

COERCIVE AND MANDATORY IMMUNISATION

By

Judy Wilyman (BSc,MSc,DipEd)

j.wilyman@murdoch.edu.au

ABSTRACT

In 2008 State Government's in Australia implemented mandatory immunization policies for health professionals working in clinical situations. Australia also has a Childhood Immunisation Schedule which recommends thirteen vaccines be administered to infants before two years of age. This article uses pertussis epidemiology as a case study to examine the evidence supporting Australia's immunization policies. It concludes that there is a shortage of reliable independent evidence supporting these policies. The results of this research show that pertussis vaccine is not controlling the incidence of pertussis in the community nor the mortality and morbidity of this disease. It concludes that the implementation of mandatory immunization policies is unethical if it cannot be shown there is a serious risk to the community if vaccines are not used.

KEY WORDS

pertussis, epidemiology, immunization, mandatory, policies, public health

Acknowledgement

I would like to acknowledge Senior Lecturer Glenn Mitchell, Associate Professor Brian Martin and Associate Professor Peter Dingle for their direction in writing this article. I would also like to acknowledge the support given by a growing number of parents and health professionals concerned about mandatory immunisation.

INTRODUCTION

Immunisation is a medical intervention for healthy individuals, which is based upon theories that have evolved over time. It was accepted as a strategy against infectious diseases two hundred years ago at a time when our knowledge of immunology and genetics was very different. The social context of these times was also very different. If public health policies are based upon evidence and theories that are changing over time and without full knowledge of the mechanisms involved, there is the potential for policies to be harmful to the health of the community. To be certain of the health benefits of mandatory and coercive immunisation policies it is important to examine the history of vaccination and debates over evidence and theory. This paper uses a case study of pertussis to analyse the supportive evidence for immunisation policies.

Throughout the twentieth century the pertussis vaccine was continually questioned with respect to both efficacy and safety (1) (2). The Australian Government promotes immunisation programs as the main reason why infectious diseases such as pertussis are no longer causes of death and disability in Australia. The Government also claims that the pertussis vaccine is the most effective means of controlling the incidence of pertussis in the Australian population.

This analysis will examine the evidence that is used to support these statements in order to determine whether mandatory immunisation policies are appropriate. Finally, it raises the question of why necessary safety data has not been collected.

PERTUSSIS DISEASE

Pertussis or whooping cough is a highly contagious disease that is transferred by droplets in the air (3). By 1954 the risk of this disease in Australia was highest in children under one year of age with the most serious cases occurring in children under six months of age (4). It was not considered a serious disease in adults and adolescents because most individuals were exposed to this disease naturally in childhood and this provided long-term immunity (5). The overall mortality rate of pertussis is 0.03% (6b) and deaths usually result from pneumonia, pulmonary complications, asphyxia or encephalopathy (3).

HISTORY OF PERTUSSIS IN AUSTRALIA 1900 – 2007

Pertussis along with other infectious diseases was one of the main causes of infant deaths in Australia in the early nineteen hundreds. However, changes that occurred over the first half of the century significantly reduced the influence of these diseases on mortality and morbidity. In the nineteen-twenties sanitary reform was initiated and there was a greater emphasis being placed on social medicine (7).

Public health officials became aware that malnutrition increased the susceptibility of children to disease by weakening the immune system (7). The medical profession increased its support for breastfeeding in 1929 and this measure along with new relief policies regarding the minimum nutritional requirements in food provisions for the unemployed, led to a marked reduction

in mortality and morbidity in infants (8). This was further reduced by the discovery of antibiotics in the 1940's (8).

Lancaster noted that during the period from 1946-1954 pertussis was an uncommon cause of death for children and there was a significant decline in mortality if the age of infection increases (9). He noted that pertussis is very sensitive to social conditions and hygiene and its decline began before routine immunisation programs were implemented (10).

