An Integrated Approach to Infectious Disease
A discussion document

June 2001
Foreword

This draft public discussion document has been developed by people working within the infectious disease sector, co-ordinated by the Ministry of Health. It is designed to open discussion on key issues concerning infectious diseases, which will lead to the development of a final version of An Integrated Approach to Infectious Disease later in 2001.

Infectious diseases significantly affect the health of New Zealanders. The incidence and impact of infectious disease is influenced not just by action in the health sector, but also in sectors such as housing, agriculture and local government. Disease risks change over time, as do policies and programmes. It is time to review our approach to infectious diseases to ensure that scarce resources are used to best effect.

An Integrated Approach to Infectious Disease (IAID) is being developed to define the key priorities and strategies for infectious diseases, based on a broad, multi-sectoral view of infectious disease transmission and control. This approach complements existing strategies that take a population approach (such as the Child Health Strategy). Given limited resources, the IAID will set out key priorities for action at national and local levels over the next five years. It will identify key policy priorities for the Ministry of Health and will guide funding of infectious disease programmes by District Health Boards. It will also offer guidance for intersectoral action and policy priorities for other central and local government agencies.

How to have your say:

Please take this opportunity to have your say to help identify the most important strategies to reduce the incidence and impact of infectious diseases. Comments on any aspect of this document are welcomed.

There are some key questions that we would like you to think about and answer as you read the document. These questions are in the accompanying booklet.

You can then post them back to us at:

IAID submissions
Public Health Programmes, Public Health Directorate
Ministry of Health
133 Molesworth Street
PO Box 5013
Wellington

Alternatively, if you have accessed this document on the Ministry of Health web site or electronically, please email to:

nicola_chapple@moh.govt.nz

Submissions are due by 31 July 2001.
Part V: Legislation and the Integrated Approach to Infectious Disease

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Part I: Introduction

How infectious diseases affect New Zealanders

The impact of infectious diseases

In the developed world (including New Zealand) people are now living longer and in better health largely because of the improved control of infectious diseases over the past 150 years. This has been achieved by improved sanitation and the safety of water and food, improved housing and working conditions, the widespread adoption of immunisation, and the introduction of other public health approaches to the control of disease.

However, infectious diseases still continue to cause considerable illness and deaths, accounting for 6% of the deaths in New Zealand. This makes it the fourth most serious category after cardiovascular disease, cancer and death from injury. Infectious diseases also account for 12% of admissions made to New Zealand hospitals, with acute respiratory infections a predominant cause. Many of these are avoidable through effective control or prevention measures.

Re-emerging diseases and new threats

History shows that complacency concerning infectious diseases is dangerous because:

- pathogens are constantly evolving and emerging (CDC Atlanta 1998); there are particular concerns about the potential future impact of antibiotic-resistant organisms, and the potential for an influenza pandemic
- old threats are re-emerging due to changing lifestyles, adverse socioeconomic conditions or immigration from high prevalence countries; these include highly infectious diseases such as meningococcal disease, tuberculosis and gonorrhoea
- new organisms may become established in New Zealand due to environmental change and/or the introduction of exotic pests and diseases; for example, the recent discovery in New Zealand of the salt-marsh mosquito, which is a common transmitter of the Ross River virus in Australia
- there is increasing evidence that certain infectious microbes cause or contribute to the development of some chronic diseases (for example, Helicobacter pylori and peptic ulcers (Stewart Goodwin et al 1997).

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1 See Appendix A. This data is based on a reanalysis of ICD-coded hospital and mortality data, using a CDC-Atlanta recoding system.
These threats have significant impacts, as overseas experience shows. In Eastern Europe, falling immunisation rates are associated with major outbreaks of diseases such as diphtheria, formerly under control, among children. Over 20% of South African adults are estimated to be HIV-positive, and at the current rate of spread nearly half of the country’s 15-year-olds will die of AIDS-related illnesses in the coming years (UNAIDS 2000).

**Infectious diseases disproportionately affect disadvantaged and marginalised groups**

The distribution of infectious diseases among New Zealanders is not equal. Overall, children under five years represent 28.5% of the total number of hospital admissions for infectious diseases. Many infectious diseases are more prevalent in lower-income populations, due in part to their association with housing and environmental conditions.

Māori and Pacific peoples in particular suffer disproportionately high rates of many infectious diseases. Rates of rheumatic fever, for example, are 15 times as high in Māori as in non-Māori, and total meningococcal B disease rates are nearly three times higher in Māori and six times higher in Pacific peoples than in other New Zealanders. The highest rates seen in New Zealand in 2000 were in Pacific children under one year (576.9 per 100,000, compared with 82.3 per 100,000 in other New Zealanders) (ESR 2001).

Improving infectious disease control amongst Māori and Pacific peoples will help reduce health inequalities.

**Why do we need an integrated approach now?**

Infectious diseases are an important cause of unnecessary illness and death in New Zealand. Some have the potential to cause large outbreaks of disease, requiring local, regional or national population-based approaches to control.

