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Child Health

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Introduction

The health and wellbeing of children and youth are any country's most crucial future concern (Stanley, Prior, & Richardson, 2005). Measuring health (or ill-health as we usually do!) and wellbeing (or ill-being!) gives us an indication of the success of our society in providing those environments (physical, social, emotional, cultural and economic) that are positive for healthy child development. Interestingly, such environments appear not only of benefit in growing children well, they seem also to be good for economic success, equality, and the care of other vulnerable groups such as the aged and the disabled. Countries with the policies, services and cultures that serve children well are those with good outcomes across the whole of the population. Because they care for the future of their children, they are also more likely to be concerned about the environment, climate change and the negative effects of the modern world, such as excessive consumption, advertising to children of harm, appropriate use of new technology, and providing the best health and social services. Such countries also tend to have a greater focus on enhancing the circumstances for health than in just providing good curative and crisis services in all the domains such as health, education, child protection and juvenile justice.

This chapter will briefly review the physical and mental health status of Australia's children. It will make the case for

prevention, as well as the provision of good care for sick or damaged children and youth; and address the societal influences on child health and wellbeing. I include a separate section on Aboriginal children because of their special status in our society, and conclude with a call to action to put children and youth more in the centre of our values and our care.

Physical health — some good news and some bad news

If we take a 100-year view of child health (Stanley, 2001) the trends in health, as measured by the proportions of children dying, or becoming seriously ill from many preventable disorders, have improved spectacularly. In 1900 nearly 120 children in every 1000 births did not make it to their first birthday, dying from infections such as diarrhoea, whooping cough, diphtheria, pneumonia, tuberculosis, rheumatic fever and others. Once a child survived its first year the chances of dying were much less, but for most diseases such as cancers, diabetes, and many other rarer chronic disorders, and for accidents and serious trauma, medical care was rudimentary and often failed to change the disease outcomes. By 1930 the rates of survival in the first year of life had soared and infant mortality was down to less than 50/1000 births (these rates are all Caucasian and we have little data on these measures in Aboriginal populations either at this time or before colonisation). There is an interesting little book written by Brian Gandevia (*Many a Tear Shed*) about immigrant children in the early colony of NSW, which suggests that while the rates of infectious disease were high, the level of nutrition and living conditions in Sydney Cove were better than London, with resulting better health of young children here.

The major reasons for improved health of children during the first 30 years since Federation were in fact much more to do with living conditions and nutrition, maternal education and paternal income than they were to medical care. One of the most dramatic influences was breast-feeding; Armstrong, who was Director of Health Services in NSW, showed that the rate of infectious diarrhoea was tenfold higher in those infants

who were not breast-fed compared with those who were (Armstrong, 1939). He encouraged women to breast-feed, and initiated the first maternal and child health workforce to educate women about how to improve the health of their children. Better nutrition, ice-chests to preserve food, better housing and sanitation all improved during these years and contributed to better health of all children. As more men were employed in better jobs they had more capacity to provide housing, food and education for their families which also contributed to improved health (Stanley, 2001).

All these improvements commenced before antibiotics and immunisation were discovered and used widely. These did not really impact on infectious diseases until the 1940s. Subsequent to this period, both these wonderful medical interventions meant that the majority of children and young adults either did not get, or die, from infections that had been common causes of death just 40 years earlier. While the era of major impact of vaccinations for common infections in Australia was from the 1940s, the discovery of the polio vaccine and its use in the late 1950s and early 1960s resulted in dramatic falls in this relatively recent and devastating viral infection (Figure 1). And of course we have to remain eternally vigilant as now some parents, who rarely see a serious case of infection, are reluctant to vaccinate their well children, and if enough parents decide to stop vaccinating as happened in the United Kingdom in response to scares about pertussis (whooping cough) vaccine, dramatic levels of disease are seen (see Figure 2; Ada & Isaacs, 2000). Luckily we, in Australia, managed to avert a similar situation after the erroneous Lancet report linking the vaccine for measles, mumps and rubella to autism; this was disproved by a large number of studies, and we did not see a fall in protective immunity from parents not vaccinating their children. Vaccination remains the most effective public health intervention ever, as so many people succumbed to infections, with many young children dying or getting serious complications. Prevention of disease remains our best, most cost effective and humane method of management.

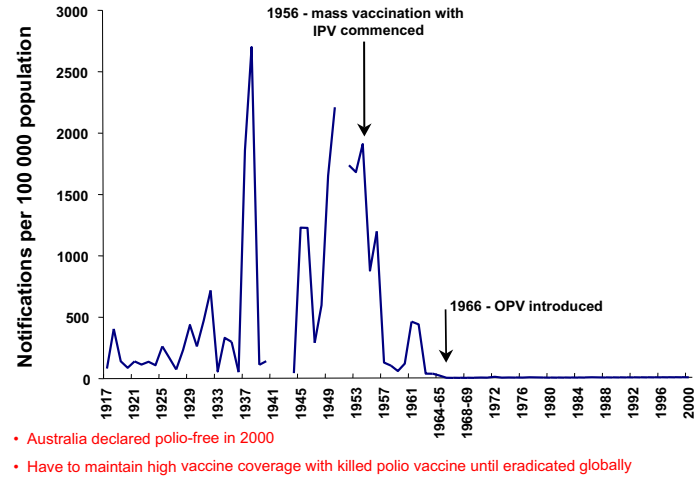

Figure 1

Polio, 1917–2000. Australia.