In 1950 the National Health and Medical Research Council (NHMRC) removed pertussis, influenza and measles from the list of nationally notifiable diseases in Australia because of the reduction in mortality and morbidity that had occurred by this time (11). Although vaccines for pertussis were developed in Australia in 1920, they were not used routinely or extensively until 1954 because of the variability in their efficacy and safety (12) (1) (13).

The decline in infant mortality from infectious diseases throughout the twentieth century in Australia is illustrated in **Figure 1** below:

(FIGURE 1 HERE)

It is clear from this graph that the most significant decline in infant mortality occurred prior to 1950 and as the graph shows a steady continual decline that began early in the twentieth century it cannot be a result of immunisation programs implemented in the late 1950's. However, there may be hidden effects due to vaccination programs after the 1950's. In the case of pertussis

disease this could be determined if the vaccination and socioeconomic status of cases of pertussis caused by the *Bordetella pertussis* bacteria had been collected.

The Decline in Mortality in Australia

Prominent Public Health officials of the twentieth century, such as Lancaster, Cumpston and Burnet state that social medicine including improvements in living standards, fitness, nutrition, breast-feeding, family size and sanitary reform were the most significant factors in reducing mortality due to pertussis in Australia (9) (14) (15).

The Decline in Morbidity in Australia

By 1953 the morbidity due to complications of pertussis disease was also low. Public Health Authorities have indicated that morbidity and mortality due to pertussis fluctuate together (16). Scheil et al claims that despite the high incidence rates of pertussis in South Australia over the nineties there has been no increase in the mortality or hospitalisation (morbidity) for pertussis in South Australia (17). This suggests morbidity and mortality rates fluctuate together. It also suggests there is no correlation between high incidence rates of pertussis and mortality and morbidity of this disease.

THE CASE FOR PERTUSSIS VACCINATION

In 1954 when the NHMRC recommended pertussis vaccine be placed on the routine immunisation schedule for infants, the mortality rate for pertussis was stated to be 0.091/1000 live births (10). Mortality had declined to 15 deaths per year and the majority of these deaths were infants under one year of age (11). The National Health and Medical Research Council (NHMRC) decided

pertussis was a vaccine preventable disease in 1954 because a more effective vaccine had become available and they recommended it be placed on the routine immunisation schedule for Australian children (13).

It was theorised that protection from disease could be provided to infants by introducing a modified infection into the individual and that only trivial symptoms would be experienced (14). It was believed that this would be definite enough to produce lasting immunity (14). Pertussis vaccine was promoted with the aim of further reducing mortality and morbidity due to pertussis.

It was also believed at this time that pertussis, like measles, could be eradicated (18). This belief was based on the theory of herd immunity. Herd immunity is a statistical theory that suggests that if a high enough percentage of individuals are vaccinated then the susceptible population is so reduced that the organism will stop circulating (18). It was believed this also provided a degree of protection to the unvaccinated population as the organism is prevented from circulating due to a reduction in the susceptible population. This belief resulted in a campaign in Australia in the 1980's to increase the vaccination rates for pertussis to 95%. Infant immunisation was strongly emphasised at this time and it intensified in the 1990's with the Immunise Australia Program in 1993 (6a).

The Government's immunisation policy states immunisation is the most effective means of controlling the incidence of pertussis in our community (13). The emphasis on increasing vaccination rates in the population assumes that the vaccine will reduce the incidence of this disease in the community

and that this will result in a reduction in the mortality and morbidity of this disease.

The highest risk group for pertussis disease is infants under 6 months of age (6b). In order to reduce mortality and morbidity of this disease it was necessary to vaccinate babies at 2 months of age to ensure they were protected by 6 months of age. Though vaccination carries a risk of injury or death for some individuals the Health Department states that the risk of the disease far outweighs the risk of vaccination (6a). The pertussis vaccine has been promoted by the Government as being for the good of the whole community due herd immunity (6a). Vaccination with pertussis in 2007 is now emphasised for all age groups as the disease is now considered a problem for adults and adolescents and they are also considered a reservoir for transmission of the disease (19).

