-commitment systems are now or will soon be available for both EGM and online wagering systems. These are an important tool for all gamblers to manage expenditure and time. The following recommendations relate to pre-commitment and its application to self-exclusion:

12. Pre-commitment systems operating as 'voluntary' or 'opt-out' systems should be required to be adapted for universal use from a specific date. Universal use of pre-commitment means that every person who wishes to use EGMs or wagering services should be required to establish an account for that purpose, with a secure identity check required, and nominate at least a weekly limit for expenditure across the system. Daily, weekly and monthly limits should be available for selection, and users should also be able to nominate daily, weekly and monthly time limits.*
13. Loyalty programs should not be used for pre-commitment purposes. Pre-commitment systems should be operated by the provider of the monitoring system for EGMs, and data generated (including limits set) must not be used for commercial marketing purposes.*#
14. Data generated by pre-commitment systems should be routinely provided in a de-identified unit record form to researchers, and regularly published via the internet in a summary form for interested members of the public.*
15. Pre-commitment systems operated by online wagering providers should require users to nominate spending, deposit, and time limits that apply to all providers with whom users have accounts, including any accounts established by users with additional providers. Eventually, all gambling products should be registered to an individual, with limits applying across all products.*
16. Pre-commitment limits should be initially established via an easily accessible online system. Once established, limits should not be increased other than at set intervals (e.g., monthly or quarterly). Reduction of limits should be possible at any time, including via use of an 'instant exclusion button' to stop gambling for a specified period (e.g., 24 hours or seven days).*
17. Consideration should be given to establishment of a statutory maximum limit for bets and wagers, and deposit limits.
18. Users wishing to self-exclude from gambling should be required to either terminate their pre-commitment account or set a spending and time limit of zero.*
19. Self-excluded users should be required to demonstrate that they have taken appropriate steps to address gambling harms before being able to reinstate their account.

20. Users wishing to self-exclude for a short period (e.g., seven days) should be able to do so via an easily accessible 'instant exclusion button', activation of which means they will be locked out of the system for the relevant time period.
21. Users currently using limits provided by, or self-excluded using non-universal systems should be automatically transferred to an account with equivalent limits on the universal system.

Interactive and 'pop-up' messaging

There is some evidence to suggest that 'pop-up' messages, driven by monitoring algorithms, may provide benefits for some gamblers. The evidence suggests that personalised messages (relating to expenditure, time or both) are likely to be more effective than impersonal messages promoting 'responsible gambling'. This intervention could be tailored to both EGMs and online wagering. Again, this is similar to some interventions using Smartphone apps to message users, reminding them of their commitment to restrain their drinking. The advantage of this approach to EGMs and online wagering is that exact 'trigger points' for such messages could be determined.

There is good theoretical support for this approach, drawing on the alcohol literature. Interventions will be effective when designed to counter the valence of the 'operating system' – that is, the collection of feelings that generally guides human activities. This means they need to provide effective information to support the 'executive system', that element of the affective system that pursues more rational decisions and actions. Pre-commitment systems are an example of this, and so are interventions that occur at the point where affect is driven by the operating system; for example, when a specific pattern of harmful behaviour occurs. Effective pop-up messaging triggered by a specific pattern or patterns of use is an example. Such interventions require monitoring and feedback of activity, and rely on algorithms that identify harm. This is already technically feasible.

Interventions and policy opportunities

Interactive messaging has the potential to provide useful information to gamblers, and assist in preventing or minimising harm. The following recommendations relate to use of such messaging:

22. Interactive messages should be deployed regularly within gambling sessions to provide accurate information about expenditure and time spent within gambling sessions. This information should be provided on an established schedule (e.g., at intervals of 20 minutes) and whenever 'trigger events' are identified (e.g., when a proportion of a predetermined limit has been achieved – 25%, 50%, 75%, 90%).
23. 'Generic' messages should be avoided on pop-up messaging systems, in favour of information related to user behaviour. This can be facilitated by linking messaging to pre-commitment data.
24. When displayed on EGM screens, pop-up messages should be located centrally on the screen, with no competing messaging or game activity displayed concurrently. Messages should be provided in an easily read text. Consideration should be given to developing language options for registration via pre-commitment systems to allow messages to be provided in a language preferred by the user.*
25. When displayed via mobile or online devices, pop-up messages should be displayed prominently on the screen, with no competing messaging or wagering activity displayed

concurrently. Messages should be provided in an easily read text. Consideration should be given to developing language options for registration via pre-commitment systems to allow messages to be provided in a language preferred by the user.*#

26. Support systems including counselling and advice on limit setting and risks associated with gambling activities should be marketed via pop-up messages regularly or under certain conditions (such as reaching a limit, or when gambling is undertaken on multiple successive days or at certain times of day or night).*#

Accessibility and exposure

There is good evidence about the relationship between accessibility of EGMs, socio-economic disadvantage, expenditure and harm. This is also strongly supported by the alcohol literature. There is some international evidence (from Norway) demonstrating that large scale reduction of EGMs reduces both expenditure and harm. Australian studies have involved only modest reductions or redistributions of EGMs. The face validity of the efficacy of EGM reductions is high. In Victoria, current average venue size is 53 EGMs per venue. A reduction of 25% in average venue size (measured by EGMs) would result in an average venue size of 40 EGMs. VCGLR data (VCGLR 2017) indicates that average NGR per EGM in club venues with more than 40 EGMs is \$73,659 p.a. per EGM. Average NGR per EGM in club venues with 40 EGMs or less is \$53,283, or 38.2% less. In hotels with more than 40 EGMs, average NGR per EGM is \$130,919. In venues with 40 EGMs or less, average NGR per EGM is \$90,066, a reduction of 45.4%. A relatively modest reduction in venue size could plausibly be associated with significantly less gambling intensity.

Accessibility also relates to operating hours, venue size and age restrictions. The alcohol literature supports reductions in hours of accessibility as leading to reduced harms such as violence, injury and attendance at A&E departments. This could readily be applied to gambling environments, including online environments, where recent UK evidence (GambleAware, 2017) suggests that people experiencing harm from gambling are much more likely to gamble late at night and into the early morning.

There is also good evidence that venue size (i.e., the number of EGMs located within a venue) predicts expenditure and harm. Interventions reducing the size of venues, redistributing or limiting access to EGMs and/or online wagering (via 'capping' for terrestrial gambling forms and/or restrictions in hours of operation) are indicated.

Interventions and policy opportunities

Accessibility issues are strongly linked to the development of harmful gambling, and to other important issues around public health, including rates of intimate partner violence. The approval process for EGM venues in Victoria has created a market with EGMs and venues concentrated in areas of socio-economic stress. Recent policy decisions by the Victorian government relating to regional caps acknowledge this and address it to some degree. However, clear guidelines for the 'no net detriment' test, and a more active process by the regulator in considering harms to communities are required to ensure that regressive concentration of EGM venues and EGMs is halted and reversed.

Online and mobile wagering, via its nature, is potentially ubiquitous. There is evidence that users betting at certain times of the day are highly likely to experience significant levels of harm.

Recommendations related to relevant issues are:

27. EGM venue size should be reduced over a period of time to reduce the gambling intensity of large venues. Reductions should focus on larger venues (e.g., those with more than 49 EGMs) and those with high average EGM expenditure, and be expected to achieve a reduction in average venue size from 53 EGMs (in July 2017) to 40 EGMs in 2023. This would represent an average reduction of 25% in EGM numbers, to a total of no more than 19,900.*
28. Government should provide VCGLR with clear direction as to the requirements of the 'no net detriment' test, including requiring that: applicants present an evidenced-based plan for addressing harm at their venue; VCGLR monitor actual EGM expenditure and charitable donations at venues to assess the accuracy of estimates of additional expenditure and undertakings to provide charitable contributions; and VCGLR take account of and provide significant weight to data or research relating to IPV and other gambling harms. Where expenditure estimates or undertakings are not met, licence conditions should require new or additional EGM entitlements to be forfeited.#
29. Operating hours of EGM venues should be reduced to (for example) not more than 14 hours per day, and venues should be closed for EGM operations between (for example) 2:00 am and 10:00 am every day. The basis of such operating hours requires further research, although restriction of operating hours is an established harm minimisation measure in gambling regulation.
30. Online wagering systems should not be permitted to operate for 24 hours a day. Restrictions on hours of operation in Australian jurisdictions should require that no wagers be permitted after (for example) 2:00 am or before 10:00 am local time on any day. The basis of such operating hours requires further research, although restriction of operating hours is an established harm minimisation measure in gambling regulation.
31. Users seeking to establish an online or mobile wagering account should be required to provide adequate identification and establish pre-commitment limits prior to placing any wagers.*

In-venue or real-time identification of 'problem gamblers'

Available evidence demonstrates that identification of users experiencing significant harm from gambling is feasible. However, there is no evidence that such practices are implemented (the evidence suggests the opposite) and no evidence of efficacy (i.e., that such interventions have any harm prevention or minimisation effects, or indeed any outcomes). Observation of such behaviours is, in any event, most likely to occur at a point where individuals will have experienced significant harm. It is at best a harm minimisation activity, and not a harm prevention intervention.

