



OFFICE OF THE PRIME MINISTER'S SCIENCE ADVISORY COMMITTEE

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Improving the transition: reducing social and psychological morbidity during adolescence

Interim report, 1 July 2010

Dear Prime Minister

At your request, my office has been undertaking a project to assemble the available and objective evidence which might inform what actions could be taken to improve the transition through adolescence for young New Zealanders. This project is at its midway point.

Our task is to explore the causes of adolescent behaviour and to indicate where there may be opportunities for changes to policy and practices that might help to mitigate negative outcomes for New Zealand's young people. We are taking a multidisciplinary and lifespan approach to understanding adolescent behaviour. We are examining the biological roots of some behaviours including prenatal influences and age-related changes in the maturation of the sex hormones and the brain. We are also examining the social, familial, cultural, educational, and psychological causes of adolescent behaviours and some specific risk factors that might predispose particular individuals to experience negative outcomes.

To undertake this project I invited ten of our experts in social sciences and in clinical sciences to join a working party co-chaired by Professor Harlene Hayne of the University of Otago. Each expert took primary responsibility for evaluating a particular domain of the question by reviewing the literature and assessing the quality of the evidence. Their reports have been subject to iterative review and discussion by the working party. This work is ongoing and is a large task. I thank each of them for their engagement and significant commitment of time.

We are limiting our analysis to observations made in the peer reviewed scientific literature from both New Zealand and overseas. Much of this literature will come from the social sciences, but there is also a significant biomedical and clinical literature. Assessment of these different literature types takes considerable expertise. In evaluating the literature, important elements are the quality of the research design and the consistency of conclusions reached from different sources. The certainty of the conclusion suggested may be high or low and this needs to be explicit. Further, the effect size of any putative intervention needs to be considered – something may be reliably shown to have an effect, but if that effect is subtle its value for public policy formation is limited.

This interim report describes a number of themes that have emerged from our research and focuses primarily on those aspects where we have high confidence in the conclusions. It indicates where substantive conclusions have been reached, the direction of our thinking, and the focus of ongoing work. The complete report, which will be available in the last quarter of 2010, will be considerably more detailed and will include reference to the original literature. It is intended to provide a detailed evidence base from which government might develop future policy.

Allow me to make a personal assessment of the available data and put it in context: the problem we face is complex and multi-dimensional. The underlying issues are, on one hand, an earlier age of biological maturation due to improving maternal and child health over the past 150 years versus, on the other hand, a gross change in societal complexity that has either induced or exposed the limits of brain maturation in the adolescent years. Indeed, recent research shows that components of brain function that promote judgement rather than risk-taking behaviour do not fully mature until well into the third decade of life. The changes in society in relation to how people communicate with each other, the sources of authority and the definitions of acceptable behaviour have been profound. While it may be stating the obvious, the status of the family and teacher as role models and definers of boundaries has been largely usurped for many young people by a media that focuses on celebrity behaviour, in particular behaviour that might be regarded in normative society as antisocial at best and harmful at worst. As control of media content is essentially impossible in the electronic world, we have to devise ways to help young people transition through this dislocated environment. This may need quite profound changes in how education and related services are offered.

Clearly many parents have major difficulties in working out how to put boundaries on their children's behaviour against this more complex network of influences. They are understandably scared that their attempts to set boundaries will lead to greater rebellion and greater risk-taking behaviour. These changes in social structure, and in particular in family structure, have emerged so quickly that traditional intergenerational transfer of knowledge has been lost from many parts of society and thus there is no body of folk-knowledge that can give parents and families the tools they need.

There is also a danger if we focus solely on those young people whose experience of the transition is problematic – we can learn much from the study of the many children whose transition goes well. An increasing body of evidence addresses how children develop prosocial behaviours – that is, behaviours within the desirable societal norms. The evidence is suggesting that targeted and very different programmes of early childhood experience can make an enormous difference. I would suggest that this important question of the development of non-cognitive capabilities in childhood should be a major point of focus of the ongoing work of this project. This work will by definition focus on the period between birth and six years of age, and will be complemented by study of the extent to which environmental factors (school, neighbourhood) and life skills education are important in influencing outcomes. I will be seeking your support for international expertise to assist in this next phase.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Peter Gluckman', with a large, stylized flourish at the end.