Source: http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-cdi-2002-cdi26suppl-vpd99_00.htm. This work is copyright Commonwealth of Australia. It is intended for your general use and information and provided on the basis that the Australian Government is not providing professional advice on a particular matter.

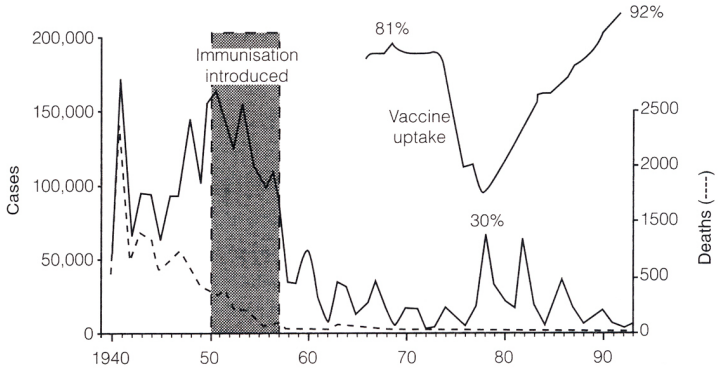

Figure 2

Whooping cough notifications: deaths in England.

Source: Vaccination: the facts, the fear, the future. G Ada & D Isaacs, 2000.

However, as Australia and the rest of the world moved in to the era of biomedical research and better care, we were seduced away from prevention and into heroic clinical interventions.

Throughout the 1940s (the war years of course led to vastly improved surgical and anaesthetic techniques), the treatment of trauma (such as blood transfusion and aseptic techniques of wound management) and surgery for cancers had an impact on the survival of children with these problems. The revolution in diagnostic capacity (e.g., X-rays, imaging, biochemical testing) and understanding of disease pathology led to much better diagnosis and treatment of many diseases including those affecting children. There is no doubt that biomedical research with these dramatically improved treatments has had a wonderful impact on the health and wellbeing of children. Illnesses such as cancers had horrendous death rates; 80% of children who developed leukaemia in the 1970s died soon after diagnosis, 30+ years later well over 80% of children have a 5-year survival rate. Other examples are the treatment of premature newborns with increased understanding of biochemistry, physiology, control of blood pressure, respiratory complications, brain function and other aspects. The death rates of preterm infants have fallen to low levels, and we often see reports in the paper of the survival of infants as young as 25–26 weeks gestation (i.e., about 6 months instead of 9 months pregnancy).

Thus if we add together the medical discoveries of vaccines, antibiotics and modern medical treatments such as insulin, chemotherapy, intensive care and surgery, the impact on disease outcomes has been extraordinary. This is undoubtedly the good news I refer to in the heading of this section. The sequencing of the human genome is now available, but the extent to which that knowledge will be used to tailor drugs, enhance diagnosis and improve outcomes of disease is still to be determined but is promising (Janssens & van Duijn, 2008). It is likely to have a greater impact on specific diseases, and while making treatment more effective it will also increase

the costs of treating disease. How much it will contribute to the health of populations by prevention is still a matter for intense debate (Khoury, Gwinn, & Ioannidis, 2010).

However, as we moved in to the 21st century, we suddenly became aware of some clear and very worrying patterns. In the developed world, in very wealthy countries with excellent health (disease-focused) systems, the patterns of child health and wellbeing changed quite markedly. It was almost as if becoming a modern country with wealth, knowledge and capacity did not result in good outcomes across all areas and was bringing with it some significant challenges for child health. And some of these are related to the very affluence we so actively sought and are encouraging the developing world to follow.

The three health areas of most challenge now facing us are: (1) asthma and allergies; (2) overweight and obesity with its young and older adult complications of diabetes, heart disease, hypertension and stroke; and (3) (possibly the biggest) mental health illnesses. The trends in some of these are shown in Figures 3 and 4 and for each of them the pattern is similar ie that they were rare before 1970 and increased dramatically since then. They are similar in the challenges that they present to us as health professionals as (a) they are complex in causation involving both genetic (probably multiple genes) and interacting environments during development from in-utero onwards; (b) they have complex social associations and risks such as family pathology (particularly in obesity and mental ill health); (c) the treatments are not particularly effective and these diseases often become chronic and hence demand a whole of life management plan; and (d) there are broader societal factors which impact significantly on their occurrence and complication rates.