Overall, however, the consumption environment can be seen as a vehicle to introduce interventions to reduce or prevent harm. This is currently implemented by 'responsible service of alcohol', and 'responsible gambling' polices. In alcohol, these are arguably more honoured in the breach than in the observance; the same is arguably true of the gambling environment (see Rintoul et al., 2017). In the alcohol sector, enforcement of the policy tends to be around the avoidance of 'trouble', not prevention or reduction of disease. In-venue consumption accounts for only about 20% of Australian alcohol, consumption, but a greater proportion of Australian gambling consumption – at least 60% or more by revenue share. Gambling environments of greater intensity

(i.e., larger venues with more EGMs, for example) produce higher rates of revenue per machine, and are associated with greater levels of harm.

Extensive training and substantial support is required for those working in gambling environments to be capable and confident of undertaking such interventions. At present, there is no evidence that this is provided. As noted above, these interventions are much more likely to be effective if automated and applied to actual user data. Online wagering is already operated on an automated account-based platform and is immediately amenable to this intervention. EGMs are networked and with the adoption of a universal pre-commitment system would be readily amenable to such an intervention.

Interventions and policy opportunities

Gambling venues and online sites provide opportunities to identify people experiencing harm, but these are presently not well utilised and tend to be achievable only at points where harms have reached a significant level. The following interventions are recommended:

32. Observation of gamblers by staff is unlikely to provide conclusive evidence of harmful behaviour unless supported by data monitoring systems and algorithms capable of identifying emerging patterns. Both terrestrial and online systems should facilitate such systems, as noted above.
33. It is feasible to identify people exhibiting signs of gambling harm in venues and online sites. Such signs are likely to be observed when people are experiencing substantial and entrenched harm. Nonetheless, interventions in such circumstances are warranted and should be required. Further, existing 'codes of conduct' for venue harm minimisation are (in some jurisdictions) voluntary, and highly subjective, and their implementation is not well enforced. Such codes should be mandatory, include objective measures to assess gambling harm (whether automated or observational) and enforceable, and venues failing to enforce any aspect of a code of conduct should be penalised by meaningful penalties, including fines and/or loss or suspension of licence, including where observation of harmful behaviour is not followed up.*#
34. Staff in venues and on online gambling sites should be trained and supported to offer assistance to people who they believe are experiencing harm. Such assistance can be implemented personally where indicated or via electronic messaging 'piggy-backing' on pre-commitment systems and harm identifying algorithms.*
35. Venue and online gambling operators must be required to implement mandated interventions when indicated via either personal observation or algorithmic identification. Such interventions should include reduction of pre-commitment limits, referral to counselling or clinical interventions, self-exclusion for a period of time or indefinitely, and activation of targeted messages in standardised form around expenditure or time spent gambling.*

Restrictions on advertising or marketing

There is little evidence of the efficacy of restricting gambling advertising, although there is evidence that advertising affects the way young people conceive of sport and appears to 'normalise' gambling as a legitimate aspect of sport. An important function of advertising (apart from attracting new users) has been identified as the 'normalisation' of behaviours, as identified from the tobacco literature. This appears also to be the case with gambling advertising.

Some restriction of advertising (e.g., for EGMs and casinos) has been adopted in Victoria and elsewhere but no evaluation of the effect of this has been identified. Some further changes to broadcast advertising of wagering services have been proposed but are yet to be implemented. Other restrictions (e.g., on the promotion of gambling via inducements, etc.) are also proposed. Again, there is no current evidence on the efficacy of these, although the face validity of such interventions is high.

There is also some face validity to the restriction of marketing and advertising activities and the impact this will have on the 'normalisation' of these activities.

The alcohol literature is divided on the effects of regulating advertising. Early exposure to advertising has been shown to reduce the age of first consumption of alcohol.

Restriction of advertising has not been associated with improvements to diet, although it has been effective in limiting the exposure of children to such promotions. Where this has been implemented by regulation (as opposed to industry self-regulation) there is evidence of greater adherence. The plausibility of such interventions is good (i.e., there is logic to support them), and restrictions intended to protect children are well supported (as appears to be the case with gambling advertising). Multiple factors affect the dietary (and other) habits of children and advertising restrictions on their own are unlikely to be efficacious.

Interventions and policy opportunities

Advertising and marketing of gambling is a matter of much community concern, particularly around marketing to children, or where children are exposed to such advertising. A number of interventions are recommended in this area:

36. Advertising of gambling should not be permitted in connection with sporting broadcasts during times when children are likely to be viewing, whether free to air, subscription or online. In practice, this may mean a prohibition on such advertising until after games have concluded.
37. Advertising or marketing of gambling products via computer or mobile applications or electronic games classified as G should be prohibited.*
38. Advertising or marketing of gambling products via social media should be prohibited.*
39. Establishment of a gambling account and associated pre-commitment limits should require formal identification and proof of age prior to implementation of the account.*
40. Sponsorship or 'branding' of children's sporting competitions by gambling operators should be prohibited.*
41. Sponsorship or branding of sporting competitions by gambling operators, including endorsements or sponsorship of players, should be phased out over a reasonable period and replaced by alternative sources of revenue.*

Stigma reduction

People directly affected by gambling harm frequently report shame and a sense of stigma. The advent of the HIV pandemic led to early engagement with high risk groups – MSM, PWID and

CSW. At the time of early engagement, all these groups were highly stigmatised, and in some cases were engaged in (then) illegal activities. Engagement with these highly stigmatised groups was necessary for public health purposes in order to design and implement effective harm prevention and minimisation strategies. This engagement led to the decriminalisation of CSW, gradual adoption of less punitive treatment of illicit drug users, and much broader understanding and acceptance of different sexualities.

People experiencing shame and stigma are less likely to acknowledge their situation and to seek support and assistance. Stigma reduction activities are a key intervention to encourage help seeking and allow people harmed by gambling to better understand that the harm they experience is neither unique nor insurmountable. Indeed, awareness of the potential harms of gambling can arguably be better transmitted by peers, and/or with their input into messaging, than by other means.

A corollary of any de-stigmatising intervention is the need to engage with high risk communities. In the HIV case it was necessary to develop effective education and risk awareness programs for harm prevention or minimisation. Engaging community members may more likely engage the attention of affected individuals and assist in transmitting important information and messages. With some exceptions, engagement with the affected community has not been widely achieved in gambling harm prevention or minimisation. Messages and strategies crafted with this input will be more effective, and help at-risk people to identify the risks they face and implement strategies to prevent or reduce these.

The longer-term consequences of an engaged and de-stigmatised community include more active engagement with political and regulatory processes. This has important consequences for supporting reform. The HIV case presents a strong example of the effectiveness of enlisting support from affected communities, leading to broad community acceptance of the necessity for reform, much more effective harm prevention and minimisation interventions, and concrete legislative reform.

Engagement with affected communities for messaging and strategic purposes could be expanded to broader engagement between agencies (such as VRGF), affected members of the community, and the research community, to support broad-based advocacy for implementation of harm prevention and reduction strategies. Successful gambling reform is likely to rely on a reasonable degree of concordance between those interested in pursuing harm prevention and minimisation. This appears to be a further clear lesson from tobacco control. Support for developing a coherent and agreed agenda for reform is likely to be a useful intervention. An iterative and reflexive approach to reform is likely to be most successful, with a focus on addressing the systems and determinants that define and frame the consumption of gambling.