Sir Peter Gluckman KNZM FMedSci FRSNZ FRS

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Background

The transition between childhood and adulthood is characterized by a developmental paradox – despite a substantial increase in both physical and cognitive abilities, there is also a dramatic increase in morbidity and mortality rates. Some statistics indicate that mortality rates during adolescence increase by as much as 200% from middle childhood. This paradox is due, in large part, to difficulties in the control of emotions and behaviour during the adolescent period. For example, we know that adolescents are more likely than adults to abuse alcohol, smoke cigarettes, use illicit substances, commit antisocial acts, and drive recklessly or while intoxicated. Each of these behaviours carries substantial risk in terms of both physical and psychological development.

New Zealand has an unacceptably high rate of poor outcomes in adolescence – among OECD countries, we have the highest rate of teenage suicide and perform badly (24/30) in measures of teenage risk-taking (including smoking, drunkenness and pregnancy). The long-term consequences of such activities to young people are particularly significant in terms of health, earning capacity and social integration. These consequences are reflected in significant emotional costs to families and individuals and in major costs for many components of government including social welfare, justice, education, police and corrections. They also create or reinforce cycles of intergenerational disadvantage. Ultimately, these factors affect between 10 and 20% of young people in New Zealand.

The primary underlying question is why do adolescents engage in risky and antisocial behaviour? For some researchers, and indeed for many concerned members of society, the “raging” hormones of puberty are often held responsible for the sometimes reckless, risky and antisocial behaviour of adolescents. More contemporary research, however, has shown that it is not adolescent hormones *per se* that cause the problem, but rather a constellation of earlier and concurrent influences that disrupt normal biological, social and emotional development, thereby promoting a gap between normal biological maturity, which occurs increasingly earlier in Western society, and emergent social and emotional maturation, which is occurring increasingly later. Effectively, adolescence is now a longer and more prominent part of the life-cycle. From this perspective, it has been argued that risk-taking and antisocial behaviour may be an attempt to bridge the maturity gap by demonstrating autonomy from parental and societal control. We are reviewing the factors that have been shown to promote this gap in development and are considering directions and recommendations aimed at improving outcomes for children as they traverse the challenges of adolescence.

Another important component of normal development is the maturation of brain function which supports an individual's cognitive and social skills. The immature human brain does not exhibit the level of understanding, abstract thinking, or higher executive functions that make impulse control, wisdom, and judgement possible. One of the most important new findings comes from recent neural imaging studies which suggest that the human brain is not fully mature until sometime between 20 and 30 years of age. Importantly, those areas of the brain that are late to mature are involved in impulse control and judgement. In this way, our ability to think like fully fledged adults may not occur until well into the third decade of life.

There is increasing evidence to show that non-cognitive performance (that is social skills, emotional development and the ability to persist with difficult tasks) is affected by the quality of early childhood education and experience. These elements of non-cognitive performance contribute to high school completion as well as long-term functioning in the workforce. Non-cognitive skills have also been shown to affect morbidity and mortality during adolescence, primarily because they reduce adolescent involvement in risky behaviours. Countries that place greater emphasis on non-cognitive skill development from early childhood appear to be countries with lower levels of adolescent morbidity, although a causal relationship is yet to be determined.

The complexity of society has changed rapidly and continues to do so in an exponential manner. Television, internet, cell phones, texting, and Twitter all provide young people with the ability to form and maintain much more complex social networks. Although this increased use of technology obviously has some societal advantages, there are also risks as immature brains attempt to process all of this information and to manage the consequences of these ever widening social networks. The expectations on young people have also changed as society has evolved. Family structures have also changed. The importance of the media, social networks and peers relative to family and societal authority in influencing behaviours is likely to be modified by these evolving changes.