THE CASE AGAINST PERTUSSIS VACCINATION

i) Controlling the Incidence of Pertussis

The pertussis vaccine has now been used for fifty years and in this time we would expect to see significant reduction in the incidence of this disease if the vaccine is effective. This is not the case. Epidemics of pertussis are being described in the United Kingdom, Australia and America where vaccination rates for infants have been above 86% since 1995 (20). The incidence of pertussis in highly immunized countries is similar to the incidence of pertussis in European countries, such as Sweden, Germany and Italy, where

immunisation with DTP vaccine is discretionary and vaccination rates are around forty percent (21).

To assess the benefits of pertussis vaccination programs it is necessary to know the changes in mortality and morbidity rates that have occurred with increased vaccination rates and not the changes in incidence of pertussis that is given in most policy documents. This is because the disease is caused by several bacteria species of which the vaccine only targets one species and only in prolonged cases (22) (1). Also because the incidence of the disease does not indicate the severity of the disease, as it is not a severe disease in all age groups (14).

Senanayake claims that pertussis is circulating in a similar fashion nowadays to the pre-vaccine era and it is the only disease on the universal childhood vaccination schedule that has seen an increase in reported cases in the USA rather than a decrease (23).

According to the NHMRC many cases of pertussis are now being recognized in adults and adolescents in highly immunized communities (19). This data on notifications is used to support the claim that booster doses are now required in individuals over the age of ten years in order to reduce morbidity in this age group (19). It is also suggested that this will reduce the transmission of pertussis to those most at risk: infants less than six months of age (19). Morbidity statistics for adolescents are not provided to support this claim but prior to vaccination this disease was not considered serious in adults and

adolescents (5) (23). In addition, there were 16 deaths attributed to pertussis from 1993 – 2002 and 15 of these deaths occurred in infants less than 12 months of age (23). This was at a time when vaccination rates were higher than any previous decade, approximately ninety percent of all infants (19).

The argument that adults/adolescents are now a reservoir for the disease ignores the fact that they have always been a reservoir for this disease. The difference is that artificial immunity wanes more quickly than natural infection and an individual who is first exposed to natural infection as an adolescent or adult is more at risk from this disease (14).

The lack of correlation between overall incidence statistics and the mortality and morbidity of pertussis disease was noted by prominent Public Health officials in the early nineteen hundreds (14) (15). Clinical severity of pertussis disease can only be determined by comparing the age-incidence in the population with the age-incidence of mortality and morbidity, because this disease is of greatest risk to children under 1 but most severe in children less than 6 months of age (9) (6) (23).

Reducing the incidence of pertussis in the Australian community was the premise used by the Government for increasing vaccination rates in 1993 (13). It is clear after fifteen years of high vaccination rates that this has not occurred.

ii) Long-Term Immunity versus Short-Term Immunity

Behrman et al claim patients who have been infected with pertussis naturally do not require pertussis vaccinations because the disease produces lifelong immunity (3). This has been disputed by Wendelboe et al, who conclude immunity is not life-long but it is longer than the duration of immunity after pertussis vaccination (5). The Australian College of Paediatrics (ACP) stated in 1991 that the duration of immunity induced by the Australian whole-cell pertussis vaccines wanes after two to three years (24).

Wendelboe et al noted that adults in the pre-vaccine era rarely presented with typical forms of pertussis (5). This would suggest that being infected with pertussis in childhood did confer long-term immunity as pertussis was not diagnosed in adults very often and it was not considered a serious disease in adults prior to vaccination (5).