Interventions and policy opportunities

People affected by gambling harm, including gamblers, their families and others are not highly visible in the broader community. However, there are substantial numbers of people in these categories. This is to a substantial degree the consequence of stigma and shame associated with experiencing gambling harm. It is highly arguable that this, in turn, is a by-product of 'problem gambler' and 'responsible gambling' messaging, which internalises the harm as a consequence of individual decisions and behaviours, rather than dealing with it as a public health issue amenable to population health methods. Further, with some recent important exceptions, the voice of affected individuals is rarely heard in the policy debate or in the design of interventions. Those affected by gambling harm have a significant role to play in developing interventions, in supporting necessary

reforms, and in assisting peers to understand the risks and develop approaches to gambling regulation and treatment that prevent or minimise harm.

42. Effective campaigns and messages to counter the stigma associated with experience of gambling harm are key to overcoming the harms of gambling. These need to be adequately resourced, and developed in association with those affected by gambling harm, with multiple objectives;*#
- a. De-stigmatisation will assist those affected by gambling harm to seek out assistance and support;
 - b. Establishing user experiences as significant and expert contributions will be crucial to the development of more effective harm prevention and minimisation initiatives and policies;
 - c. Stigma has been significantly reinforced via the individualising and frequently pathologising discourses of 'responsible gambling' and 'problem gambling'. Overcoming these will allow more rapid development of public health focused population health methods for gambling harm prevention and minimisation;
 - d. Develop strategic alliances between those affected by gambling harm, researchers, and the broader concerned community will better inform research activity, policy and intervention development, and provide more balanced and informative advice to policy and decision makers.
43. Peer expertise in developing effective messages and programs for gambling harm prevention, minimisation, and treatment has been substantially under-utilised. Provision of resources to better support such peer intervention and project development, and to implement such interventions, is likely to produce much more effective interventions.*#

Price

Price has been shown to be a key factor in reducing consumption of alcohol, and tobacco, and has been shown to have effects in modifying demand for some energy dense food products (e.g., high fructose carbonated drinks). The apparent inelasticity of demand for gambling products may be associated with the lack of price information for gambling products, especially EGMs. However, some consideration of price signals may be effective in gambling harm prevention or reduction.

Most of the costs of gambling consumption are externalised. This means that they are transferred to the consumer or their dependents, associates, and the broader society, and are not incurred by providers of the product. Increased taxation of tobacco products captured many such costs and greatly assisted in reducing consumption. Increasing taxation of more harmful products, or otherwise modifying the costs to the operator of providing specific products, is likely to be an effective tool to reduce more harmful consumption.

In the context of gambling harm prevention and reduction, 'price signals' may be best conveyed at the operator level. More harmful gambling forms can be taxed at higher rates to capture a higher proportion of externalised costs, and discourage the operation of these forms. To some extent, this already occurs, but could be better targeted. As with the early phase of tobacco control activities, additional revenue could be diverted to increased, well marketed treatment and social marketing,

and/or to population/public health focused harm prevention and minimisation activities and research.

Interventions and policy opportunities

Price is a well-established means of signalling the actual cost of products and services and it is now well acknowledged that capturing externalities has been effective in providing disincentives to consumption of harmful products. This has been established in the alcohol, tobacco and food sectors. However, the lack of price information for many gambling products is an impediment to price signalling for consumers. For example, EGMs in Victoria frequently generate net gambling revenue well in excess of 200% of average revenue, depending on location, intensity of venue operation, and marketing activities. Despite lack of price information, the price concept may be utilised to assist in reducing harmful consumption of gambling products in a number of ways:

44. The most harmful gambling products should be subject to highly progressive tax systems to discourage operators from pursuing the super-profits that such products frequently yield.
45. Current average NGR should be utilised as a benchmark in determining progressivity of the EGM tax regime, with significant increases in EGM tax rates above the average level and at increments above that level – e.g., 125%, 150%, 175% and 200%. Such a regime should not distinguish between ‘not for profit’ and commercial operators.
46. The Australian government should impose a uniform national tax regime on interactive wagering operations based on gross revenue (as recommended by the Productivity Commission 2010). The proceeds of this should be distributed amongst the states on the basis of place of consumption. States should utilise the proceeds of this for funding product fees for the racing and sports industries and for general revenue purposes.*
47. Additional revenue resulting from any progressive or expanded tax regime should be allocated to the provision of effective social marketing around gambling harm, stigma reduction, well-resourced counselling, support and recovery programs, and research funding.
48. Price information for gambling products should be provided as transparently and clearly as possible (see recommendations 8 and 11, above).*

Framing of the issue

Gambling, alcohol, tobacco, overweight and obesity and illicit drug consumption are regularly framed in the context of addiction, with the principal actor in this framing the ‘problem drinker’ or ‘alcoholic’, or the ‘problem gambler’, the obese individual, or the ‘addict’. This is a convenient framing from the point of view of those seeking to maintain or expand (licit) consumption levels. It arguably focuses attention on treatment of the aberrant individual, and is reinforced by concepts such as ‘responsible gambling’ or ‘responsible drinking’. The consequence of this is that attention and interventions are often largely focused on treatment for individuals affected. Although necessary and helpful for many, treatment does not address underlying issues with potentially harmful products, and is not preventive.

The ‘addiction’ model does, however, implicitly acknowledge the harm associated with the product, although it often does so by transferring responsibility to the user. It also positions the user as lacking agency and may be counter-productive for harm prevention and minimisation purposes, in that it presents the issue as monolithic, difficult to protect against, and to some degree inevitable.

Framing gambling and other 'addictions' as public health issues, best addressed at a population health level, is essential to effective harm prevention and minimisation. This has been amply demonstrated by the tobacco control experience. The tobacco control movement has been largely comprised of public health and population health specialists, rather than clinicians. The approach adopted by these specialists has been more focused on population level interventions, although clinical services for smoking cessation operate. This is arguably distinct from the gambling field, where, although 'public health' approaches have been articulated since at least 1999, the research and policy field has arguably been dominated by clinical and psychological understandings of 'problem gambling'. Adoption of a more consciously population/public health approach to gambling harm prevention and minimisation is well underway but framing of the issue and broad understanding of it remains largely trapped in an individualist paradigm. This can be altered but requires reframing of the issue, away from a focus on individual responsibility and towards a focus on the harms associated with gambling, and a harm prevention and minimisation agenda. This has demonstrated efficacy with BBV and tobacco control as good examples. It is also associated with stigma reduction as a priority, as identified above.

Interventions and policy opportunities

Reframing of a public health issue is an important aspect for the achievement of more effective harm prevention and minimisation policy and strategies. The effects and harms of gambling for those directly and indirectly affected have not been well presented in public discourse, with the focus generally being on concepts such as 'responsible gambling' and 'problem gambling'. There are multiple approaches to this issue including the following:

49. The discourse of 'responsible gambling' has been effective in shifting responsibility from providers of harmful products to those experiencing harm from those products. It is timely to move from the 'responsible gambling' discourse to a discourse of gambling harm prevention and minimisation.*#
50. The 'problem gambler' discourse represents an individualising and pathologising concept that should be replaced by the concept of gambling harm, and the population affected should be referred to as those harmed by gambling.*#
51. Treatment or recovery programs for those experiencing gambling harm are essential and need to be expanded to enable access for all who require it. Expanding uptake requires comprehensive action to de-stigmatize the experience of gambling harm and encourage all those affected to seek assistance and support, as noted in recommendations 42-47 (above).*#
52. Social marketing, promotional materials, and campaigns to reduce gambling harms should refrain from using terminology such as 'responsible gambling' or 'problem gambler' and avoid messages focused on individual behaviour. Messaging should focus on advice about how and where to seek assistance, accurate advice about the price and risks of gambling, and encourage the uptake of tools and techniques to monitor gambling activity and avoid, prevent or minimise harm.*#
53. Legislation regulating the provision of gambling should incorporate the prevention and minimisation of gambling harm as its principal objective.*
54. Gambling regulators should be tasked with ensuring that the prevention and minimisation of gambling harm is their prime objective, and decision makers dealing with applications for

gambling licenses and entitlements should be required to address gambling harm prevention and minimisation as their principal decision making criterion.*