Such societal factors include such diverse circumstances as excessively clean living environments (possible risk factor for allergic asthma) to changes in the parental workplace (more women working, both parents working longer hours indirectly

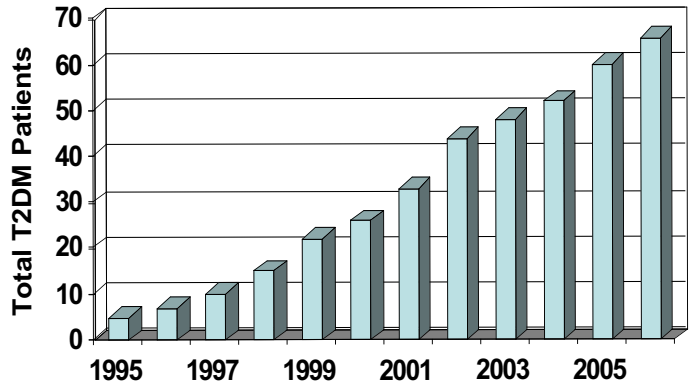

Figure 3
Increasing Type 2 diabetes in children in Western Australia.
Source: Hewitt J, Davis EA et al, APEG 2007.

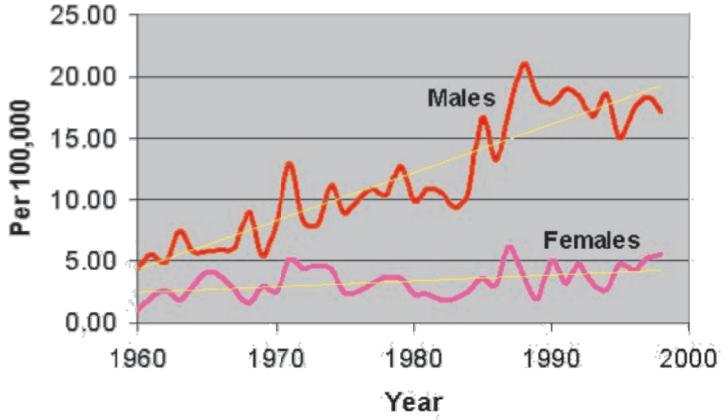

Figure 4
Suicides: 15- to 19-year-olds 1960–1998.
Source: Australian Bureau of Statistics Cat. No. 4398.0.

impacting on both obesity and mental health). In contrast to the infectious diseases of 100 years ago, we are unlikely to develop simple vaccines to prevent asthma, overweight or mental ill health or antibiotics to treat them. And yet there are

some parallels to the population interventions of 100 years ago. Then, none of the doctors knew the organisms that infected young children and killed them and they had no means of adequately treating them. Yet the most dramatic falls in the occurrence of these infections occurred well before antibiotics and vaccines. Population interventions that improved children's resistance to infection, such as improving their nutrition (breast-feeding, refrigeration, maternal education, better food), avoided contact with organisms (hygienic interventions) and better housing (improved their general resilience) were all implemented by a highly motivated and well funded public health workforce. A plaque outside a Maternal and Child Health Clinic in Subiaco (Perth) in 1903 reads 'the health of mother and child is the first consideration of the state'.

The prevention imperative: Why prevention is logical

I suggest that we can learn from the early years of Federation for today's challenging problems. The infectious diseases of 1900 must have seemed as worrying as are our child and youth problems of today. And yet the health authorities pursued information on risk factors for these diseases and implemented population wide strategies to reduce their occurrence with resounding success. It is obvious that we need to shift our focus in health and health care from the crisis end of acute and chronic care to a much bigger investment in prevention of problems. Prevention can be primary — avoiding the disease starting at all as happens with vaccination for infections. This would mean getting a reasonable understanding of the causal pathways in to asthma and allergy, of overweight and obesity and of mental ill health, and then intervening across the whole population — 'vaccinating' the majority to protect as many from developing these problems. It is highly unlikely that these primary preventive pathways include changes in genes ie increased genetic risk, as this would not have occurred as quickly as these trends we observe. Research is now focusing on preventing asthma occurrence within high risk families but no population wide interventions have yet been clearly identified.

Avoiding children becoming overweight and obese is a major societal challenge — it is certainly not as easy as just telling parents and children to eat less fat and sugar and to exercise more! It probably involves parental dietary and activity patterns, fetal growth in pregnancy, length of sole breast feeding (again!), introduction of a diet low in certain fats and sugars as well as how active a child is. Interventions are likely to include the way we plan our cities, how we advertise food, what happens in families and communities in relation to how easy healthy choices are, and parental education. There are likely to be multiple genes for obesity but the major ways to prevent overweight children are likely to come from manipulating their environments more than new drugs based on genomic medicine.

The pathways in to mental health problems in children and young people are also very complex and include both multiple genetic and environmental risks and how they interact during development. There are a clear set of parental and societal factors that are likely to enhance mental health and protect against many of the psychosocial problems we see in our children and young people; our challenge in 21st century Australia is to change these societal problems to reduce the impact of these disorders. There are two basic groups of psychosocial problems in children and young people — less frequent and more severe are the group of psychoses. These are serious, usually lifelong conditions more likely to be due to biological conditions, and may well be soon shown to have clear brain or genetic anomalies. They include severe depression (sometimes called endogenous depression), bipolar disorder (used to be called manic depressive psychosis) and schizophrenia. These disorders are not really that common in childhood and do not seem to be increasing very much, although there are a group of young adults who appear to be particularly vulnerable to cannabis or other illicit drug use and develop psychotic illness as a result of such exposures. This latter group may well be increasing (Degenhardt, Roxburgh, & McKetin, 2007).