It is thought that subsequent mild, unrecognised pertussis infection maintains a high level of immunity in adolescents and adults who have been infected in childhood (5) (25). Although Wendelboe et al question the length of duration of naturally acquired pertussis immunity they still conclude it is of longer duration than immunity after vaccination, possibly as long as twenty years (5).

iii) The Efficacy of the Pertussis Vaccine

Estimates of the efficacy of pertussis vaccine range from 40 – 90% and this is a result of significant differences in the design of different studies (24). The claim is often made that pertussis is increasing in frequency in areas where immunisation has declined (3). However, this is an unsupported statement and contradicts the fact that outbreaks are occurring in fully immunized

children and in countries where immunisation rates have been high for the last two decades (5) (20).

In a study by the Communicable Diseases Intelligence in 1985, it was found that 73 percent of the 15 patients of vaccine age (19 months) who got infected with whooping cough had 2 or more doses of vaccine (6b). This evidence does not support a case for vaccinating children under six months of age, as they do not receive the third dose until six months. Statements from the ACP also indicate there is no benefit for infants less than six months of age. They say, with regard to the schedule of doses, there is clear evidence that “two doses are inadequate and suggestive evidence that four or five doses are more effective than three” (p.16) (24).

By 1991 the ACP admitted that the theory suggesting pertussis disease could be eradicated by achieving a vaccine uptake of 95% was probably wrong (p.16) (24). In other words, the epidemiological evidence for pertussis disease does not support the theory of herd immunity. This is because the vaccine is thought to protect better against ‘disease’ than ‘infection’ when disease is classified as an infection with coughing longer than 21 days (1) (24). This allows the *Bordetella pertussis* bacteria to continue to circulate in the population. In addition, there are other bacteria causing pertussis disease, which the vaccine does not protect against (22).

It is also known that the vaccine does not stimulate antibody production in one hundred percent of individuals and the pertussis bacteria can also revert to

virulence under certain environmental conditions or as a result of inadequate treatment (1). Smith indicates that vaccine trials for acellular pertussis vaccine show no correlation between antibody response and vaccine efficacy (1).

This illustrates there are a number of reasons why immunized communities may have outbreaks of pertussis disease. It also strongly refutes the theory of herd immunity upon which pertussis immunization policies are promoted.

iv) Hidden Variables in Health Statistics

Three of the hidden variables in pertussis incidence statistics include vaccination status, socioeconomic status and the pathogen responsible for causing the disease. If these variables are not recorded then it is impossible to determine what effect the vaccine is having in reducing mortality and morbidity due to this disease. Despite the fact that pertussis has long been associated with poor living standards by Public Health Officials, the Government made no effort to collect socioeconomic status of cases of pertussis until 1997 (26).

Nor has the Government collected and published the vaccination status of hospitalised cases of pertussis. This information can be collected easily and be used to provide sound science on the debate yet this data has not been collected. This has resulted in an absence of information essential to our understanding of the effects of current immunisation programs on the health of infants.

v) Ingredients of the Vaccines

Parents are informed that the chemicals and virus's/bacteria in vaccines will not overload a baby's immature immune system nor will it harm their

developing neurological systems (6) (27). Yet parents are not informed of the ingredients of vaccines which include preservatives, antibiotics and adjuvants. These chemicals are known allergens and neurotoxins such as mercury compounds, formaldehyde, foreign proteins and aluminium adjuvants (28).

In addition, the combination of vaccines recommended on the childhood vaccination schedule (currently 13) has not been monitored for all outcomes in long-term health studies in animals or humans (6b). This means that synergistic and cumulative effects of the ingredients have not been evaluated. Value judgments regarding the safety of the vaccine schedule for infants are being made on an absence of this evidence.

Veterinary studies are showing there is overwhelming evidence supporting the link of autoimmune diseases with vaccines (29). Our knowledge of genetics has also evolved and it is now stated that genetic predisposition and environmental factors are accepted as risk factors for immune and neurological diseases (30) Epidemiological studies with set parameters will not detect conditions that are produced in children who have a genetic predisposition to certain conditions (31). Yet it is epidemiological studies that are used to promote vaccination to health professionals and the government. Scientists also admit that one of the hindrances to developing improved vaccines is the limited understanding of the mechanisms involved in either natural infection based immunity or that conferred by vaccination (1)

Scientists have not provided conclusive evidence that harm is not being caused to the immune and neurological systems by vaccinating against an

increasing number of diseases. Supporting this possibility is the escalating chronic illness that is being observed in children and the knowledge that, like all drugs, there is an increased risk with each vaccine that is used. Since 1966 there has been evidence indicating that there are hazards and complications arising from the use of vaccines and these increase with the increased number of vaccinations that an individual receives (32).

