

The science of prevention for children and youth

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ABSTRACT

The high prevalence of social, emotional and behavioural health problems in children and young people in Australia, and the high cost and relative ineffectiveness of treatments to 'cure' them, lead to the conclusion that the most efficient and cost effective approach is to prevent them from occurring. The challenge is in determining what to prevent and how to do so. While there are complex social and political aspects to prevention, it must also be guided by a solid scientific basis. This paper makes the case that *prevention science* provides a framework for ensuring that prevention initiatives are founded on robust evidence and implemented in a way that will allow progressive growth in knowledge of 'what works' in prevention. The paper examines some of the opportunities and challenges in a shift to an evidence-based prevention agenda to improve the lives of children and young people.

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Introduction

Psychosocial problems account for a major portion of the current burden of child and youth disease and dysfunction. These include mental health disorders such as anxiety and depression, behavioural problems such as aggression and antisocial behaviour, substance abuse and juvenile crime. The prevalence of these problems is high (for example, social and emotional problems affect 14 per cent of children and 26 per cent of adolescents), and in many cases appears to be increasing (Australian Research Alliance for Children and Youth 2008). ARACY's *Report Card: The Wellbeing of Young Australians* (2008) shows that Australia does not compare well to other wealthy OECD countries across a number of these domains. Progress in technology and economic growth, rather than contributing to improvements in wellbeing for children and families, appears instead to be associated with the increased incidence of problems. Treatment for many of these problems is unavailable, limited in effectiveness or fails to reach the majority of those in most need.

Child and youth problems matter, not only for the immediate wellbeing of the individuals concerned, but because many have sequelae into adulthood. Many adult conditions that are expensive or impossible to treat have their roots in childhood and adolescence (Stanley, Sanson & McMichael 2002). Thus poor outcomes in childhood and adolescence become the antecedents of costly, chronic, complex and disabling problems in the adult years.

Importantly, these problems are not inevitable—in fact there is clear evidence that they are preventable (Greenberg, Domitrovich & Bumbarger 2000). Access Economics (2009) estimated the annual cost of preventable conditions of children and youth across Australia at \$22 billion, and projected this will increase to \$40 billion by 2040, without effective prevention. Such considerations have led to the conclusion that efforts need to focus on prevention during childhood and adolescence.

The purpose of this paper is to document the potential of prevention and the challenges to its adoption at a significant scale, and to argue for *prevention science* as a framework for advancing a coherent holistic evidence-based approach to addressing the current problems of Australian children and youth. An outline of what is meant by prevention is provided as background to discussion of the central tenets of the prevention science framework. This is followed by an analysis of what is needed to advance prevention science in Australia, with the conclusion that interdisciplinary and intersectoral collaboration is a key ingredient to progress towards a prevention science agenda.

Prevention: Some scientific, socio-political and practical considerations

In recent years Australia has played an internationally significant role in demonstrating how prevention can be effectively utilised to achieve deliberate population health targets. The best known recent achievements include Australia's National Tobacco Strategy, which has resulted in steady decreases in the level of tobacco use, and state road trauma prevention programs, including the introduction of mandatory wearing of seat belts, random blood alcohol testing, and road and car safety improvements, which have been reflected in lowered rates of road accident-related morbidity and mortality. These broad-based primary (or 'universal') prevention approaches in Australia have traded on a noble history of health-related prevention triumphs across the world. This history includes the almost complete eradication of smallpox between 1967 and 1980 (World Health Organization 2001), which in turn echoed the late 19th century closure of the Broad Street water pump in the United Kingdom which halted the transmission of cholera (Goldfeld 2010). These achievements in the fields of public health and medicine have provided clear evidence for the efficacy of a number of preventive interventions.