The other group of mental disorders which is much more common and rising much more than the psychoses, are divided in to internalising and externalising problems. Internalising disorders include depression and anxiety, and externalising disorders include excessive aggression and inability to control anger (sometimes called conduct disorders). These are clearly related to adverse early life experiences and the most preventable of all of the mental health problems we see in young people. The pathways to this group of disorders is shown in Figure 5 — which shows that there are multiple possibilities for intervention.

Prevention can also be secondary, where we attempt to reduce the impact or complications of the disease by intervening early in the course of the disease. This is similar to using antibiotics to treat meningitis and therefore avoiding the brain damage and disability we used to see from such infections. With asthma and allergies, secondary prevention would be

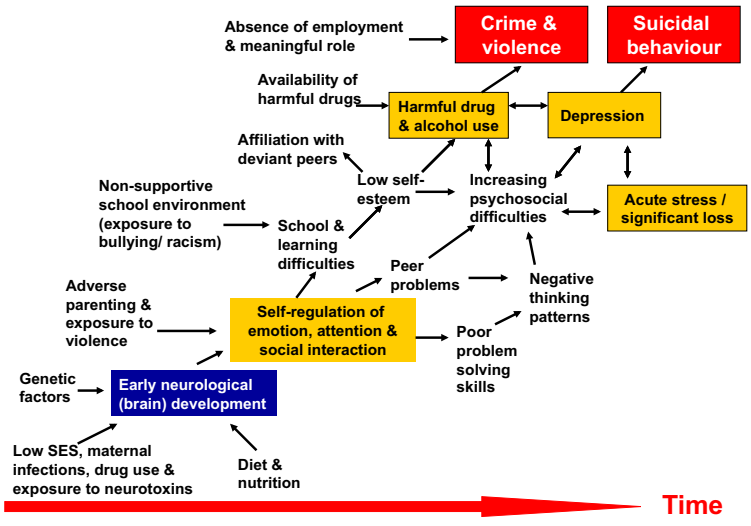

Figure 5
Pathways into suicide.
Source: Silburn, 2001.

attempting to avoid acute attacks becoming chronic with airway damage, or by exposing children to small doses of the allergen to reduce their sensitivity to the exposure. With obesity and overweight the aim of secondary prevention is to attempt weight reduction to avoid type 2 diabetes and other complications — this is proving notoriously difficult. And with mental health problems, secondary prevention includes early diagnosis and treatment to avoid abnormal behaviours in children becoming entrenched, leading to serious adolescent and adult mental health problems that are much harder to treat. There is increasing evidence that this is most important.

But the most cost-effective, humane and logical approach is primary prevention, and it is imperative that our research and efforts concentrate on such activities. While these are real challenges and will involve us unravelling the complex interplay between genes and environment that must be occurring during the development of children who are affected by these conditions, the benefits are huge. The costs of these three diseases alone are enormous already. If costed over the lives of individuals who are affected children today, it is likely to mean that our hospitals and medical services will be increasingly expensive and overstretched. It has also been estimated that if we cannot prevent these problems, we may be the last generation to have longer lives than our parents (Gray & Holman, 2009). In committing to the 'prevention imperative', remember that these diseases have increased very quickly over recent times. If we can address the factors that caused these recent increases surely we can reverse the trends and decrease the diseases and problems like our founding fathers of 100 years ago?

The other pattern that is common to many of these 'new morbidities' of the 21st century is that they are, as were the infectious diseases of earlier times, strongly linked to social disadvantage. This means that there appears to be a gradient in the disease, with risk increasing as you move from a position of advantage to one of disadvantage — and that at each level of disadvantage the risk of getting the disease is higher than the level above it. This pattern is shown for overweight and obesity

in Figure 6 and for mental health problems in Figure 7. Perhaps there are some things about our modern society inherent in these patterns that we might be able to change that could reduce the negative impacts of social inequalities on today's children's health?