While the mismatch between biological and social maturity may underlie the heightened vulnerability of adolescents to a wide range of adverse psychosocial outcomes, it does not provide an adequate explanation of why some young people develop problematic outcomes and others do not. The literature shows that what places young people at risk is not a single factor (such as family poverty) but rather an interactive accumulation of adverse social, family, personal and biological factors. These factors include family socioeconomic and related conditions; cultural factors including discrimination and institutional racism; individual factors including personality, temperament and intelligence; exposure to perinatal adversities; child abuse, neglect and family violence; parenting practices and upbringing; educational

achievement and school experiences; peer affiliations and influences; community and neighbourhood features; and media influences. These personal, social and contextual factors are likely to interact with biological influences including biological maturity, brain development and genetic strengths or vulnerabilities to influence the probability that the young person will encounter significant difficulties during the period of adolescence. This cumulative risk model emphasises the importance of social and related policies that span a wide range of areas across health, education, welfare and youth justice.

Initial Findings

We have been and are continuing to review a complex multidisciplinary area that consists of a wealth of published research. Our initial survey of the literature base has used both a life-course approach – looking at biological, familial, social, environmental and educational factors that can impact on progress through adolescence and affect susceptibility to risk-taking behaviour – and an outcome-based approach – looking at whether targeting specific behaviours such as drug/alcohol abuse can offer ways to prevent or mitigate poor outcomes. A number of clear themes have emerged.

1. Adolescents are particularly susceptible to mental health problems, but there is a major deficit in our ability to detect and treat these disorders

Depressive disorder in adolescence is common, affecting at least a fifth of young people by the age of 18. Depression is the leading risk factor for suicide, and New Zealand has the highest teenage suicide rate in the OECD. Three-quarters of young people with depression get no treatment. We have also identified that other psychological problems, such as conduct disorder and poor self-control, are associated with negative outcomes during adolescence, including obesity, substance abuse, unsafe sex, crime, and drunk driving. These psychological problems affect up to 10% of young people. Psychological difficulty, even in milder forms, is also associated with disengagement from education or employment during adolescence.

Despite the fact that there is a growing body of evidence about effective programmes for the prevention, treatment and management of mental health problems in adolescence, there is a continuing deficit in the availability of, and access to, high quality mental health services for adolescents and their families in New Zealand. Effective programmes include both population-level public health programmes and individual-level clinical intervention. Effective interventions in the area have largely been founded on Social Learning Theory and Cognitive Behavioural approaches, however medication has also been found effective for some conditions including major depression and attention deficit hyperactivity disorder. A recent innovation has been the growing use of internet and text based interventions. Identifying the availability of these evidence-based approaches in New Zealand will be an important aspect of our ongoing work.

2. *The developmental status of the adolescent brain makes it particularly susceptible to the effects of alcohol and other drugs*

In New Zealand, a significant number (10% approximately) of young people experience serious difficulties with the use of alcohol and illicit drugs, with cannabis being the most commonly used illicit drug by far. Those adolescents who are most at risk of negative outcomes from alcohol and drug use are those who experience an accumulation of personal, social, and family disadvantage; affiliation with antisocial peers in particular plays a highly influential role during adolescence. In addition, research has shown that adults and adolescents differ in their response to alcohol. During adolescence, developmental changes in some neurotransmitter systems make the brain more responsive to the rewarding effects of alcohol. In other words, the adolescent brain 'likes' alcohol (and other potentially rewarding stimuli) more than does the adult brain. Unfortunately, the adolescent brain is also more susceptible to the cognitive impairments that alcohol produces. Furthermore, exposure to high doses of alcohol not only poses acute health risks during adolescence, but also may make the individual more susceptible to addiction later in life.

We recommend that consideration should be given to population-based and individual-based measures aimed at reducing the harm caused by alcohol in this age group. We note that both the Law Commission in New Zealand and the National Institute for Health and Clinical Excellence in the UK have also recently proposed evidence-based measures to restrict access to alcohol and exposure to alcohol advertising, particularly for adolescents. We have also identified a number of effective school, extracurricular, and family-based programmes that reduce adolescent alcohol use and could be implemented in New Zealand, in particular those promoting sustained parental influence on drinking behaviour.