In contrast to the relatively focused behavioural and disease targets above, attempts to prevent psychosocial problems of children and youth have a shorter history. Several well-known programs to prevent poor social and educational outcomes and promote positive early childhood development amongst disadvantaged children were initiated in the United States in the 1960s and 1970s. Intensive pilot interventions such as the Perry Preschool Project (1962–67) and the Olds Nurse Family Partnership (home visiting) Program (first implemented in 1977) (Olds et al. 1986) were explicitly aimed at improving the capacities of children's families and enhancing their educational stimulation so as to prevent child development problems and promote psychosocial adjustment in the pre-school years and later educational success (Wise et al. 2005; Australian Institute of Health and Welfare 2007). Perhaps the most well known such program is Head Start, which was first implemented in 1965 as part of the War on Poverty during the 1960s. Head Start (and Early Head Start, introduced later) aims to improve school readiness among children living at or below the poverty line and features nutrition, physical and mental health services, parent and community involvement, home visits, social services for families, and early childhood education (Ripple & Zigler 2003). Long term follow ups of these exemplar prevention programs show significant benefits in prevention, with quality of implementation one of the key determinants of degree of success (see Head & Redmond (2011) for more detailed discussion of these programs).

Despite the strong evidence for these prevention initiatives, a recent comprehensive review revealed that a relatively small number of programs with a specific focus on prevention in early childhood were underway (Wise et al. 2005). The vast majority of

these did not meet basic scientific standards for evaluating their efficacy. Of the ones that did, the strongest evidence base for efficacy comes from surprisingly short and structured parenting programs. For these, results suggest moderate to large treatment and prevention effects that are sustained over time (Prinz et al. 2009; Webster-Stratton, Jamila Reid & Stoolmiller 2008; Zubrick et al. 2005). However, the challenge has been to make these programs accessible to families at greater risk for problems. This is due to a range of implementation problems including poor uptake, retention, and barriers to practitioners/service use of the programs. The absence of longer term follow-up data also means that the extent to which gains are sustained over time is uncertain (Wise et al. 2005).

The development and uptake of prevention approaches for burdensome developmental outcomes (such as emotional and behavioural problems, delinquency, aggression, school disengagement, substance abuse, and obesity) has remained slow and, in some areas, remains relatively embryonic. There is a clear difference in complexity between prevention which hinges on single behaviours (for example, tobacco smoking) or interventions (for example, installing seat belts) and prevention of these complex and multiply determined phenomena. For each of these phenomena, there is no single cause but rather a set of intersecting factors from different levels in the 'ecology' of a child's life (from cultural and socio-demographic factors through to aspects of family life) that co-occur and influence each other. Each of these developmental problems has embedded in it, or is closely connected to, other problems (for example, antisocial behaviour, depression and substance abuse often co-occur and mutually influence each other). This means that there is no one solution, and no single, one-shot effort that will eliminate it (Shonkoff 2010). Broadly, the problem is never likely to be 'solved' in the sense that, for example, smallpox has been eradicated. Further, the very nature of these problems and their potential preventive solutions are often contested along political and philosophical as well as scientific lines (see Head & Redmond (2011) for further discussion). Multiple stakeholders with differing values, cultures, politics, and access to funding streams are likely to be involved in any preventive initiative, with multiple formulations of what 'really' is the problem focus and therefore what are legitimate or appropriate solutions. Taking the example of substance abuse, there is disagreement about when use becomes abuse, whether abstinence or harm reduction should be the goal of prevention efforts, and whether its status as a 'problem' rests on its social meanings, its harmful sequelae, or its role as a marker of other ills. Further, information as a basis for action will always be incomplete because of the uniqueness and complexities of the phenomena. These characteristics of complex developmental problems for which prevention is desired explain the applicability of the terms 'grand challenges' and 'wicked' problems (Horn & Webber 2007; Rittel & Webber 1973; Kazdin 2009). However, the fact that a problem is complex does not inevitably mean that it is impossible to understand it or address it through preventive strategies.