Societal influences on child health and wellbeing

There is a growing area of research and understanding of how our modern society, with all of its benefits and ease of living, is also leading to increasing rates of problems for children and young people. If we look at the societal trends over the same time that the rates of these complex problems in children and youth have been increasing, many of them may well explain the changing environments that could be causes of these problems. While I have mentioned asthma, obesity and mental ill health, at the same time we are observing increases in child maltreatment, a range of behavioural problems (attention deficit/hyperactivity, communication problems, learning disabilities, substance abuse, aggression, sexual precocity, youth violence and disengagement), and increases in juvenile incarceration. The worrying aspects of these disorders (which are also

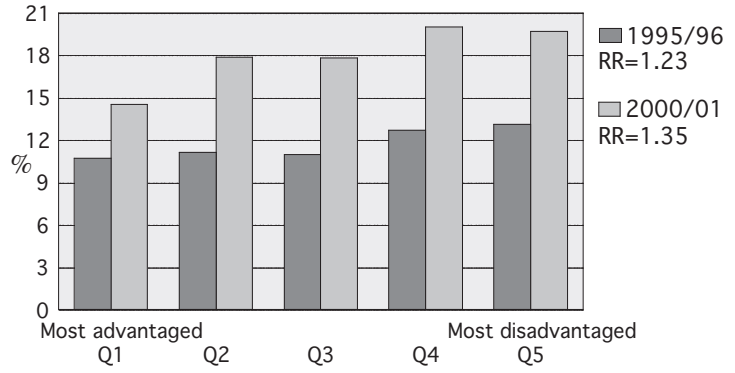

Figure 6

Overweight and obese 4-year-old children, South Australia, 1995–1996 and 2000–2001.

Source: Glover, PHIDU, Adelaide University (unpublished data).

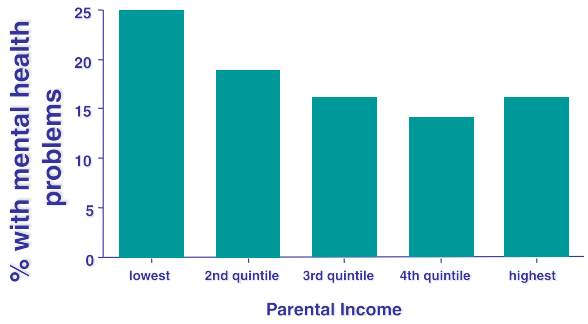

Figure 7
Parental income and mental health problems in 4- to 16-year-old children.
Source: Silburn et al., 1996.

similarly complex to our health and mental health examples) is that they traditionally occurred more in males than in females. Hence another dramatic change that also pinpoints environmental rather than genetic effects, is that these problems are occurring almost as frequently in females, whose rates have escalated much more than those for males.

We are looking at one in five young people with these sorts of problems, and our concern in relation to these is how they impact on the future ability of our youth, and hence of our society. The term 'human capability' measures the extent to which we can as individuals and collectively, participate socially, economically and civilly in our lives. The more of us who can do this, the better and more effective our society will be. Not only will we have a more competent and effective workforce, but the next generation of parents will have the knowledge, capacity, income and other resources to provide for their children the best possible chances of health and well being. Our society will benefit in other ways as we will not have to spend such huge amounts on health, mental health, and welfare and justice services.

What have been the major changes in our society and do they explain the patterns in diseases and problems we are now seeing in increasing proportions in our young people? The changes are profound in their capacity to interfere with children's development and many are interrelated. They include changes in family structure — divorce, remarriage, single parenthood and blended families; a focus on wealth creation and individual greed with the resulting increases in inequalities across society; dramatic changes in women working without concomitant provision of high quality care for children; families working and living away from extended family; the pace of and stress in the workplace, with a focus on profits over a place where people worked to earn a living and increased mobility to seek work; more part-time work, more marginalised workers, more poverty, more children living in households with two to three generations of unemployed parents; a dramatic increase in the gradient between CEO salaries and those of their workforce; dramatic changes in technology, the pace of life, the way we communicate and in the media, TV, the internet, mobile phones, access to pornography; less creative play; a huge increase in material consumption in the pursuit of happiness; environmental degradation and climate change; more fatty, high carbohydrate foods, with much more fast foods than that cooked or grown at home; a huge increase in car ownership and less opportunities/encouragement for children to walk/ride bikes to school, play with friends and so on; more fear about harm or litigation stopping active play; substance abuse and violence accepted by Australian society as normal behaviour; and the sexualisation of children and targeting children as consumers by advertising.

About 80% of all child maltreatment is associated with poor mental health of parents, parental substance abuse (particularly alcohol), and disability in the child. For a country like Australia to have such a high proportion of children under care and protection orders (see Figure 8 for trends) is anguishing and of huge concern. Yet when report after report shows

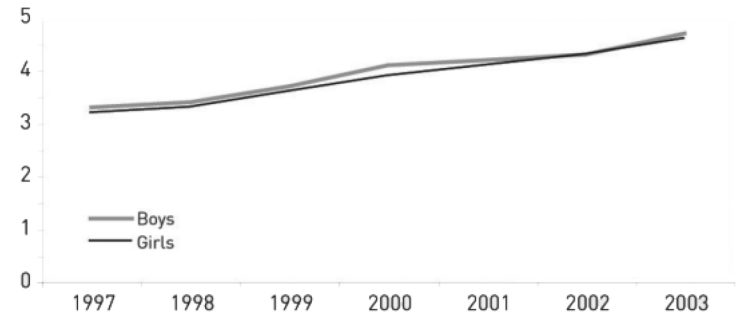

Figure 8
Children aged 0–14 years on care and protection orders at 30 June, 1997–2003 (rate per 1000 children).
Source: AIHW, 2005.

the levels of child abuse and neglect, or newspapers describe in shocking detail a neglected child, the call is always for more child protection workers, removal of children and finding and imprisoning the perpetrators. While it is vital to look after children already harmed, we should all be asking why the rates are rising and how can we prevent children being so harmed. Of all of the conditions I have mentioned surely this one is the most important for us to prevent and not wait until a child is irreparably damaged with life long effects?