Although cannabis has fewer *acute* negative health effects than alcohol, cannabis use during adolescence is associated with educational underachievement, mental health problems, more extensive illicit drug use, suicidal behaviours, and traffic accidents. Like alcohol, cannabis has its greatest harmful effects on adolescents. We recommend that efforts to reduce cannabis use should consider the special vulnerability of adolescents to this drug.

3. *The family unit is an important site for policy application, support and intervention*

A ubiquitous finding in the area of adolescent difficulties is that the young people who are most prone to problems frequently come from families marked by multiple disadvantages. These disadvantages include low income and poverty; family conflict and violence; child abuse and neglect; impaired parent-child attachment and other related factors. There is compelling evidence to suggest that an accumulation of

these adverse factors makes young people vulnerable to a wide range of adverse outcomes. Developing policies that strengthen families and address the needs of young people reared in multiple-problem family environments needs to be a central plank of any policy aimed at adolescence.

Two more specific areas, child maltreatment and interparental conflict, merit attention. Child maltreatment – physical, sexual and psychological abuse – leads to a host of negative social, emotional and cognitive outcomes during adolescence and later in life, including suicide, substance abuse, criminality and economic failure. Changes in brain chemistry have been reported in adults subject to such childhood abuse. Rates of maltreatment are greater in areas characterised by poverty and high unemployment. Up to 25% of children in some communities report witnessing an adult hitting or hurting a child. Without intervention, a quarter of maltreated children in turn become initiators of abuse. Furthermore, children who have been maltreated appear to be more susceptible to the detrimental effects of exposure to violent media. Interventions have been identified to prevent initial maltreatment, child impairment after maltreatment, and recurrence of maltreatment. Programmes that prevent the onset of child maltreatment provide the greatest individual and economic benefits; these include measures to improve education and employment opportunities and parenting skills in at-risk families.

Interparental conflict – domestic violence, separation and divorce – also has negative consequences for later mental health and achievement in children and adolescents. In New Zealand, approximately one-third of marriages end in divorce. There should be a focus on developing assessment strategies to identify children at increased risk for adverse psychological outcomes from interparental conflict and on evidence-based interventions to support these children and their families.

4. Policy should incorporate a Māori perspective on adolescence

There is overwhelming evidence of sustained poorer outcomes for Māori adolescents – poorer achievement rates from school, poorer participation rates in post-compulsory education, higher rates of risk-taking behaviours, higher unemployment rates, compromised health and development outcomes. Yet these behaviours and outcomes are not universally negative for Māori, with many Māori performing at the same or better standards than their non-Māori counterparts.

A clear focus on Māori and Māori-relevant solutions must be maintained, using Māori-specific and New Zealand relevant measurement tools to increase the evidence base. There is also an urgent need for enhancement of the Māori workforce in this area, both in the number and skills base of practitioners and the number of programmes. Policy development must occur in the context of the well-being of the whole whānau and there should be specific investment to address both determinants and other causes of differential outcomes for Māori adolescents.

Other Issues

A number of other issues emerged during our initial discussions that require additional research by the group to identify their importance and whether they may inform other possible recommendations. One example is the social, emotional and cognitive effects of access to mass media (e.g., television and internet), social media (e.g., cell phones, Twitter, Facebook) and other forms of technology. These changes in how people communicate with each other, in the sources of authority and the definitions of acceptable behaviour have been profound.

Our research will also extend to aspects of family structure, in particular how the greater fragmentation of families has led to the loss of positive role models for many young people. Traditional intergenerational transfer of knowledge, particularly around ways to guide children through this difficult period, has been lost from many parts of society.

In addition to understanding the difficulties that some adolescents experience, it is also vital to understand the factors that inoculate many individuals from negative outcomes. Nearly all adolescents will have access to media and technology, most adolescents will be offered alcohol or illicit drugs, and sadly a high proportion of adolescents will have less support from their families – because of abuse, neglect or parental conflict – than would seem ideal. But why do some individuals exposed to such risks experience serious emotional, behavioural and physical problems across the life course, while others experience little or no such difficulties? The essence of adaptation in the context of adversity is captured by the scientific field of *resiliency* research. We are exploring resiliency and using it as a framework for our recommendations – for example, what are the implications for adolescent risk-taking behaviour of the evidence that resistance to hazards may derive from controlled exposure to risk rather than its avoidance? The answers to questions like these can then be incorporated into health and life skills education, which may be one of the weakest parts of the New Zealand curriculum.