Determinants of health often lie outside the direct control of the health sector, with the social and economic environment playing a crucial role in the distribution of infectious diseases within communities. Infectious diseases disproportionately affect the poorest, most marginalised and vulnerable groups in our society. Addressing infectious disease problems therefore requires action from many sectors, including housing, education, social welfare and employment. It is time to review this intersectoral approach in a co-ordinated way, and to identify important priorities for action.

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2 This is based on a reanalysis of ICD-coded hospital and mortality data using a CDC-Atlanta recoding system.

3 Age-standardised rates. Crude rates show much more disparity given the age structure of Māori and Pacific populations (ESR 2001).
Increasingly, the public health approach to prevention and control of infectious diseases is based on risk management concepts rather than traditional regulatory approaches. Less emphasis is placed on inspection and control and more on self-monitoring and risk management (for example, in drinking-water supplies and food production). The focus is on addressing ‘up stream’ factors in order to reduce the likelihood that exposure to health hazards occurs. This may involve using surveillance data and modelling of possible events, analysis of critical points in processes where hazards can be introduced, ensuring that quality assurance and quality control programmes are in place, and contingency planning.

Many infectious diseases can be reduced in severity through public health protection and health promotion programmes, and early diagnosis and treatment. Timely access to health services is vital. This is a particularly important consideration at this point as the new District Health Boards (DHBs) will fund most health services for their local communities. It is important that their services for infectious disease control are well co-ordinated and consistent, and that suitable guidance is offered through An Integrated Approach to Infectious Disease.

The health policy context

The New Zealand Health Strategy

The overall goal of the IAID is to address the New Zealand Health Strategy objective (Minister of Health 2000):

To reduce the incidence and impact of infectious diseases.

The disease-based approach of the IAID complements and reinforces a number of key goals and objectives in the New Zealand Health Strategy, including better physical health, providing accessible and appropriate health care services, creating a healthy physical environment, and reducing inequalities in health status.4

This approach also links to other action-based strategic documents and tool kits that have been produced, or that are in preparation, under the umbrella of the New Zealand Health Strategy and the New Zealand Disability Strategy including:

- He Korowai Oranga (Māori Health Strategy)
- Primary Healthcare Strategy
- Child Health Strategy
- Pacific Health and Disability Action Plan
- Sexual and Reproductive Health Strategy
- New Zealand Health Information Strategy.

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4 Refer to pp. 10–13, Goals 1–4, 8, 10; objectives 1, 6–8, 9–13, 14, 17, 18, 32, 47, 54–56 (Minister of Health 2000).
The IAID complements the population approaches being taken by, for example, the youth health and child health strategies.

**Acknowledging the special relationship between Māori and the Crown under the Treaty of Waitangi**

Central to the Treaty relationship and implementation of Treaty principles is a common understanding that Māori will have an important role in implementing health strategies for Māori, and that the Crown and Māori will relate to each other in good faith with mutual respect, co-operation and trust.

Māori should be able to define and provide for their own priorities for health and be encouraged to develop the capacity to deliver services to their communities. This needs to be balanced by the duty of the Crown to govern on behalf of the total population.

The relationship between Māori and the Crown in the health and disability sector has been based on three key principles:
- participation at all levels
- partnership in service delivery
- culturally appropriate practices.

Not only is it important to improve Māori health status, but other goals based on concepts of equity, partnership, and economic and cultural security must also be achieved.

**The resource context**

Health services are just one of many factors that can keep us healthy, help us recover from ill health or make it easier for us to live with chronic illness. If we really want to make a positive difference to health we will need to co-ordinate action across different areas of government and address a broad range of social, economic and lifestyle issues.

The Government faces difficult choices when it decides how best to spend the money it has available each year. It has to balance what should be spent on health with what should be spent on other important social services that also impact on health status, such as education, social welfare benefits and housing. Then, within the health budget, more decisions have to be made about what types of health services to fund, and how to share resources fairly among New Zealanders.

The New Zealand Health Strategy identifies priorities for action by DHBs and the Ministry of Health. The adoption of priority areas does not mean that other areas will be neglected, but it does mean that the priority areas will get special emphasis when funding decisions are being made. *An Integrated Approach to Infectious Disease* will highlight the key objectives to be achieved in infectious diseases within the resources available.
New Zealand Health Strategy priorities related to infectious diseases are:

- to ensure access to appropriate child health care services including well child and family health care, and immunisation
- to minimise harm caused by alcohol, illicit and other drug use to both individuals and the community (an objective relevant to blood-borne diseases).

DHBs are carrying out health needs assessment with their local communities. This, together with other consultation, will help the Boards identify appropriate timeframes for implementing the priorities identified in the IAID. DHBs will agree on the specific areas they will focus on in funding agreements entered into with the Minister of Health. These funding agreements will contain clear, measurable performance indicators that will enable progress to be measured.

References


Part II: The Framework: Infectious Disease Categories Based on Broad Control Mechanisms

In this document infectious diseases have been categorised into 17 groupings, rather than attempting to deal with each disease individually. These categories reflect:

- modes of transmission - including settings where transmission occurs and control measures are likely to be implemented
- affected populations, or
- control measures - broad intervention areas such as immunisation and the sectors involved in providing and supporting these measures; for example, national organisations (with policy, regulatory and funding roles), local providers (with an investigation and/or delivery role) and surveillance, investigation and research service providers.