If these characteristics of modern society are so negative for children — and they are — what can we do to influence them and make them positive rather than negative? Not all aspects of the internet or TV or the workplace or our communities are harmful and many are of benefit. What is needed is that the negative aspects are realised, their effects neutralised and that all of us at all levels realise the importance of putting our children and young people at the centre of our planning, our policies, our services and our lives.

Figure 9 shows what I mean — it shows a circle of influences on children's health and wellbeing; those close to the child such as their family, their community and their schools can be enabled or disabled by those spheres outside, such as

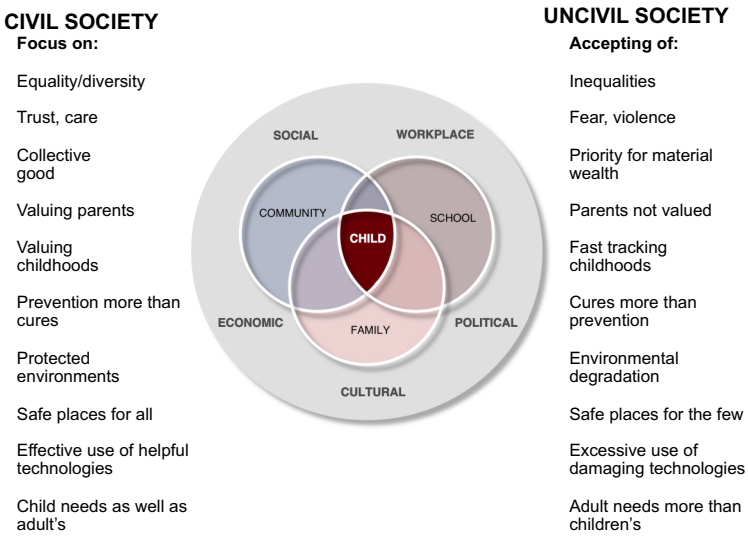

Figure 9
Civil society, uncivil society.
Source: Stanley, Prior, Richardson, 2005.

the workplace, the economic and social milieu, the media and other influences. We must work collectively to try to move towards a more civil society to prevent these major problems I have highlighted.

As many developing countries become wealthier and follow the pattern we have set for them they could well be facing not only the diseases of poverty that we coped with 100 years ago but also the diseases of affluence and inequality that we are attempting to tackle now. Thus it is urgent for us to change for our children and even more urgent for these poorer countries, many of them close to us geographically. In Australia we also have a population that is being hit by this double whammy of poverty and poor development and affluence and chronic disease — our Aboriginal and Torres Strait Islander populations. I think we need to think about these special children — our first nations people.

The special case of Aboriginal children

The population pyramid and the deaths (Figures 10 and 11) suggest that, if we look at the total Aboriginal population, they tend to be younger, dying more as infants and as young men and women, compared to the rest of the Australian population. The pathways into the poor levels of Aboriginal health and wellbeing are illustrated in Figure 12, and suggest that these commenced with colonisation (or invasion as many Aboriginal groups would maintain). That these levels are higher than in non-Aboriginal people in Australia reflect this historical and continuing marginalisation rather than being due to 'Aboriginality'. Any group of people experiencing the level of cultural interference and neglect that our first nations people have had would have similar patterns of disease and problems such as substance abuse and violence. And in fact, that is exactly what other colonised populations in North and South America, New Zealand and in Europe are also experiencing.

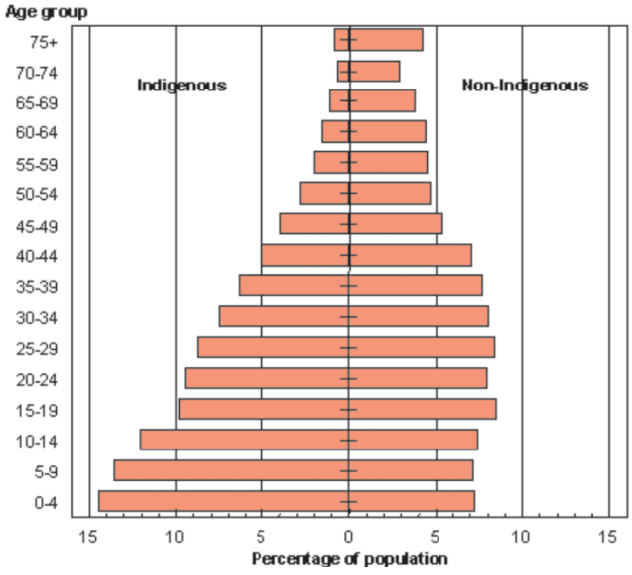

Figure 10
Australia: Growing old and growing young.
Source: Australian Bureau of Statistics, 2010.