There are other factors, besides these complexities, which have acted to hamper progress in the development, promotion and implementation of a more coherent approach to prevention in Australia. First, many early prevention programs were not based on robust theory or research on the factors influencing children's development, so it is unsurprising that they had limited efficacy (Catalano et al. 2002). Second, 'single-solution' approaches to prevention are often attractive to lobby groups, the media and funders (for example, boot camps to prevent or 'fix' antisocial behaviour, dietary restrictions to prevent ADHD, drug education to prevent substance use problems), but typically fail to deliver significant gains (and can in fact cause harm), thus discrediting prevention. Third, many prevention models have focused only on 'proximal' risk factors such as a child's personal characteristics, family relationships, and peer friendships which, while important, ignore the more 'distal' influences on child and youth development and wellbeing emphasised in ecological models of development (for example, Bronfenbrenner & Morris 2006), such as the physical environment, economic deprivation, school cultures, community cohesion, and more broadly still, welfare regimes and social exclusion (Homel et al. 2006). Targeting these broader factors would arguably result in more substantial and sustainable prevention gains. In a similar vein, since problem behaviours are multiply determined and intercorrelated, a holistic approach to preventive interventions is preferable, but these are more difficult to implement, evaluate and gain funding support for.

The fourth important factor is socio-political (see Head & Redmond 2011): intervention and treatment services are faced with never being able to meet the need, and the cry for increased support gives rise to a powerful constituency and advocacy for treatment services—over which the voice of logic about the necessity for prevention is difficult to hear. Put more bluntly, existing government and agency services are focused on, and burdened by, the struggle to support those in need of treatment. Taking a longer-term view wherein the demand for these services would decrease over time through effective prevention requires a 'culture change' in thinking, responding and resourcing.

A 'culture change' towards prevention would involve a greater degree of cross-disciplinary and cross-sectoral collaboration than currently exists. There has been growing awareness of the limited capacity of individual, specialised disciplines to investigate and resolve these developmental burdens on their own (Stanley, Sanson & McMichael 2002). Services directed to a single outcome domain (for example, mental health) cannot cater to diverse co-occurring problems (let alone their causes), despite their interconnectedness. Just as a single discipline or specialised service cannot provide a full understanding of or response to problem outcomes, no single government department is likely to be able to provide a policy framework to guide their prevention. Indeed, many of the determinants of these outcomes are not within the grasp of the departments and agencies charged with their treatment and management. Separation of funding (and therefore services) across different

government departments, and limited connectivity between them, make a holistic approach to prevention difficult to achieve. Hence the call is increasingly made for whole-of-government policy responses and integrated approaches to prevention, a significant organisational challenge for government and services requiring leadership with a guiding conceptual framework for a holistic prevention approach.¹

What is prevention?

There have been several attempts to categorise prevention efforts (for example, Mrazek & Haggerty 1994; Weissberg, Kumpfer & Seligman 2003). A useful and widely used categorisation divides preventive interventions into three types: *primary*, *secondary* and *tertiary*. *Primary prevention*, often called *universal intervention*, applies to whole populations, irrespective of their risk status, in order to decrease the incidence of a problem or set of problems or to promote wellbeing. Primary prevention programs may target one or more risk or protective factors at various stages in the causal pathway. They may be relatively narrow, such as programs to prevent obesity through exercise and nutrition programs in schools (for example, Kids – ‘Go for your life’, Victorian State Government 2008), or school-based programs teaching social and emotional skills (for example, Promoting Alternative Thinking Strategies, Greenberg et al. 1995). Alternatively, primary prevention can be applied at a broader policy or systemic level. Examples include universal immunisation programs to prevent infectious diseases, universal prenatal and maternal and child health care programs, and social marketing campaigns to effect attitudinal and behaviour change such as the Quit campaign to reduce smoking (Quit Victoria 2005) and the HIV-AIDS prevention campaigns (Cresswell 2007). These universal methods of prevention act at a societal level and have the advantages of not labelling or stigmatising participants, and in principle can reach all or almost all of the population. They may, however, have smaller benefits to individuals with emerging or existing problems than more targeted interventions.