55. 'Responsible gambling codes of conduct' should be (i) revised as 'Harm prevention and minimisation codes of conduct'; and (ii) be mandatory and subject to clear regulatory requirements, including specified minimum requirements, and penalties for breaches of these up to and including loss of licence or entitlements.*#
56. Mandatory warning signs and messages should be required on any marketing, promotional or advertising materials associated with gambling, and should refrain from use of such terms as 'responsible gambling' or 'problem gambler', in favour of accurate messages about the harms of gambling and the risks of experiencing those for regular gamblers, e.g.,: 'Gambling is associated with significant harms including increased risks of physical and mental health problems, separation, divorce, financial difficulties and bankruptcy, intimate partner violence and fraud' or 'up to 30% of weekly EGM users experience moderate or serious harm derived from gambling'.*#
57. The Community Benefit system operating in Victoria for club-licensed EGM operators (and its equivalents in other jurisdictions) should be comprehensively amended to provide for provision of accurate and transparent provision of information about donations and contributions. Any such contributions should be allowable only when made to (i) organisations with tax deductible status; or (ii) bona fide sporting or community organisations; or (iii) as scholarships, bursaries, or donations to bona fide educational institutions; or (iv) organisations to support returned service personnel, their families and dependents. In all cases, donations should not be permitted to organisations or persons linked to the donor or its office holders or agents. Such schemes should not permit the operating expenses, wages, or other costs of the business to be regarded as community contributions. Contributions should be allowed to reduce liability for gambling tax up to a maximum 8.33% of NGR. Contributions less than the maximum amount should reduce liability for gambling tax only by the proportion of NGR contributed.*
58. The Victorian Responsible Gambling Foundation should be renamed, for example as 'The Victorian Gambling Harm Prevention Foundation'.

Affect, place of consumption, and the social world of the gambler

The patterns of consumption for both alcohol and gambling may be susceptible to the social worlds in which consumption occurs. Few attempts have been made to influence these social worlds, although both alcohol and gambling are promoted via discourses emphasising sociality and enjoyment. These may construct a social world of drinkers or gamblers that promotes heavy consumption. Some intervention in this process may be helpful for harm prevention or minimisation purposes. There are multiple methods to pursue such interventions.

The social context of consumption of tobacco has been dramatically altered over time by restrictions on advertising and promotion, by prohibition on where and by whom the product may be purchased or consumption may occur, and by development and transmission of key messaging around the harms associated with consumption.

Gambling consumption remains contextualised as an increasingly normalised activity, and is available ubiquitously via widespread terrestrial venues and mobile technology (analogous to earlier unrestricted consumption of tobacco). Modifying the social context of gambling is possible via restrictions on advertising (and by allowing some products to be advertised, but restricting others, based on evidence of associated harms). It is also about providing information about the risks (relative or absolute) and harms of gambling that are evidence based, accurate and readily comprehensible. The preparation of such information requires some care but is readily achievable.

There is also good evidence of the efficacy of school based activities promoting healthy eating and physical activity, and some evidence of efficacy in tertiary education settings. There is also good evidence of the efficacy of interventions to the physical environment for specific purposes (e.g., bicycle paths). Translating these to gambling environments may be challenging. However, the evidence suggests that environmental changes may be important in assisting behaviour change. This may be applied to gambling environments, for example by pursuing venue and site characteristics that are known to encourage less intensity of use for harmful activities, and greater and more accessible opportunities for alternative activities.

There is evidence that point of decision prompts are effective in encouraging use of options to increase physical activity (e.g., stairs). Information provided at the equivalent point of choice for gambling decisions is currently focused on 'responsible gambling' messages rather than encouraging a particular course of action, or otherwise requires action to access (e.g., choosing to view the information screen on an EGM, or seeking out the game rules for a table game). The better analogy for EGMs or online wagering modes may be the regular provision of information about actual price (i.e., expenditure) or time on device, to encourage a conscious decision to continue or stop the activity. Simplifying both access to and content of information informing key decisions may be an important lesson from this intervention.

There is evidence to support the likely efficacy of some technological innovations for achieving this for both EGMs and online wagering. In addition to pre-commitment and interactive messaging, other technological innovations (for example, real time contact with peers or counsellors) could be developed and implemented. Regular harm minimisation messaging or reminders could be adjuncts to pre-commitment.

Interventions and policy opportunities

There are multiple means of modifying the environment within which consumption of gambling occurs, and this modifying the affective system that currently often encourages excessive consumption. These include restrictions on promotion and advertising, size of terrestrial venues by EGM numbers, hours of operation, structural characteristics etc. Recommendations arising from this area of interest are:

59. Warning information for gambling should be focused on provision of accurate information about the risks of gambling harm arising from specific gambling types (e.g., 'amongst people using EGMs weekly or more often, the rate of serious harm is five times the population average').*
60. Price information relevant to specific games must be disclosed for each game in a simple and readily comprehended way (see recommendations 8 and 11, above), and must be unavoidably provided at the commencement of every session of use.*

61. Prominent messages relating to rate of expenditure and elapsed time of sessions must be regularly and unavoidably provided (as noted in recommendations 22-25, above).
62. The size and opening hours of venues and the operating hours of online providers should be subject to reasonable restrictions as noted at recommendations 27, 29 and 30 (above).*
63. Smoking areas in gambling venues should be required to allow egress from the venue other than through the gambling area.
64. Gambling venues should not be permitted to be open for business at times when the only part of the premises trading is the gambling area.
65. Gambling venues should provide clearly available information about how to gain access to information and support to address gambling harms, including via promotion of interactive systems to enable contact with services such as peer to peer support and counselling, etc.*
66. Development of a digital engagement strategy with the goal of providing a portal for multiple support systems for gamblers and others affected by gambling harm should be facilitated, and information about how to gain access to such support, and reminders to make use of it should be prominently displayed in gambling venues, and via mobile and online wagering sites.*#

Product information

The provision of information about products has limited demonstrated efficacy, although it is a potentially straightforward intervention with relatively low costs. It is not clear from the literature whether simple messages have more efficacy than providing complex information. There is some evidence that people are less likely to comprehend more complex messages involving, for example, nutritional information. There is no evidence to support current practices around the provision of information about gambling products. Acquiring straightforward and meaningful information about gambling products, and key elements of them such as their probabilities and average costs of use, and the relative risks of these, is currently a challenging process for users. For example, the 'return to player' ratio of an EGM game is currently presented in a way that defies ready understanding, and may be misleading.

It is reasonable to require that average price information for gambling types should be presented more clearly. Price information is a basic requirement for decision-making and is largely absent in a comprehensible form on most gambling types at present. Further, for EGMs and online wagering products, information about the structure and characteristics of products is often difficult to comprehend and requires substantial effort to acquire. Provision of more clear and comprehensible product information is relatively inexpensive, likely to have some efficacy, and should not be difficult to implement, especially on computerised forms of gambling.

Interventions and policy opportunities

Provision of clear and accurate product information may be an effective way to improve user understanding and prevent or minimise harm. It may also be useful for researchers, policy makers and regulators. Accordingly:

67. Information about the structural and other characteristics of all gambling products must be prominently and accurately provided within gambling venues and via all mobile applications or web sites offering gambling products.*
68. Such information should include detailed accounts of price (for each game offered, and in a form as suggested at recommendations 8 and 11, above).
69. The structural characteristics of games should be clearly and accurately described, and made readily available at every location where games are offered (whether terrestrial, mobile or on line), including, for EGM games, the information set out at recommendation 7 (above) and for online wagering, information about the structure and take out rate for each market offered as noted in recommendation 11 (above). The means of access to such information should be advertised prominently at the start and conclusion of every gambling session and should be made prominently available via the web and mobile sites of gambling providers.
70. Product information should be accompanied by warning signs as suggested at recommendation 60 (above).*

Structure of the industry

Tobacco, alcohol, food and gambling businesses are all concentrated, to varying degrees. The tobacco, food and alcohol industries are dominated by a small number of global firms. Gambling and tobacco businesses range from large global corporations to small businesses (including corner stores and newsagents selling lottery products, for example). However, larger scale local gambling operators (such as hotels and club gambling venues) are also allied via associations such as the Australian Hotels Association or ClubsNSW. Some of the operators of hotels are large scale, including ALH Pty Ltd, which is a subsidiary of Woolworths, a major food and alcohol industry actor. There are also a small number of large, and in Australia mostly monopoly casino operators, and the wagering industry is rapidly consolidating.