Statistics in Australia indicate there has been a five fold increase in life-threatening food allergies in children in the decade from 1994-2005 (33). This coincides with the government's push to increase vaccination rates in Australia to 95% with the implementation of the Immunize Australia Program in 1993 (6a).

CONCLUSION

This evidence indicates that the Federal Government's Pertussis Immunisation Policy is not controlling the incidence of pertussis in the Australian community. Furthermore, pertussis vaccine was not the most significant factor in reducing the mortality and morbidity associated with this disease and in fact may not have played any positive role. Immunological knowledge regarding human defense mechanisms of disease is incomplete. Some types of scientific evidence are being given undue emphasis in evaluating the risks and benefits of the pertussis vaccine: greater emphasis is being placed on epidemiological studies with selective parameters than the biological, clinical and ecological evidence that is being obtained.

The implications of this research are significant not only to the Government's pertussis immunization policy but to all vaccines being made available to the public. The pertussis vaccine should be reassessed with respect to the risks and benefits of the vaccine to the community. Factors such as improved social conditions in Australia increased the age of pertussis infection in children and this reduced the risks associated with natural infection. There are also benefits to the community from longer lasting immunity due to natural infection in childhood.

Vaccines cause adverse reactions, which vary in severity amongst individuals due to genetic factors. Genetic and environmental factors are known to influence the incidence of disease in communities. These factors must be considered in immunization policies.

In 2008 the Australian government implemented mandatory immunization policies which coerce Health Professionals into vaccinating against ten diseases in order to continue their chosen career. This policy is in question if the Government cannot provide conclusive scientific evidence to show that the health of the community is at risk without these vaccinations. Verifiable objective scientific evidence examining all the variables must be used to demonstrate the value of the vaccines to the community. This would include the vaccination and socioeconomic status of hospitalized cases of the disease.

Consideration must also be given to the possibility that using multiple vaccines in infants and adults could be harmful to the health of the population. It is important to be certain that by using multiple vaccines we are not removing one risk and replacing it with another.

The underlying ethical principle of health practitioners is to first do no harm. If it is biologically plausible that using multiple vaccines in infants and adults could cause significant harm to a proportion of the population as a result of genetic predisposition then the onus is on policy makers to provide proper public debate and demonstration of a serious risk to the community before mandatory and coercive immunization policies are implemented in healthy individuals.

References

- 1) Smith A.M., 1999, "Analysis and expression of important vaccine antigens of *Bordetella pertussis*" (manuscript), PhD thesis, University of Wollongong.
- 2) Commonwealth Department of Health, 1945 – 1986, "Official Yearbook of the Commonwealth of Australia", No. 37 – 72.
- 3) Behrman R.E, and Kliegman R.M. (eds.), 1998, (third ed.), "Nelson Essentials of Pediatrics", W.B. Saunders Company, USA.
- 4) Commonwealth Department of Health, National Health and Medical Research Council (NHMRC), 1954 – 1986, Report of the Session, No. 38 – 101.
- 5) Wendelboe AM, Van Rie A, Salmaso S, Englund JA, 2005, "Duration of Immunity Against Pertussis After Natural Infection or Vaccination", *The Pediatric Infectious Disease Journal*, Vol. 24, No. 5, p. 558-561.
- 6) Australian Government, Department of Health and Ageing,
 - a. Immunise Australia Program 2004:
 - b. National Centre for Immunisation and Research (NCIR)
 - c. National Notification of Disease Surveillance System (NNDSS)