Secondary prevention or *selective intervention* targets individuals or population subgroups known to be at increased risk for developing problems because of exposure to certain risk factors (Giesen, Searle & Sawyer 2007; Weissberg, Kumpfer & Seligman 2003). Risk factors may be individual characteristics or characteristics of families, schools, peer groups or the community environment. While these may be broad underlying risk factors (such as school cultures) and they may occur early in causal pathways (such as prenatal nutrition or parenting in early childhood), secondary prevention tends to focus on relatively specific proximal factors. Finally, *tertiary prevention* or *indicated intervention* targets high-risk individuals with detectable signs and

¹ There are encouraging recent whole-of-government initiatives beginning in Australia such as the family violence prevention program Keep Them Safe in New South Wales (Department of Premier and Cabinet 2011).

symptoms of illness or problem behaviour, such as early intervention programs for children with challenging behaviours or developmental delays.

There are strengths and limitations to all three of these types of prevention (for more detail, see Giesen, Searle & Sawyer 2007), and each play an important role in preventing or intervening early to address different problem outcomes for children and youth.

Prevention science

The National Prevention Summit, held on 9 April 2008, which emphasised physical health, summarised the reasons for investing in prevention in the following terms:

- spending on healthcare is escalating;
- prevention saves money in the long term;
- prevention reduces pressures on hospitals; and
- health is a major indicator of workforce participation and productivity.

(See Australian Institute of Health Policy Studies and the Victorian Health Promotion Foundation 2008). These arguments apply also for the psychosocial health of young people in Australia. The need for a shift to prevention rests also on the prevalence of many of poor outcomes for children and youth, their strong social gradients, the increasing recognition that society will never be able to adequately treat all those in need, and the evidence that our existing treatments tend to have limited capacity to effect permanent change for these children and youth (Stanley 2001).

With a limit to the resources available as well as ethical considerations, it is critical that preventive interventions be supported by evidence about their benefits and effectiveness. As noted above, prevention activities often lack a scientific basis and outcomes are often unknown, unclear and/or unmeasured (Wise et al. 2005). Further, despite evidence that preventive interventions can be highly effective, further effort is needed at all stages from the development of interventions to their dissemination and evaluation before its benefits can have substantial impact. The emerging discipline of *prevention science* aims to develop a solid scientific basis for prevention activities, from the identification of causal risk and protective factors, through to the development, implementation, evaluation and dissemination of prevention and intervention strategies and programs for improving the lives of children and young people. It acknowledges the complexity in causal pathways and their influence on a range of poor outcomes, necessitating integration of perspectives from diverse disciplines and sectors. Further, the emphasis on social and ecological contexts in

which causal pathways arise suggests a need for early and wide-ranging preventive interventions as well as close partnerships between policy-makers, practitioners and researchers in order to develop, support, implement, evaluate and take to scale effective large-scale approaches to prevention.

Successful preventive interventions are usually forged from a combination of good science and good art, where science refers to a systematic, rigorous procedure for producing outcomes and evaluating them, and art is defined as the thoughtful and sensitive use of knowledge and skills in real-world contexts (Borkowski, Smith & Akai 2007). In Australia, there are many preventive systems and programs in place but it is unclear whether they achieve the goals of preventing problems. To take the example of child abuse prevention, Taylor and colleagues (2008) cite prevention programs in Australia that include community education, personal safety and protective behaviours programs, family support and parental education, child focused programs, child and family centres and offender programs. Despite the extensive use of these programs, many have little data to support their effectiveness, or draw from evidence obtained with very different populations (that is, those not at risk for child abuse). Many of the programs used in child abuse prevention are simply believed to work. Little attention has been given to evaluation.