This means the industry in these cases is relatively powerful, with significant revenues and resources. These may be used to resist reform and regulation to improve consumer protection via more effective harm prevention and minimisation strategies.

In a response to such industry power, multiple international jurisdictions have introduced or at some stage operated state owned monopolies to operate as alcohol retailers, with an associated loss of, or declining emphasis on, profit motive. If policy supports a harm reduction perspective, state actors are in a position to restrict hours of operation, regulate the marketing and promotion of alcohol and restrict sales to those intoxicated. This was the practice for gambling prior to the 1990s in many Australian jurisdictions, where state owned gambling enterprises provided relatively minimal facilities for wagering, lotteries and some other forms of gambling (McMillen et al 1999). The basis for these was to meet unstimulated demand for these products, which might otherwise be met by illegal operators such as 'SP bookies'.

However, the licensing system which characterises most Australian gambling operations at present allows demand to be stimulated in multiple ways, ranging from the 'glamorisation' of gambling at casinos (usually by advertising or marketing that fails to acknowledge that gambling actually occurs at the venue) to significant levels of major media advertising of wagering products during sporting events.

If power of industry is tied to resistance of harm prevention and minimisation (and the evidence suggests that this is the case in Australia) it is important to develop approaches to address this. These include altered licensing conditions to allow for the prospect of harm prevention and minimisation reforms without compensation (as opposed to at least one arrangement in Victoria which allows compensation claims for such reforms for the monopoly casino). Reducing the ability of industry to influence harm prevention and minimisation policy decisions is an important step. The sheer scale of tobacco interests did successfully resist reform for a considerable period, and in many jurisdictions continues to do so. However incremental and evidence-based reforms succeeded in considerable diminution of tobacco related harm, and could be expected to achieve similar harm diminution in the gambling field.

Interventions and policy opportunities

The Australian model for gambling operations is a licence model, allowing commercial operators to hold licences and to subsequently operate in accordance with those subject to meeting specific provisions. Unlike some other jurisdictions operating state-owned monopolies, commercial imperatives are in competition with harm prevention and minimisation imperatives. It is arguable that the balance between these two competing sets of interests is skewed at present in favour of commercial interests. Further, a 'whole of government' approach may assist in reducing incentives for maintenance of harmful practices. Some recommendations flow from this:

71. Large scale operators of gambling venues are currently subject to differing regulatory regimes in many jurisdictions on the basis of whether they are 'not for profit' or commercial operators. It is important to ensure that operators are regulated in a way that ensures consistency of harm prevention and reduction imperatives. Some 'not for profit' operators are indistinguishable from commercial operators, and enjoy considerable tax and regulatory benefits as a consequence. Such distinctions require scrutiny, with gambling tax arrangements modified to promote less harmful gambling forms or lower intensity operations whether operators are 'not for profit' or otherwise (see recommendation 49 (above)).
72. Corporate tax benefits for 'mutual' or 'not for profit' gambling operators should be subject to careful review by the Australian government (as recommended by the Productivity Commission 2010) and large scale operators (i.e., those operating multiple venues, or with revenues in excess of \$20 million p.a.) should be liable for corporate tax, and regarded as commercial operators for all other purposes.*
73. Australian casino operators largely operate within a jurisdictional monopoly environment. There is some perception that some such operators are, effectively, too big to regulate effectively, and have considerable power over government and regulators. For example, guarantees of compensation to gambling operators in the event that harm prevention or minimisation initiatives are adopted provides a substantial disincentive for adoption of such measures. Dismantling such monopolies and removing such inhibitions on pursuit of harm prevention and minimisation initiatives are warranted.
74. Oligopolistic control of segments of the Australian gambling market is widespread and increasing. Experience suggests that large gambling operators are difficult to regulate effectively. Mechanisms to reduce such market concentration are warranted, including reduction of the threshold proportion of the market for any single operator, and co-operation with Australian Competition and Consumer Commission (ACCC) and other regulators including Australian Charities and Not-For-Profits Commission (ACNC) to explore

mechanisms to maintain competitive markets in gambling products, consistent with harm prevention and minimisation priorities.*#

75. Gambling operators have provided significant financial support to political parties and have obtained significant apparent leverage over policy as a consequence. Action to significantly limit such influence and make it subject to real time disclosure and transparency is essential to reduce perceived distortions of the policy process and is a high priority for advancement of a harm prevention and minimisation agenda.*#

Regulatory fragmentation

An important aspect of the relative power of industry is, as with tobacco gambling, that regulation is subject to a degree of fragmentation. This involves both jurisdictional inconsistency, and legislative imprecision. Although gambling regulators may have scope for some harm prevention or minimisation actions via regulation, they remain ultimately dependent on a legislative framework, which is often cumbersome, subject to political influence, and competing with multiple other priorities for attention. The objects of relevant regulation lack precision and are not well translated into a hierarchy of priorities.

It is also the case that some legislative priorities may be at odds with harm prevention or reduction – e.g., the corporate regulatory framework, or revenue priorities of government, may not always be compatible with that for harm prevention. A whole of government approach would support gambling harm prevention and minimisation – that is, some degree of horizontal and vertical integration of priorities.

Gambling policy remains pre-eminently a state matter. There are some exceptions to this, but each state adopts distinct technical and other standards for gambling regulation and approaches research and service provision distinctly. Development of a national strategy would assist in avoiding the ‘race to the bottom’, which has arguably characterised aspects of gambling policy in Australia (note the minimal regulation and low rates of tax imposed by the NT government on online wagering providers). Uniform best practice regulation in accordance with a public health approach utilising population health principles would assist in pursuit of good standards of harm prevention and minimisation, as compared to current practice where the reform efforts of some states are undermined by the influence of powerful gambling actors operating elsewhere, providing an example adopted by other operators.

At present, it is also relatively clear that political leadership appears broadly unaware of the full extent and nature of gambling harms. The HIV experience demonstrates the importance of achieving bi-partisanship in tackling public health issues, which has been realised in part via the National Drug Strategy. There is considerable work to be done to achieve this in the gambling sector. However, it would be an invaluable achievement to engage politicians’ attention and support on a bi-partisan basis, for implementation of effective harm prevention and minimisation initiatives. Development of a National Gambling Harm Prevention and Minimisation Strategy via COAG may be a useful tool.

Interventions and policy opportunities

There are many mechanisms available for the standardisation of gambling regulation in Australia, although these have arguably not been employed as well as they could. Recommendations to improve this situation include the following:

76. Directors, officers and management of gambling operators should be encouraged via relevant corporations' legislation to implement harm prevention and minimisation initiatives, without concern for any resulting impairment of assets, reduction in financial return or otherwise.*
77. Australian governments should use the Council of Australia Governments (COAG) and other government-to-government processes to pursue agreement to remove any tax redistribution or other disincentives to more effective harm prevention and minimisation policy and interventions.*#
78. The Australian and New Zealand Gaming Machine National Standards provide a basis for consolidating and standardising harm prevention and minimisation requirements for EGMs. However, they are not currently used for this purpose as well as they might be. States apply different parameter settings to EGM structural characteristics and operation (e.g., load up limits, maximum bets, speed of operation, characterisation of losses disguised as wins, operation of multi-player gaming terminals, etc.). Modification of EGM structural characteristics provides a good basis for improved harm prevention and minimisation interventions, and best practice standards for these should be adopted by all Australian jurisdictions. If necessary, the Australian government should take a lead in co-ordinating discussions with all Australian jurisdictions to implement a genuinely uniform set of national standards, expanding new consumer protection priorities, with an explicit focus on harm prevention and minimisation. Failing agreement, the Australian government should legislate such a set of standards.*
79. The Australian government has recently taken a lead in negotiating a set of consumer-protection focused legislative and taxation standards with other Australian governments. The implementation of these should be expedited. It may be desirable for the Australian government to legislate uniform standards for harm prevention and minimisation in the online and mobile wagering industry, and impose uniform taxation arrangements as suggested at recommendation 50 (above). Development of a National Gambling Harm Prevention and Minimisation Strategy, in line with the National Drug Strategy, is a likely useful tool beyond the online gambling sector and COAG should be engaged in this activity.*

Industry influence on research

As noted by Livingstone et al (2014) the overall quality of the gambling harm prevention and minimisation evidence base is low. This is particularly so in relation to actually existing in-venue harm promotion activities. This arguably means that understanding of likely effective interventions is less well developed than it should be. This can be attributed to multiple factors including industry influence, a failure to adopt an active public health approach with a population health focus, the priority given to research into gambling harms as a branch of abnormal psychology, and the adoption of the 'responsible gambling' and 'problem gambler' models.