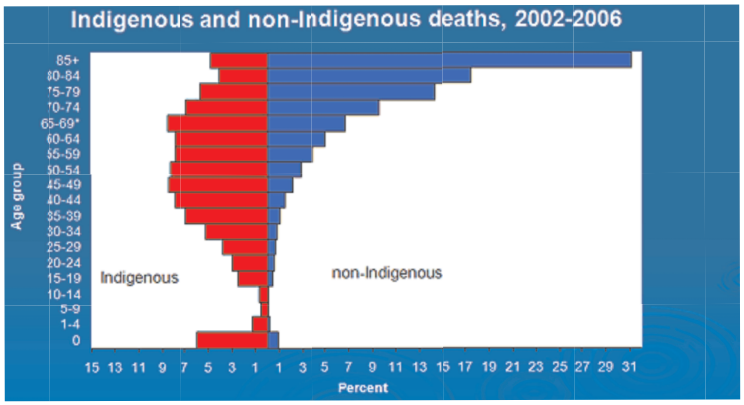

Figure 11

Indigenous and non-indigenous deaths, 2002–2006.

Source: T Calma, 2010. From Australian Bureau of Statistics. Experimental Life Tables for Aboriginal and Torres Strait Islander Australians, 2005–2007, ABS cat. no. 3302.0.55.003, 2009.

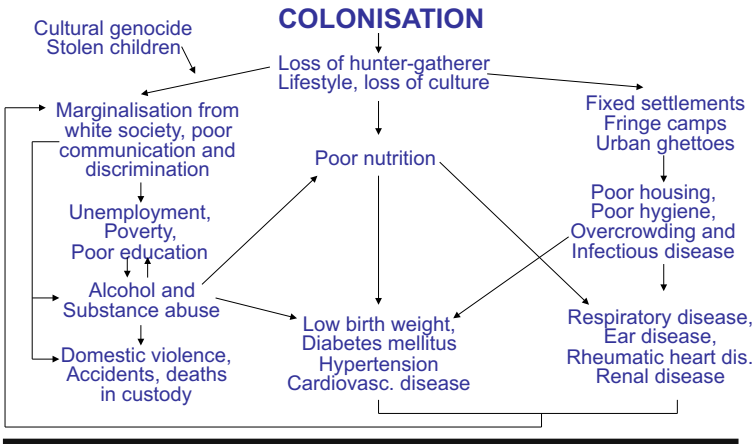

Figure 12

Impact of white colonisation on Aboriginal health today.

Source: Matthews, 1997.

The most comprehensive study of Aboriginal children and youth ever undertaken was the West Australian Aboriginal Child Health Survey (WAACHS) conducted in 2000 (*Volume 1: The Health of Aboriginal Children & Young People; Volume 2: The Social and Emotional Wellbeing of Aboriginal Children and Young People; Volume 3: Improving the educational Experiences of Aboriginal Children and Young People; Volume 4: Strengthening the Capacity of Aboriginal Children, families and Communities*). It documents the extent of the stolen generation (i.e., forced removal from family and land) across all communities in Western Australia and the impact on later generations. Between 40–60% of today's parents reported forced separations in their families, and told of the impact and pain of this on their lives and their wellbeing. The rates of social and emotional problems in children whose families reported being forcibly removed was two to three times higher than those who were not. Other problems, such as mental health, substance abuse, gambling, and feeling lonely were reported more commonly in the offspring of those who had been taken. There are still significant groups of Aboriginal people who are experiencing trauma from this history but also from current family violence and child maltreatment linked back to these practices but still causing trauma today. As recommended in almost all reviews and reports (Royal Commission Deaths in Custody; Bringing them Home and the WAACHS — all reviewed in Stanley — Hawke Oration 2009) there is still a huge need for healing services provided in culturally acceptable ways to overcome these ongoing traumas. The Aboriginal Healing Foundation of Canada is an excellent model for Australia — we have started on the same road following the Apology but need to invest much more (as Canada has done) into a similar process.

Our Institute has been awarded a major research grant from the National Health and Medical Research Council of Australia (NHMRC) for a Centre of Research Excellence in Aboriginal Health and Wellbeing. With eight Aboriginal Chief Investigators the grant brings some radical thinking to what

needs to happen to improve health and other services (education, child protection, housing, police and justice) for Aboriginal children and youth. The projects address why all such services, even for those Aboriginal people in urban areas and close to services, fail to deliver for these groups at highest risk. The exciting aspects are that many Aboriginal families are doing well, but these patterns are hidden when you compare Aboriginal outcomes with non-Aboriginal people. When we analyse data only in Aboriginal populations, it is clear that many have better outcomes. By studying these groups and their characteristics we will identify those who are doing well and why and those needing to be supported in different ways to prevent disease and enhance health and well being.