There are instructive examples of preventive interventions with apparently good 'face validity' but lacking a strong theoretical framework and a solid evidence base, and which have failed. To take some illustrations from the United States, a review of programs which seek to prevent youth problems such as antisocial and substance use by using peer influence (such as peer counselling, peer mediation, and peer leaders) concluded that there is no evidence of a positive effect and that these strategies may have unintended negative effects on high school students (US Department of Health and Human Services 2001). A widely used school-based universal youth drug prevention program in the United States known as Drug Abuse Resistance Education (DARE) has been shown in a number of well-designed evaluations and meta-analyses to have little or no deterrent effects on substance use. Nevertheless, perhaps because it has 'face validity' and there is little commitment to evidence to drive decision-making, it continues to receive substantial support from parents, teachers, police, and government funding agencies, and continues to be used (US Department of Health and Human Services 2001). Both the legitimate demands from policy makers, practitioners, and civic leaders for accountability in the expenditure of public funds on interventions (Flay et al. 2005) and the ethic of 'do no harm' require a more scientific approach to prevention.

These examples highlight the need for a shift towards a more rigorous approach to prevention. The importance of evaluation, from program planning through implementation to follow-up, needs much stronger emphasis. In an economic context where there is frequently limited funding to spread across both delivery and

evaluation, it is common for evaluation to be under-resourced despite the ethical obligation to demonstrate the effectiveness and efficacy and to identify any unintended negative consequences (Flay et al. 2005). Medical treatments today are rarely made available without evidence as to their effects; a similar principle has yet to be applied to the prevention of social, emotional and behavioural difficulties in children and youth. Too often evaluation is an after-thought and under-funded, or is ignored altogether. Rarely is there long-term follow-up or an economic analysis of the intervention's costs and benefits. Adoption of a prevention science framework would ensure that appropriate data were collected before, during and after the intervention, in the context of randomised group comparisons where feasible.

There are a number of systematic stages in evaluation and all are important. Initial evidence of *efficacy* when the program is delivered under relatively ideal conditions needs to be supplemented by evidence of *effectiveness* in real-world contexts, including those in which roll out of the program is intended. Finally, the importance of identifying the conditions under which programs can be successfully 'taken to scale' and disseminated more widely is an increasing focus of prevention science (Flay et al. 2005; Borkowski, Smith & Akai 2007)—in Australia this has rarely been done.

In order for these activities to occur we require greater collaboration and communication across sectors. Whereas most of the existing literature on knowledge sharing focuses on strategies for facilitating uptake of research by policy-makers or practitioners, it is increasingly recognised that knowledge sharing needs to be a multi-directional process (Bammer, Michaux & Sanson 2010). Traditional linear models of program dissemination are beginning to be replaced by complex frameworks that accommodate different perspectives and emphasise communication and collaboration between stakeholders (Wandersman et al. 2008). In particular, policy makers and practitioners need to be equal players in the development of the science of prevention, as contributors and participants and not just as 'consumers'. Although there are challenges in the establishment and maintenance of such collaborations, there are documented success stories from other sectors. For example, the reduction in transmission rates of HIV-AIDS has been the result of practitioners, researchers, consumers (from both the gay and drug-using communities), and policy makers working together to educate and change sexual and drug use behaviours of those at risk (Sendziuk 2007). It is important to learn from these successes in building collaborative initiatives for the prevention of social, emotional and behavioural problems of children and youth (Australian Research Alliance for Children and Youth 2009).

Systematic prevention will require more funding than it currently receives but can be expected to return a much higher rate of savings over time. This argument has been made by the National Preventative Health Taskforce (2008) which emphasised the significant return on investment that accrues from prevention efforts in the health

arena. For example, it is estimated that the 30 per cent decline of smoking between 1975 and 1995 has prevented over 400,000 premature deaths and saved costs of over \$8.4 billion, 50 times more than the amount spent on anti-smoking campaigns over this time (National Preventative Health Taskforce 2008).

Access Economics (2009) estimated that the current cost of preventable conditions of children and youth across Australia was \$22 billion per annum, and that a shift toward evidence-based prevention would save \$5 billion per annum. This provides a strong fiscal argument for a shift to prevention.