In short, research has been dominated by an individualised approach to gambling harms. There has been much less research into the environmental, social, economic, technological and industrial factors that have driven the increased consumption of gambling, and thus accelerated the production of harm.

Although there is a long history of industry influence in the tobacco and alcohol research field, this has been actively addressed over a long period of time. Industry has much less influence in alcohol research than in gambling. This is a problem because it undermines the evidence base and means that innovation and reform is delayed. This influence may be subtle or otherwise, but its effects

appear significant. Industry actively sponsors major research meetings in Australia (e.g., the annual conference of the National Association for Gambling Studies) and influences its decisions via multiple board membership. This is also the case for many major international meetings in the gambling field. Domestically and internationally, the gambling industry directly or indirectly, via proxies such as GambleAware, funds and directs research priorities. There are few sources for gambling research funds in the USA or the UK, for example, other than those derived from industry. This situation actively affects the diversity and quality of the research outputs of the gambling research field. This was the case with alcohol, tobacco and pharmaceutical research. There is no plausible argument as to why it would not similarly affect gambling research activities and outputs.

The interests of corporations and their agents lie in maintaining and expanding revenue. These interests are not directed to harm prevention or minimisation, but arguably the opposite.

Alcohol researchers (through the activities of organisations such as the Kettil Bruun Society for Epidemiological Research on Alcohol) have been effective in reducing reliance on industry funding and co-operation. This is still underway in the gambling field. Advancing this is highly likely to produce better evidence and more effective interventions.

One key aspect of the reform of this activity is that there are multiple data needs for gambling research in harm prevention and minimisation. These include technical information and data about gambling products, but also consumption data at a disaggregated level, and population monitoring data.

Population monitoring is intended to provide regular intelligence on patterns amongst those consuming the product, rather than attempting to estimate the prevalence of specific behaviours or of responses to a gambling problem scale. In an environment where new technologies and rapidly evolving forms of gambling proliferate, monitoring is likely to provide very useful information to frame social marketing and other harm prevention campaigns, assist with intervention design, and support population-based programs.

It is also an essential element of regulatory responses to product innovation. It is arguable that regulators are not well equipped to deal with technological innovation, and lack some technical knowledge and expertise necessary to identify problematic innovation. Population monitoring will assist in identifying priority areas for improved technical understanding.

Interventions and policy opportunities

Industry influence on the gambling research field has been significant and prolonged and has arguably resulted in the maintenance and expansion of high levels of harm in Australian jurisdictions. Addressing this issue will require significant activity, including the following:

80. Gambling researchers should be required to disclose all funding sources and be ineligible for VRGF or VicHealth funding if they have accepted funding, consultancies or other support from gambling industry operators or their agents in the five years preceding any grant application.*#
81. Gambling research forums or conferences should not accept support or sponsorship from gambling industry operators or their agents, and government representatives should not attend any forums or conferences that do receive such funding. Non-industry dependent

support for such independent forums should be available from relevant non-industry influenced sources such as VRGF or its equivalent in other jurisdictions.*

82. Research funding for gambling research should ideally be raised from general revenue. However, utilising taxation from gambling operations to support research funding may allow expansion of the evidence base. Where research funds are derived from gambling taxation revenues, allocation of funds should be subject to decision only by independent foundations (such as VRGF) or funding bodies (such as the Australian Research Council) and based on peer review processes. Researchers with a history of gambling industry support should not be peer reviewers in such processes.*
83. Government and government agencies may have specific knowledge requirements around gambling research. These should be informed by regular engagement with the research community and service providers engaged with the needs of those who have experienced or are experiencing harm from gambling. These should be subject to contract processes that echo the independence requirements of recommendation 83 (above).
84. Funding bodies should provide a significant proportion of available research funds to researcher-directed funding, with funding being based on criteria including innovation in harm prevention and minimisation, expansion of basic knowledge, soundness of method and improvement of community wellbeing.
85. Population monitoring studies should be preferred to prevalence studies as a means for developing understanding of the nature and extent of gambling harms, innovations in gambling behaviour, uptake of products and establishment of priorities for harm prevention and minimisation interventions and policy. Such studies are significantly less expensive than prevalence studies, can be undertaken frequently and regularly to develop a metric system for tracking harm, and can provide valuable information for improving harm prevention and minimisation activities.*
86. Gambling researchers should be encouraged to form independent research and professional associations with no connection to the gambling industry, and to agree on and abide by ethical and professional standards that minimise the risks of industry influence on research activity.*
87. Access to de-identified data and information about gambling operations and products should be available to bona fide researchers as a condition of licensing. Gambling operators should be required by licensing conditions to permit reasonable access to premises for the purposes of recruitment of research participants.*#
88. Gambling regulators and policy makers should be supported by researchers to acquire knowledge and understanding of innovation in gambling products and user activity, preferences, and behaviour. This will be facilitated by acquisition by regulators of technical information and data as suggested in recommendation 88 (above).*
89. Gambling regulators should consider re-acquiring technical expertise and 'in-housing' at least some approval processes for some products to ensure improved technical understanding and better regulatory capacity.

Advertising, marketing, knowledge transfer and educational interventions

Interventions using advertising and marketing may support behaviour change, and may also develop public support for regulatory and legislative change. These however require design based on specific considerations, i.e., whether the message is negative or positive (negative messages, for example, are thought to be effective in preventing harmful behaviour, and positive messages for supporting behaviour promoting harm prevention or minimisation). Knowledge transfer activities are useful for maintaining public interest, and that of policy and decision makers in support of reform.

Media and social marketing campaigns are widely utilised as a response to public concern, but are not of demonstrated effectiveness unless conducted at a community level and/or supported by other activities such as environmental modifications, or within controlled environments.

The evidence suggests that stand-alone educational activities are ineffective. However, educational activities coupled with other interventions (provision of a supportive environment, active interventions to encourage physical activity, etc.) are likely to be more effective.

Interventions and policy opportunities

There is an important role across several domains for the provision of information to gamblers and others. These include interventions to encourage uptake of counselling and support services for those affected by gambling harm, those intended to provide information about the risks of gambling and characteristics of specific gambling forms, de-stigmatising messages and campaigns, and knowledge transfer activities for the public and policy and decision makers to improve understanding of gambling harms and improve support for policy decisions and interventions intended to prevent and reduce gambling related harm. Recommendations arising from this include:

90. Campaigns and messaging around addressing existing gambling harm (help seeking campaigns) should be carefully developed to avoid stigmatising those affected by gambling harm, should be oriented towards factual information about the nature and lived experience of harms, and provide clear advice for action to address those harms.*#
91. Campaigns and messaging around gambling harm prevention or minimisation (risk reduction campaigns) should incorporate factual information about the nature of gambling products, the relative risks associated with use of those products, and evidence based advice about how to minimise those risks. Material utilised in such campaigns should avoid stigmatising those affected by gambling harm, emphasising factors that may produce increased vulnerability, and indicating that at a population level, harm can be inflicted on people across a variety of backgrounds.
92. Campaigns around help-seeking or risk reduction should ideally accompany material changes to the gambling environment via improved harm prevention or minimisation policy or interventions. For example, both help seeking and risk reduction campaigns would be important around the phase-in of a universal pre-commitment system and assist in explaining why it is a useful and important initiative to support harm reduction. Information provided should be accurate, factual and evidence based.

93. Gambling researchers undertaking VRGF commissioned or funded research, or providing support to the development of campaigns, should be encouraged and supported to provide brief plain language versions of their research for distribution to interested members of the community.*#
94. VRGF should encourage researcher policy forums regularly, involving decision makers and political leaders, to assist in improving the understanding of all facets of the gambling harm prevention and minimisation program.*#
95. Educational interventions designed to improve understanding of the relative risks of gambling types should be factually based, draw on available evidence, and include advice on how to reduce the risks associated with gambling. Educational programs should be supported by general community campaigns reiterating and reinforcing similar messages, and identifying tools and resources available to support risk reduction, and harm prevention and minimisation.
96. Knowledge transfer activities between researchers and the policy community should be actively supported via development of topical material such as brief research summaries, electronic resources (e.g., podcasts, short video presentations, and where possible interactive 'webinars').