www.health.gov.au visited 17.03.06
Immunise Australia Website: www.immunise.health.gov.au visited 10.03.06
- 7) Gillespie J.A., 1991, "The Price of Health: Australian Governments and Medical Politics 1910 – 1960", Cambridge University Press, Cambridge, UK.
- 8) O'Connor K., 1989, "A History of 75 years of baby health services in NSW". NSW Department of Health
- 9) Lancaster, H.O. 1956a, "Infant Mortality in Australia", *The Medical Journal of Australia*, 2: p.100-108.
- 10) Lancaster, H.O., 1956, "The Mortality of childhood in Australia: Part 1 Early Childhood", *Medical Journal of Australia*, 2: p. 889-894.
- 12) Feery BJ, 1982, "Incidence and type of reactions to triple antigen (DTP) and DT (CDT) vaccines", *Medical Journal of Australia*, 2: 511-515.
- 13) Commonwealth Department of Health, "The Control of Pertussis in Australia 1997", *Communicable Diseases Intelligence Technical Report Series (CDI)*, Vol. 22, No.9, 3rd September, 1998)

- 14) Burnet, M., 1952, "The Pattern of Disease in Childhood", *Australasian Annals of Medicine*, Vol.1, No. 2: p. 93.
- 15) Lewis MJ. (ed.), 1989, "Health and Disease in Australia: A History by JHL Cumpston", *Australian Government Publishing Service Canberra*.
- 16) Cumpston JHL, 1927, "The History of Diphtheria, Scarlet Fever, Measles and Whooping Cough in Australia 1788-1925, Commonwealth of Australia Department of Health", *Service publication No. 37*, Green HJ, Government Printer, Canberra
- 17) Scheil W, Cameron S, Roberts C, Hall R, 1998, "Pertussis in South Australia 1893 – 1996", *Communicable Diseases Intelligence*, Vol. 22, No. 5, May 14.
- 18) Colgrove J, 2006, "State of Immunity: The Politics of Vaccination in Twentieth-Century America", University of California Press, California
- 19) Commonwealth of Australia, 2003, National Health and Medical Research Council (NHMRC), Australian Immunisation Handbook (eighth edition) www.immunise.health.gov.au visited 2.10.06
- 20) Burgess, M.A., McIntyre, P.B., Heath, T.C., 1998, "Pertussis re-emerging: Who is responsible?" *Australian Journal of Public Health*, Canberra: February, vol.22, Iss; pg. 9-10.
- 21) Tinnion ON and Hanlon M, 1998, "Acellular vaccines for preventing whooping cough in children", *The Cochrane Database of Systematic Reviews*, 1998, Issue 4.
- 22) Khelef N, Danve B, Quentin-Millet MJ, Guiso N, 1993, "Bordetella pertussis and Bordetella parapertussis: two immunologically distinct species", *Infect Immune*, Feb; 61(2): 486-490
- 23) Senanayake S, 2007, "Pertussis in Australia Today: A disease of adolescents and adults that can kill infants", *Australian Family Physician*, Vol. 36, No.1/2, January/February.
- 24) Zeigler JB, Burgess M, Gilbert G, McIntyre P, 1994, The Australian college of Pediatrics Policy Statement, "Contraindications to immunization against pertussis", *Journal of Pediatrics and Child Health*, 30(4): p. 310-311.
- 25) Commonwealth of Australia, 1991, National Health and Medical Research Council (NHMRC), "Immunisation Procedures" (fourth edition), *Australian Government Publishing Service, Canberra*.
- 26) Andrews R, Herceg A, Roberts C, 1997, "Pertussis Notifications in Australia 1991 to 1997", *Communicable Diseases Intelligence*, Vol. 21, No. 11: p. 145-148.

27) Ada, G., Isaacs, D., 2000, "Vaccination: the facts, the fears, the future", Allen and Unwin, Australia.