Advancing prevention science in Australia

Given the need for effective, close collaboration across disciplines and sectors, and the need for advocacy of adequate support for evidence-based prevention, a first requirement for advancing prevention science in Australia would seem to be a forum in which all stakeholders can coalesce to advance this agenda. Until recently there has been no existing network or organisation that (1) focused on children and youth; (2) was interested in a broad range of outcomes; (3) was strongly committed to evidence-based approaches; (4) focused on all three levels of prevention (primary, secondary and tertiary); (5) had an interdisciplinary and intersectoral membership; and (6) saw advocacy as part of its role. A number of existing organisations which promote prevention, capacity building and inter-disciplinary work can clearly make important contributions to prevention science. These include: the Public Health Association of Australia (PHAA), which provides a forum for the exchange of ideas, knowledge and information on public health; the Australian Health Promotion Association (AHPA) which focuses on practice and research in health promotion; the Australian Network for Promotion, Prevention and Early Intervention for Mental Health that aims to assist organisations to implement mental health promotion and illness prevention; and Early Childhood Intervention Australia (ECIA), which aims to promote the public profile of early childhood intervention, facilitate effective community liaison and advocacy, and foster quality service provision. However, all of these networks are narrower in scope and none fulfil all the criteria above.

A relatively new organisation which fulfils all the above criteria is the Australian Research Alliance for Children and Youth (ARACY), which was created specifically in reaction to the worrying trends in the wellbeing of Australia's young people, with the goal of bringing together experts and organisations to work collaboratively to seek solutions to these complex problems. ARACY is a national collaboration whose 1,400 individual and organisational members arguably include most of those in the child and youth sector in Australia. It integrates expertise from across disciplines and sectors, and works to close the gaps between research, policy and practice. Key aspects of ARACY's approach are an emphasis on prevention and early intervention

rather than crisis-end treatment and care, a focus on systems and policy reform, and a commitment to evidence-based action. Through the ARACY ARC/NHMRC Research Network (2004–09), it created a Prevention Science sub-network to provide a forum for people specifically interested in the science (and art) of prevention across multiple domains to share their experience and knowledge, identify needs for further development of the field, and plan collaborative activities. Its interests include both systemic and programmatic approaches to prevention. Key goals that have been identified by members include: the production and use of standards of evidence; evaluation and dissemination of preventive policies and programs; supporting research into the effectiveness of preventive interventions in an Australian context; and advocating for adequate funding for prevention, including evaluation, sustainability and up-scaling. It seeks to enable a new generation of skilled and knowledgeable prevention scientists who can build effective partnerships across sectors, cut across silos, and adopt systemic thinking. It also seeks to advocate for prevention science as a responsible and cost-effective approach to advancing developmental wellbeing. A forum of this sort, with adequate resourcing, could become an important vehicle for advancing prevention science in Australia.

Conclusion

The case for prevention, and more specifically an evidence-based approach to prevention, to improve outcomes for children and youth is strong. The emerging multi-disciplinary and multi-sector domain of prevention science aims to promote evidence-based prevention by strengthening capacity, building knowledge and bridging the research/policy/practice divide. Prevention science would provide a workable framework for coherent advancement of research, policy and practice to improve child and youth wellbeing.

However, in Australia the prevention science field is embryonic and is developing in a context of considerable constraint with respect to the pervasive demand for, and focus on, treatment services. Moreover, the effort (financial and human) that is already being expended on current Australian prevention initiatives will come under increasing competitive scrutiny as inexorable demand for treatment services continues. This dynamic poses the possibility of a decline in the emergent science of prevention and a retreat from proactive, evidence informed trials, evaluations, and translation efforts that secure real human and financial gain.

Cross-sectoral and cross-disciplinary collaboration is arguably a key ingredient in ensuring that prevention science not only does not fall off the agenda but gains support, credibility and momentum. In order to actively pursue the goal of advancing prevention science in Australia, a critical first step is to create a structure for the diverse stakeholders in this area to come together to share and build knowledge. ARACY and its Prevention Science sub-network hold promise as such a structure

which could go some way towards advancing prevention science in Australia in order to begin to reduce the burdensome problem of social, emotional and behavioural problems in children and youth.

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