Standard of evidence

Population/public health interventions are, by their nature, generally untestable until deployed at a population level. Demands by industry and others for 'gold standard' evidence prior to implementation are unreasonable, and a delaying tactic. As recently noted, there is a tendency for industry to argue that 'nothing can be done until everything can be done' (Cassidy et al., 2013). There is ample evidence of significant harm, and in many cases good evidence to support incremental reform. A public health approach using population health principles will ensure that the prevention or reduction of avoidable harm is a matter of priority.

This does not mean that interventions should be ad hoc. All interventions and policy should rely on the best available evidence, have theoretical support, and be plausible. This means that action should be taken when cost of inaction is likely to outweigh the cost of action (Banks, 2011). This also appears to be a clear lesson from the tobacco control experience. Incremental and well-considered reform can be highly effective in gradual but effective prevention and minimisation of harm, as has occurred in the tobacco and BBV sectors.

Interventions and policy opportunities

It is not feasible to utilise clinical standards of evidence to support implementation of harm prevention or minimisation interventions in a public health field such as gambling. Therefore, demands for unachievable standards of evidence must be seen as delaying tactics. When considering the implementation of interventions, demands for evidence should be weighed against knowledge of the extent of harm and the relative urgency of actions to reduce that harm, rather than against an unachievable standard of evidence. Some recommendations related to this are warranted:

97. Interventions or policy changes intended to prevent or minimise gambling harm should be evidence based, and focused on gambling sectors where risks of harm are demonstrated and significant. However, given the nature of the gambling system, and its complex determinants,

clinical standards for evidence supporting interventions are untenable, and should not be adopted.*

98. Interventions intended to be implemented in the gambling sector to prevent or minimise harm should be plausible, have face validity, and be evidence based. Where possible, trials of such interventions should be utilised in advance of their implementation. However, where evidence of harm is high, implementation of likely effective interventions should be expedited.*
99. Evidence or critiques of evidence of the likely or actual effectiveness of proposed interventions produced by the gambling industry, or by researchers or consultants engaged by the gambling industry, should be subject to careful and independent re-analysis before consideration. Data used in support of submissions by the gambling industry or its agents should be made available for re-analysis in full before such material is considered by policy or decision makers.*#

Multi-faceted and systematic interventions

The evidence strongly supports the improved efficacy of integrated multi-modal interventions. That is, systematic interventions and policies appear more likely to be effective than stand-alone interventions, with some exceptions (such as school based physical activity programs). Although unsurprising (systematic approaches to complex problems are now regarded as most likely to have improved efficacy) (Haddon, 1980; Runyan, 2015). This is an important and clear lesson from the evidence.

This does not mean that individual interventions should not be implemented. It does mean that developing interventions that complement each other is an important consideration.

For example, evidence-based media messaging that justifies increased surveillance of drink driving via random breath testing assists in developing support for the intervention by providing an explanation for its implementation. The actual material intervention (the reduced speed limit, and its effective enforcement) is itself evidence based and likely to be effective. It is complemented by the media messages and the combined effect of the interventions is likely to be increased.

In developing a systematic approach to a public health problem, it is important to identify the determinants of the problem. This can allow interventions that target these to be identified, and gradually introduced in a complementary way. The determinants can be social, individual, technical, economic, legal or neurological (for example). Developing a systematic approach means identifying these and addressing them effectively.

Interventions and policy opportunities

The determinants of any public health issue affecting a population are invariably complex and multi-faceted. This has been increasingly recognised as an important consideration in the design of interventions and policy intended to prevent or minimise harm. Such recognition implies a systematic effort to better understand and engage with the determinants of the issue in order to better comprehend the building blocks of an effective response. For this reason, some rethinking of the way issues such as gambling harm are construed and understood is necessary.

Gambling harm arises from a complex interplay of factors, at multiple levels. To this point, factors emphasising the individual have been highlighted, as evidenced by the focus given to treatment and the use of terminology such as 'problem gambling' and 'responsible gambling'. However, there

are multiple factors at work in the development of gambling harms at the population level, including individual psychological and behavioural factors such as stressful living circumstances, socio-economic conditions, environmental factors such as the relative availability of gambling opportunities, technological factors including the nature and relative intensity of gambling technologies available, educational opportunities, employment opportunities, the availability of alternative recreational and entertainment opportunities, and the regulatory environment.

100. Approaches to gambling harm prevention and minimisation need to be cognisant of this complexity, and address factors such as these via effective multi-factorial interventions. Accordingly:
101. Research into factors other than those at the individual level relating to gambling harms should be expedited, particularly in relation to the socio-economic and regulatory determinants of gambling harm.*
102. Responses to gambling harm should be developed iteratively but systematically in order to produce a strategic approach that addresses all relevant factors to the greatest extent possible.*
103. Development of a systematic approach to harm prevention and minimisation should not delay adoption of likely effective interventions or policy innovations, but should proceed in tandem and produce a complementary system in which all effective interventions are accommodated.*
104. Understanding and knowledge from public health areas other than gambling harm should be regularly monitored and effective approaches or interventions identified for possible inclusion in the gambling harm prevention and minimisation system.*

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Appendices

Appendix A: RQ1 literature review strategy

Electronic databases searched:

- CinahlPlus
- Informit
- Ovid Medline
- Proquest
- PsychINFO
- PubMed
- Sage journals online

Grey literature and websites:

- Australian State Government websites
 - ACT Gambling and Racing Commission
 - Department of Racing, Gaming and Liquor WA
 - Department of the Attorney-General and Justice (Northern Territory)
 - Department of Treasury and Finance (South Australia)
 - Liquor and Gaming NSW
 - Office of Liquor and Gaming Regulation (Queensland)
 - Tasmanian Liquor and Gaming Commission
 - Victorian Commission for Gambling and Liquor Regulation
 - Victorian Responsible Gambling Foundation
- Alberta Gaming and Liquor Commission
- Australasian Gaming Council
- British Gambling Commission
- Centre for Gambling Education and Research (Southern Cross University)
- GambleAware®

- Gambling Research Australia
- Gambling Research Exchange Ontario
- Independent Gambling Authority (South Australia)
- Independent Gambling Research Consortium
- National Center for Responsible Gambling
- National Gambling Board South Africa
- Responsible Gambling Council
- Responsible Gambling Infohub
- University of Calgary Alberta Gambling Research Institute

Search terms:

- Problem gambling
 - problem gambl*
- Harm minimisation/harm reduction
 - harm minimi*ation AND gambl*
 - harm minimi*ation AND EGM
 - harm reduction AND gambl*
 - harm reduction AND EGM
- Responsible gambling/responsible gaming
 - responsible gambl*
 - responsible gaming
- Electronic gambling machines
 - electronic gambling machine*
 - electronic gaming machine*
 - EGM
 - pokies
 - poker machine*
 - slot machine*

- video lottery terminal*
 - VLT
- Betting shops/gambling venues/casinos
 - bet* shop
 - gamb* AND venue
 - casino*
- Online gambling/online gaming/online wagering
 - online gamb*
 - online gaming
 - online wager*
- Self-exclusion/self-banning
 - self*exclusion AND gamb*
 - self*ban* AND gamb*
- Pre-commitment technology
 - pre*commit AND gamb*
 - pre*commit AND technology
- Venue signage
 - signage AND gamb*
 - sign* AND venue AND gamb*
 - sign* AND in*venue AND gamb*
- Identification of problem gambling
 - identif* AND problem gamb* AND venue
 - identif* AND problem gamb* AND staff
- ATM removal
 - automatic teller machine AND gamb*
 - ATM AND gamb*
- On-screen messages

- player information display AND gamb*
 - PID AND gamb*
 - on*screen message* AND gamb*
 - on*screen message* AND EGM
 - (message* OR pop*up message) AND gamb*
- Sound
 - sound AND gamb*
- Bet size
 - bet size
 - bet limit
 - single bet limit
- Venue size
 - gamb* AND venue AND size
- EGM caps
 - gamb* AND machine AND (number OR limit OR cap)
 - gamb* AND EGM AND (number OR limit OR cap)
- Licensing
 - gamb* AND licen*
- Operating hours
 - gamb* AND venue AND hours
 - gamb* AND operat* AND hours
- Loyalty cards/membership
 - card AND gamb*
 - member AND gamb*
 - loyal* AND gamb*
- Marketing and promotions
 - (market* OR promot*) AND gamb*

