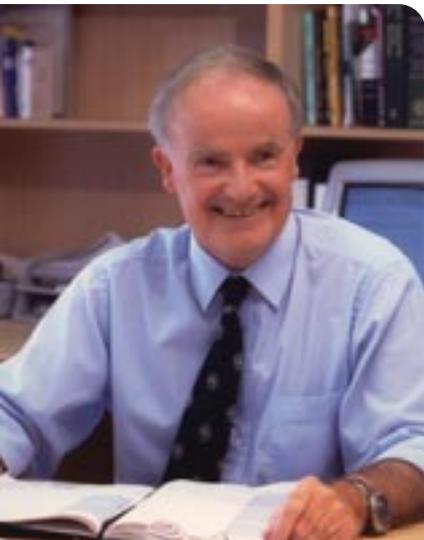


PREFACE

I present to you a unique report envisioned by Professor Richard Smallwood during his term as Chief Medical Officer of Australia. This is a book for all Australians, from school students, government and industry workers to retirees. Communicable diseases will continue to threaten populations, a threat best managed by knowledge, understanding and action. Professor Smallwood's vision provides the backbone for all Australians to grasp and embrace control of infectious diseases, both known and new.

Professor John Horvath
Chief Medical Officer



Professor Richard Smallwood, Chief Medical Officer
1 November 1999 - 30 June 2003

'A dance to the music of time'
Anthony Powell

The title of Anthony Powell's major, life-long work is an apt metaphor for the relationship between humankind and the microbes that cause communicable diseases. We have evolved with microbes over countless millennia. Our relationship will continue into the future to be hazardous and unpredictable.

Most of us have some understanding of the historical importance of communicable diseases. In past centuries, diseases such as plague and smallpox could suddenly appear to threaten the very survival of some civilisations. Yet few of us understand why communicable diseases are still a problem and why new diseases will continue to emerge, despite the advances of medical science and the implementation of public health and hygiene measures.

This report, 'Protecting Australia against Communicable Disease: Everybody's Business' is designed to help the Australian public to understand these challenges from infectious diseases. Until recently, people might reasonably have been asked: 'Why worry? Haven't we in this country been on top of communicable diseases for decades now?' Yet after the emergence of HIV/AIDS in the 1980s there has been a gradual re-awakening of concerns about communicable diseases around the world. There have been accounts for the lay reader¹ as well as reports such as those from the National Institute of Medicine in the USA², and the Chief Medical Officer in the UK³. A sense of urgency has been engendered by the anthrax attacks in the USA, by 'white powders' here and by the global emergence of SARS.

Australia was independently aware of these emerging problems. In 2001 I convened an editorial group and invited contributions and suggestions from many communicable disease experts to help us develop this special report. After producing several lengthy draft documents, we came to the view that Australia would be best served by a short and engaging report for the general public⁴, and references for those in need of more detailed information.*

* References and web-site addresses are listed on p78.
A short glossary is also provided on p65 to help the non-technical reader.



The underlying messages of this short report are simple. First, if Australians understand more about communicable diseases, they will be better able to protect themselves through good hygiene, safe-sex, vaccination and the prudent use of antibiotics. Second, many communicable disease problems, including SARS, BSE, variant-CJD, HIV and hospital acquired infections, are the unintended consequences of changes in human society and behaviour. Third, because microbial agents causing communicable disease can evolve quickly to exploit new opportunities, or to escape our interventions, we cannot predict how they will change and we may never finally win the arms race against them. Fourth, with global threats from terrorism, there is the possibility that microbial agents, new or old, might be spread deliberately. The risks are low, but we have already seen, following the anthrax attacks in the USA and the white powder 'false alarms' around the world, how fear can cause public alarm that is out of proportion to the real threat.

The rest of this preface summarises the main themes and conclusions of the report, the most important of which is that the control of communicable diseases requires constant vigilance now and into the future.