We are also exploring wider issues in education. As discussed above, there is growing research around the balance of development of cognitive versus non-cognitive skills in early education. While we have more research to do, we will consider whether it would be beneficial to place more emphasis on the development of non-cognitive skills during the course of early childhood and primary and secondary school education. Also, effective school and family practices can be identified which increase engagement at school, academic success and well-being for adolescents who currently have poorer outcomes.

There is also a growing body of knowledge relating prosociality (that is, cooperative behaviour towards other people and society in general) in young people to

neighbourhood quality independent of income. We will investigate whether there is evidence to suggest that modest expenditure to improve neighbourhood quality through diverse measures could have positive results for adolescents.

Although the speed of biological maturation for all adolescents has increased over the last century, it is also clear that individual adolescents who reach puberty earlier than their peers are even more vulnerable to earlier sexual and drug/alcohol experience and greater morbidity from risky behaviours. There is growing evidence that the timing of puberty can be affected by conditions before and after birth. In general, babies born smaller tend to have earlier puberty. Infants stressed or abused may have earlier puberty. Offspring of obese mothers, or children who gain excess fat in childhood, have earlier puberty. We will examine the significance of these and other biological factors that influence development.

Beyond consideration of these specific factors, the core question that this work leaves for policymakers is how to respond to the new phenomenon of prolonged adolescence. All developed countries are experiencing the effect of the 'maturity gap' between earlier puberty and delayed acceptance as an adult, which has occurred simultaneously with changes in social and economic structures that have de-emphasised the family unit and changed the nature of employment. Our findings and recommendations will have implications for many aspects of society, such as the rights of young people, the structure of education and the way that the justice system handles young offenders.

Where To From Here?

Over the next 6 months, we will continue to develop these themes into a fully referenced and justified report describing the scientific foundations for evidence-based policy development in the area of adolescence, suggesting new initiatives which will advance the welfare of our young people to the benefit of all New Zealand. In developing possible recommendations we are giving due weight to the size of the effect that might be anticipated by any particular intervention, its probability of impact and its potential cost. The final report will be subject to international peer review. Some of the recommendations that could well emerge from this report will be relatively easy to implement, but others will require substantial investments of both time and money, and some might suggest fundamental changes in the way New Zealand does things. Some of our recommendations have the potential to foster immediate change in the outcome for New Zealand adolescents; many of them, however, will lead to change over the long term.

Most importantly, any recommendations arising from our report will be based on evidence obtained through careful assessment of the available research. In this way,

we feel that that there is a high probability that interventions are possible that will increase the health and well-being of New Zealand's young people.

Who is Participating?

The Chief Science Advisor to the Prime Minister, Professor Sir Peter Gluckman, invited the following experts to contribute to this initiative:

- Dr Sue Bagshaw (Collaborative Research Centre, Department of Paediatrics, University of Otago, Christchurch)
- Professor Chris Cunningham (Research Centre for Māori Health and Development, Massey University)
- Dr Simon Denny (Department of Paediatrics and Centre for Youth Health, University of Auckland)
- Professor David Fergusson (Department of Psychological Medicine, University of Otago Christchurch School of Medicine)
- Professor Gordon Harold (Centre for Research on Children and Families, University of Otago)
- Professor Harlene Hayne (Department of Psychology, University of Otago), Co-Chair
- Professor Stuart McNaughton (Faculty of Education, University of Auckland)
- Associate Professor Sally Merry (The Werry Centre for Child and Adolescent Mental Health, Department of Psychological Medicine, University of Auckland)
- Professor Richie Poulton (Dunedin Multidisciplinary Health and Development Research Unit, University of Otago)
- Dr Deborah Sloboda (Liggins Institute, University of Auckland)