Appendix B: RQ1 gambling interventions

Summary of measures that may minimise gambling-related harm

Intervention	EGMs	Online ¹	Comments/purpose/findings	Refs that cover this topic
Gambling environment				
Self-exclusion	x	x	Exists in all Australian jurisdictions but improvements needed. These include multi-venue or jurisdiction wide coverage (now planned for online under new online wagering framework), move to electronic identification (facial detection technology instead of photo) and enrolment - paper-based mode is antiquated, cumbersome and liable to error or breach. Would be readily facilitated under a full universal pre-commitment system.	Blaszczynski et al., 2014; Dragicevic et al., 2015; Gainsbury, 2014; Hing, Cherney, et al., 2015; Hing, Russell, et al., 2015; Hing et al., 2014; Ladouceur et al., 2017; Meyer et al., 2015; Parke & Rigbye, 2014; Responsible Gambling Council, 2014, 2016; Salis et al., 2015; South Australian Centre for Economic Studies, 2015
In venue staff identification of gamblers experiencing problems	x	x	Staff can be trained to identify gamblers experiencing problems, however interventions are potentially fraught. A simpler workaround is available through behaviour tracking algorithms. This would circumvent the need for awkward or potentially hostile interactions between staff and gamblers in distress. Studies have also shown that interventions by staff are rare. This may also be influenced by management who are motivated by profit to facilitate continued gambling.	Delfabbro et al., 2016; Excell et al., 2014; Haefeli et al., 2011; Hing & Nuske, 2012; Hing et al., 2013; LaPlante et al., 2012; O'Mahony & Ohtsuka, 2015; Quilty & Robinson, 2013; Quilty et al., 2015

¹ The focus in this review in the online environment is for online wagering.

Intervention	EGMs	Online ¹	Comments/purpose/findings	Refs that cover this topic
Venue size, number of gamblers	x		Larger venues encourage higher losses, encourages reinforcement. Implicit competition in busy venues encourages normative comparison and increases intensity of betting	Rockloff et al., 2011; Young et al., 2012
Venue machine layout	x	x	Think piece only. Observations of spatial layout and lighting appear to minimize scrutiny encouraging intensive gambling.	Adams & Wiles, 2017
Venue lighting, sound	x		Casino context (warm lighting and sounds) together effect reaction times to wins and losses – those in control condition were slower to react after losses and rewards.	Brevers et al., 2015
Static signage (responsible gambling messages)	x	x	Provide information, encourage RG, correct erroneous beliefs etc.	Required in all Australian jurisdictions
Opening hours	x			Gainsbury et al., 2014
Daylight	x		Windows and natural light in venues	Commonsense
Age restrictions	x	x	In jurisdictions where age restrictions exist there is minimal engagement by adolescents	Gainsbury et al., 2014
Restricting children access to gaming area			Reduce exposure and modelling	
Alcohol regulations	x		Licensing requirement for EGM venues to have alcohol license Promotional tool: subsidised or free drinks	Gainsbury et al., 2014

Intervention	EGMs	Online ¹	Comments/purpose/findings	Refs that cover this topic
Smoking regulations	x		Smoking ban in EGM venues – interruption to use resulted in substantial drop in EGM revenue post introduction	Lal & Siahpush, 2008
Cash access: ATM removal & EFTPOS	x		EFTPOS may have undermined in initial reduction in revenue of ATM removal (9.3% real decline)	Thomas, Pfeifer, Moore, Weyer et al., 2013
Cashless gambling			Preferred by operators to improve security. May result in dissociation for gamblers.	Nisbet 2005a, 2005b, 2005c; Nisber et al., 2016
Cheque cashing facilities, Restricting lines of credit	x	x		
Restrictions on credit betting		x	New legislation and forthcoming Federal Consumer Protection Framework to address this	Financial Counselling Australia, 2015
Inducements, venue promotions	x	x	Free bets (EGM vouchers), subsidised or free food and drinks,	
Website design	x	x	Navigation of users to place bets and promotions (rather than review account summary etc.)	
Structural characteristics	x			
Multiple line betting, losses disguised as wins, betting styles			Ability to bet on multiple lines facilitates LDW.	Dixon et al., 2015; Dixon, Graydon, et al., 2014; Dixon et al., 2010; Dixon, Harrigan et al., 2014; Harrigan, Dixon, & Brown, 2015; Harrigan et al., 2014; Templeton, Dixon, Harrigan, & Fugelsand, 2015
Auditory and visual cues	x	x	In addition to evidence above, similarities between online simulated games that replicate real EGMs may reduce gamblers ability to distinguish between free games and gambling.	See above and also Bramley & Gainsbury, 2015

Intervention	EGMs	Online ¹	Comments/purpose/findings	Refs that cover this topic
Spin rate			Influences speed of 'play', continuity, in play betting	
Bet size restrictions	x	x	Maximum and minimum	
Jackpots	x		Encourage and intensify gambling. Large prizes even more so	Browne et al., 2015; Donaldson, Langham, Rockloff, & Browne, 2016; Li, Rockloff, Browne, & Donaldson, 2016; Quilty, Lobo, Zack, Crewe-Browne, & Blaszczynski, 2016; Rockloff, Donaldson, & Browne, 2015; Rockloff & Hing, 2013; Rockloff et al., 2014; State of Queensland, 2010
Load up				
Banknote acceptors				
Bonus games, "free spins" 'metamorphic games'	x	x	Have the appearance of being free but are factored in to the RTP of machine. PG shown to derive greater arousal from bonus games	Belisle, Owens, Dixon, Malkin & Jordan, 2016; Schottler Consulting, 2014
Return to player				
Pre-commitment	x	x	Universal ('mandatory') or optional ('voluntary') enrolment, full or partial systems may include required or optional time or monetary limit setting, binding or non-binding variations exist. Accurate account summaries of activity can be provided in full	Auer & Griffiths, 2013; Blaszczynski et al., 2014; Brevers et al., 2016 Harris & Griffiths, 2017; Kim et al., 2014; Ladouceur et al., 2017; Lucar et al., 2013; Nisbet, Jackson, & Christensen, 2016; Salis et al., 2015; Van Dyke, Jenner, & Maddern, 2014; Walker et al., 2015; Wohl et al., 2013
Dynamic warning messages (e.g. Pop-up messages)	x	x	Message: content ('informative', self-appraisal, personalized, normative feedback, money and time limits), positioning, timing and duration, context (win or loss conditions)	Auer & Griffiths, 2015: Auer et al., 2014; Blaszczynski et al., 2016; Department of Social Services, 2014; Gainsbury et al., 2015a, 2015b; Ginley et al., 2016; Harris & Griffiths, 2017; Harris & Parke, 2016; Harris et al., 2016; Hing, Cherney et al., 2015; Kim et al.,

Intervention	EGMs	Online ¹	Comments/purpose/findings	Refs that cover this topic
				2014; Landon, Palmer du Preez, Bellringer, Page, & Abbott, 2016; Palmer du Preez et al., 2016; Palmer du Preez, 2014; PriceWaterhouseCoopers, 2016; Salis et al., 2015; Wohl et al., 2013; Wohl, Parush, Kim, & Warren, 2014
Clocks on machine	x	x	Pop-up time might be an effective complement to this	Blaszczynski & Gainsbury, 2011
Push messages (e.g. SMS warning)		x	Another platform for account summary or pop-up style messages	Common sense
Behavioural tracking algorithms	x	x	Use to deliver messages and warnings according to money lost, time spent gambling. Could be tailored according to win/loss conditions. Used within pre-commitment systems	Schellinck & Schrans, 2004, 2007, 2011; Schellinck, Schrans, Bliemel, & Schellinck, 2010
Exposure & accessibility - licensing				
Caps on machine no's	x			South Australian Centre for Economic Studies, 2005
Venue size	x			Rockloff et al., 2011; Young et al., 2012
Operating hours	x	x		Common sense (see alcohol studies)
Promotions/Marketing (external to venue or website)	x	x		Binde, 2014

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