28) Eldred BE et al, 2006, "Vaccine components and constituents: responding to consumer concerns", *Medical Journal of Australia*, 184: No. 4: pp.170-175.

29) La Rosa, W.R., 2002, "The Hayward Foundation Study on Vaccines; a possible etiology of autoimmune diseases".

www.homestead.com/vonhapsburg/haywardstudyonvaccines.html visited 18.01.06

30) Ravel G, Christ M, Horand F, Descotes J, 2004, "Autoimmunity, environmental exposure and vaccination: is there a link?", *Toxicology*, 196(3): 211-6, Mar 15.

31) Friis RH and Sellers TA, 2004, "Epidemiology for Public Health Practice", Jones and Bartlett publishers, Boston, 3rd ed.

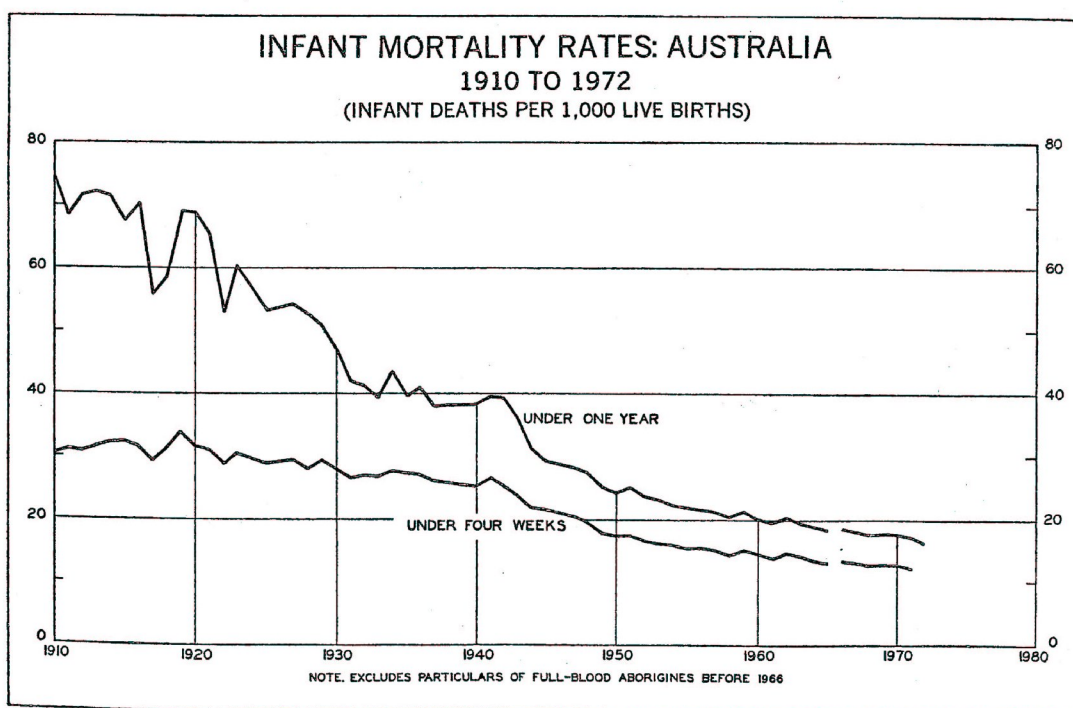
32) Greville, RW. , 1966, "Recent and Future Development in Immunising Vaccines", *The Medical Journal of Australia*, May 21, p. 908.

33) Australian Government, Australian Institute of Health and Welfare, 2005, Child health, development and wellbeing:

1. Selected Chronic Diseases Among Australia's Children 2005, Bulletin Iss. 29, September, 2005
2. Chronic Diseases and Associated Risk Factors.
3. A Picture of Australia's Children (May, 2005)

www.aihw.gov.au visited 10.03.06

Figure 1: Infant Death Rates in Australia



Reference - Official Commonwealth Yearbook of Australia, 1973, No. 59, p.183 (2)