Many of the Aboriginal researchers are conducting research using novel methods called community participation action research, which fully engage the populations they are investigating. Using these methods we can influence the way services are provided and make them effective. There are also projects on racism and its role in service failure and on how children identify as Aboriginal and what that does to their self esteem and resilience in the dominant culture systems such as education and health. We believe these powerful projects will have a major influence on service provision — hence we have called our grant 'From Marginalised to Empowered: research into action for Aboriginal health and wellbeing'.

Some good news stories — prevention in action

I want to end with some good news stories that illustrate how research into prevention and its application in the population can reduce and almost eliminate serious problems in children and young people. These are all Australian examples but have been implemented more widely too.

Prevention of cot deaths

From the 1970s, data in most developed nations showed that one of the most important causes of death occurring in children in the first year of life was Sudden Infant Death

Syndrome (SIDS), often called cot death as the infant was often found by the parents dead in their cots. The rates of these unexplained deaths seemed to have been rare before 1970 and the WHO Classification of Diseases had not had a category for SIDS before that time. There was intense research by both perinatal and paediatric epidemiologists and by those working in animal models to attempt to ascertain the cause of these deaths. Risk factors included not breast-feeding, being found lying supine, exposure to cigarette smoke, minor infections, being too warmly wrapped, poor immune function, having been born premature, parental poverty and a host of others. Many studies suggested that sleeping face-down was a major influence (Gilbert et al, 2005) and in 1991 a seminal Australian study done on a Tasmanian birth cohort demonstrated a clear increase in relative risk in babies put face-down to sleep (Dwyer et al., 1991. Without further evidence (e.g., from a randomised controlled trial), but with considerable discussion by panels of experts, Australian authorities made the decision to implement a nationwide 'reduce the risks' campaign focusing on prone lying, breast-feeding, avoiding exposure to cigarette smoke, and not wrapping up the baby too warmly.

The results have been extraordinarily successful, with rates of cot deaths falling from over 2 per 1000 to less than 0.4 in the first few years, and this is now standard infant care practice internationally. The program was, however, less successful in Aboriginal infants, and research and work with Aboriginal communities to properly engage them in preventive programs is widespread.

Prevention of spina bifida by folate

Most birth defects have no known cause. In the 1980s, following the thalidomide disaster, birth defects registers were established in many countries, including Australia, in the hope that such monitoring would detect a new 'thalidomide' before it caused too much damage. As part of the research done arising from such important data collections, we investigated the

patterns of spina bifida and related defects. Many groups around the world showed that peri-conceptional folate intake was associated with reduced rates of these defects, and by 1992 the randomised controlled trials showed that up to 75% of spina bifida and related defects could be reduced by increasing folate consumption before and in early pregnancy. Folate is a vitamin found in leafy green vegetables, wholegrain foods, nuts and fresh fruit such as strawberries. It is also in vegemite! This was the most exciting finding since rubella vaccination to prevent congenital heart and hearing defects caused by that virus during pregnancy. In Western Australia our team pioneered the world's first total population prevention program and showed that about 30–40% of defects were avoided (Bower & Stanley, 1989). While this was good news it was not as good as the research had predicted so we repeated our studies of women and found that there were several groups in whom the intervention did not work. They included Aboriginal, young, poorer women and those whose pregnancies were unplanned. We thus started to lobby to put folate in bread-making flour and achieved this aim in September 2009. We will continue to monitor the occurrence of these defects to ensure that the intervention is effective. The next major challenge in terms of prevention of birth defects are those due to exposure to alcohol in pregnancy.

The impact of swimming pools in remote Aboriginal communities

A team of researchers in the Institute were engaged by the WA Minister of Health to investigate the impact of putting in swimming pools in remote Aboriginal communities in Western Australia (Lehmann et al., 2003). Two communities, Jigalong and Burringurrah, were selected, and we examined all aspects of child health and wellbeing in all children in both communities over several years to ensure that the impact of the pools could be quantified. The results were most interesting, showing that ear and skin infections, antibiotic usage and referral to medical services for most diseases has fallen after the pools were installed. School attendance went up, along with

self-esteem and a general sense of wellbeing. The results from this study have resulted in many other pools being installed and maintained in remote communities around Australia.

Summary And Conclusions

The health and wellbeing of Australian children and youth is a mixed situation. On the one hand, we have some of the lowest rates of deaths and some particularly preventable infectious diseases in the developed world. Our health system of high technological medical care and its availability to the majority of the population is the envy of the world. Hence our 'sickness' system is terrific. However, there are some worrying patterns. One is that as we have become wealthy and sedentary, with more stress in our lives and increased pressure to earn and consume, the levels of some complex child and youth problems have increased. And I have outlined that our Aboriginal children and youth are needing much more from us if they are to feel fully part of our society.

The call to action is to put a much stronger focus on prevention in our health and other systems (such as child protection and juvenile justice), while still needing to provide crisis end-stage care. The benefits from such a shift in our balance will mean much less severe disease and trauma, a more humane approach and lifelong benefits to individuals and their families.

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