CHAPTER ONE: UNINTENDED CONSEQUENCES

Why can't we conquer communicable diseases once and for all? The answer is that in our rapidly changing world, many communicable diseases can be viewed as unintended consequences of changes in our own behaviour. The microbes causing communicable disease are able to evolve incredibly quickly to exploit new opportunities and to subvert measures that were previously effective against them. Changes in human society, both historical and contemporary, have led to the emergence of new diseases and the re-emergence and spread of some old ones. Measles, influenza, tuberculosis, HIV and SARS all originated from animal microbes that then adapted to spread amongst humans. Influenza and other 'crowd diseases' spread rapidly in overcrowded urban environments, particularly if hygiene was poor. Global epidemics of HIV/AIDS and hepatitis C emerged as a result of rapid transport, changes in work arrangements, sexual habits, intravenous drug-use and medical practice. Many bacteria spread easily to vulnerable patients in a hospital environment. Two generations of antibiotic use for trivial reasons have given a selective advantage to those microbes that are resistant. Consequently, some

serious bacterial infections can no longer be cured by antibiotics that would have been effective in the past. The use of bovine meat-and-bone-meal as food supplements for cattle ('bovine cannibalism') triggered the BSE epidemic in UK cattle, with subsequent spread to people as variant-CJD.

CHAPTER TWO: LOW BURDEN ... BUT HIGH THREAT

Australia is still a lucky country. The burden from communicable diseases is much lower here than in developing countries. With good public infrastructure, an educated population and well-trained health professionals, life expectancy in Australia increased by almost 30 years during the 20th century, largely because of declining infectious disease mortality. We now take our low infectious disease burden for granted, but we must thank our many experts, working behind the scenes to keep old and new diseases under control. Nonetheless, many diseases could still threaten us.

Past generations were more aware of communicable diseases. In 1918 – 1919, a global influenza pandemic killed at least twenty million people, including many thousands in Australia; many more fell ill, health services were disrupted, with widespread public

alarm. Influenza virus is a continuing global threat because it can spread easily and evolve rapidly to elude our prevention and treatment strategies.

Previous generations of Australian families faced the real possibility that their children would succumb to childhood illnesses such as diphtheria, whooping cough, measles and infantile paralysis (polio). Such diseases, now prevented by childhood vaccination, could return promptly if vaccination rates are allowed to fall.

Australia did not escape the global epidemic of HIV/AIDS, but by dint of prompt and far-sighted public health measures, we escaped with a lower rate than in most other countries. Yet the threat remains. HIV is still life-threatening, despite the availability of new treatments in countries such as Australia. Our rates of HIV transmission are rising again, possibly due to unsafe sex amongst younger generations with no direct experience of AIDS. Other sexually transmitted infections, such as chlamydia and gonorrhoea, are rarely life threatening, but they can cause serious disease or infertility.

Hepatitis C, a major cause of chronic liver disease and cancer, is also a looming public health threat. It had infected over 200,000 Australians by 2003, with a continuing risk of blood-borne infection through needle-sharing and unsafe procedures for skin-piercing and tattooing.

Other global diseases of historical importance could still threaten us. Australia has been free of local malaria since the 1960s. Yet in 2002, mosquitos in northern Queensland bit a person who had acquired malaria in Africa, and transmitted it to nearby campers. Fortunately, further spread was averted by swift public health action. Tuberculosis (TB) infections kill 2 – 3 million world-wide each year and can be difficult to treat if the microbe resists the usual antibiotics. If such resistant TB is introduced here, local infections would be costly and difficult to cure.

Health authorities and researchers also work to protect Australia against new disease threats recognised overseas. When variant-CJD (v-CJD) was identified in people who had eaten BSE-contaminated beef in the UK, Australia banned imports of food and therapeutic goods that could pose a risk of transmission of v-CJD. In 2003, the Australian burden of BSE and v-CJD is still zero, but the threat remains. The world had another scare early in 2003 when the SARS virus was spread from southern China to other countries by air travellers, infecting many thousands, with many hundreds of deaths. Fortunately, Australia's border control, surveillance and infection control measures have helped to protect us from SARS.

The world is now facing a new era of threat from infections or toxins that may be deliberately spread by terrorists. Fortunately the chance of such a biological attack is small. Furthermore, the principles for outbreak detection and management, well rehearsed for other communicable diseases, would apply equally to deliberate attacks. With its measured responses, Australia will keep the public informed, to help ensure that fear of the unknown does not cause concern that is disproportionate to the small level of risk.

CHAPTER THREE: EVERYBODY'S BUSINESS

All of us have a responsibility to prevent communicable diseases from spreading. We rely on government, industry and each other for the safety of our food and water supplies. We know that a simple breakdown in hygiene can lead to diarrhoea or hepatitis for the individual, or even trigger a large outbreak of food-borne disease. We know that rejection of vaccination can threaten the life of an infant exposed to a serious disease such as whooping cough or expose an unborn child to catastrophic damage from rubella virus. Moreover, for every family that rejects vaccination, the level of herd immunity will fall, increasing the risk that the microbe can re-emerge and

spread to infect all those who are not immunised. If an individual ignores safe sex messages, there is a risk of sexually transmitted infections, not only for that person, but also for future partners. Sharing of syringes by intravenous drug users or unsafe tattooing or skin-piercing practices will spread blood-borne viruses such as Hepatitis C. Where vulnerable or dependent people come closer together, as in hospitals, nursing homes or child-care centres, microbes are more able to spread from person to person. Indeed, microbes can be inadvertently carried around by health-care workers and attendants unless there is scrupulous attention to hygiene and infection control precautions. Many Australian parents can speak with feeling about otitis media and other infections that young children bring home from day care.

Why do we continue to behave in ways that spread disease and expose others to risk? Knowledge of transmission risks is not enough to modify behaviour. Even health care workers, presumably well informed about infection risks, can do the wrong thing; overseas, many health care workers were infected in the SARS epidemic as a result.

As individuals and as a society, we implicitly balance risks against benefits. Governments and health

authorities are working to ensure that health workers and the public are aware of disease risks and individual responsibilities. They also provide guidance about risk management, with appropriate incentives to reduce risks, as with the family allowance payments to encourage vaccination. Authorities also work tirelessly with expert groups to protect the public through border control and quarantine, surveillance and outbreak control, vaccination, safe food and water, good health care and through research.

The community also searches for the balance between individual rights and public benefit in communicable disease control. Ideally, individuals should be free to decide on the risks that they take for themselves. Unfortunately, personal acceptance of a communicable disease risk, such as unsafe sex or refusal of vaccination, will add to the risks for others. Disease control also requires that patients with dangerous diseases such as SARS are isolated, or that larger numbers of contacts remain in quarantine until the incubation period has passed. In our modern world, such restrictions on personal freedom are difficult to accept, yet they may be essential. The media can play a very positive role in promoting public discussion of such issues.

CHAPTER FOUR — LOOKING BACK, LOOKING FORWARD

History has taught us the multiple ways in which human behaviour influences disease transmission, emergence and evolution^{5 6 7}. To enjoy long-term protection against communicable disease, we need to continue to learn from past and future threats.

The situation of Indigenous Australians today is salutary. They still suffer from infectious diseases that were largely eliminated from the rest of Australia in the previous century. If Indigenous health is also to benefit, albeit belatedly, this will require good education, communication and understanding, improved infrastructure and administration, improved food and water supplies and facilities for hygiene, behavioural change and better health services.

For all Australians there will continue to be important health benefits from the better distribution and application of existing knowledge to solve problems such as hospital-acquired infection and antibiotic resistance of bacteria. Benefits will also flow from improved surveillance, in cooperation with international authorities, to ensure the earliest possible detection of new or re-emerging infections such

as SARS or influenza. With more consultation between health and non-health sectors, Australia will be better prepared to minimise the damage to public confidence and business activity that can flow from communicable disease threats. Decision-makers outside the health sector will also be able to foresee any unintended health consequences of changes within their spheres of responsibility.

Public confidence will be enhanced through more media discussion of the implications of communicable diseases for the future of society. Educators and scientists can work together to promote more widespread community understanding of risk assessments and decision-making. We must also be prepared to acknowledge uncertainty about risk and unintended consequences. For example, we know that medical

and scientific advances enabling increasingly complex surgery, transfusion of blood and blood products, intensive care and anti-cancer treatments have been of great benefit to individual patients. However, we also know that these advances have made more people vulnerable to serious infection.

Our future will be increasingly driven by social and technological change and the world needs the best available science to keep ahead of the challenges from communicable disease. Australia is fortunate in having deep expertise in biological science. We will thus be well situated to use the fruits of medical research we already know about and to bring forward new research. For example, Australian researchers have developed new treatments for influenza, which could be very important in any future pandemic. Australian

research has also underpinned a new vaccine against papillomavirus, which could prevent the sexually transmitted infections that lead to cervical and other genital cancers. Australians can be reassured that we will continue to use our best minds for the public good.

The details and examples in the full report should be of great interest to you. I hope you will take the time to read it, to discuss it with your friends and colleagues and to think about its implications for yourself, your family and your personal and work responsibilities.

In facing an uncertain future from communicable diseases, our best strategy is to ensure that the community is well informed and that our scientists and health professionals continue to be well trained and supported. Such plans really are everybody's business.

Richard Smallwood
Chief Medical Officer 1999 - 2003