Some diseases with multiple modes of transmission or control appear in more than one category. This reflects the fact that addressing such diseases will require multiple interventions.

The categories have been grouped into three levels of priority, using a framework that considers the burden of disease, outbreak potential, level of public concern, disparities between groups and economic cost (see Appendix B). This was discussed and adopted at a workshop for experts in infectious diseases in November 2000.

Important common issues – surveillance, research and legislation – are reviewed in greater depth in three separate parts at the end of this document.

Table 1: The framework for categorising infectious diseases

<table>
<thead>
<tr>
<th>Priority</th>
<th>Infectious disease category</th>
<th>Important examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>Vaccine-preventable diseases in children</td>
<td>Measles, mumps, rubella, varicella, pertussis, hepatitis B, haemophilus (Hib), polio, tetanus, diphtheria, pneumococcal disease</td>
</tr>
<tr>
<td></td>
<td>Vaccine-preventable diseases in adults</td>
<td>Influenza, pneumococcal disease, tetanus, hepatitis B</td>
</tr>
<tr>
<td></td>
<td>Blood and tissue-borne diseases</td>
<td>Hepatitis C, HIV/ AIDS, human T-cell lymphotrophic virus 1&amp;2, Creutzfeldt-J akob disease and newly recognised blood borne diseases</td>
</tr>
<tr>
<td></td>
<td>Infectious respiratory diseases</td>
<td>Meningococcal disease, tuberculosis, rheumatic fever, pneumococcal disease, mycoplasma, respiratory syncytial virus and other viral respiratory diseases</td>
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<tr>
<td></td>
<td>Sexually-transmitted infections</td>
<td>HIV/AIDS, chlamydia, gonorrhoea, syphilis, human papilloma virus, herpes simplex virus, hepatitis A/B</td>
</tr>
<tr>
<td>Priority</td>
<td>Infectious disease category</td>
<td>Important examples</td>
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<tr>
<td>Highest (cont'd)</td>
<td>Enteric disease with food-borne transmission</td>
<td>Campylobacteriosis, salmonellosis, verotoxin producing <em>E. coli</em>, yersiniosis, listeriosis, Norwalk-like virus, food intoxicants (eg, staphyloccocal), botulism, marine biotoxins</td>
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<tr>
<td></td>
<td>Infections caused by antibiotic-resistant organisms</td>
<td>Penicillin-resistant pneumococci, vancomycin resistant enterococci, multi-drug resistant tuberculosis, penicillinase producing neisseria gonorrhoeae (gonococci), and newly emerging resistant organisms</td>
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<tr>
<td>Medium</td>
<td>Enteric disease with water-borne transmission</td>
<td>Cryptosporidiosis, giardiasis, campylobacteriosis</td>
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<td></td>
<td>Hospital-acquired infections</td>
<td>Methicillin resistant staphylococcus aureus, <em>clostridium difficile</em>, legionellosis, surgical-site infections, blood-stream infections, device-related infections and opportunistic infections</td>
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<td></td>
<td>Diseases from close physical contact, superficial infections and infestations</td>
<td>Giardiasis, rotavirus, campylobacter, helicobacter, hepatitis A, adenonvirus, Epstein Barr virus, enteroviruses, skin infections and cellulitis, invasive streptococcal disease, impetigo, head lice, scabies, mycotic diseases (including dermatophytes)</td>
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<td></td>
<td>Zoonotic disease linked to direct animal contact</td>
<td>Leptospirosis, typhus, emerging diseases (eg, lyssavirus, verotoxin producing <em>E. coli</em>, cryptosporidiosis and other enteric diseases such as campylobacteriosis)</td>
</tr>
<tr>
<td></td>
<td>Diseases from contaminated environments</td>
<td>Legionellosis, cryptosporidiosis, amoebic meningoencephalitis</td>
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<tr>
<td></td>
<td>Travel-associated and imported infectious diseases</td>
<td>Dengue fever, malaria, rabies, schistosomiasis, yellow fever, typhoid, cholera, shigellosis, traveller's diarrhoea leprosy, hepatitis A, tuberculosis and HIV/AIDS</td>
</tr>
<tr>
<td></td>
<td>Congenital and perinatal infections</td>
<td>Hepatitis B, listeriosis, congenital rubella syndrome, toxoplasmosis, group B streptococcal disease and cytomegalovirus</td>
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<tr>
<td>Lower</td>
<td>Occupational infectious disease</td>
<td>Hepatitis B, leptospirosis, enteric diseases in some occupational groups</td>
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<td></td>
<td>Vector-borne diseases (especially with introduction potential)</td>
<td>Ross River virus and dengue fever</td>
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<td></td>
<td>Bioterrorism agents</td>
<td>Anthrax and other agents</td>
</tr>
</tbody>
</table>

Note: While some disease groupings may have a lower priority than others, it is important to ensure that adequate surveillance is maintained in order to monitor trends and take appropriate action if circumstances change. Likewise, while some diseases may rank as a low priority for action in the wider community, they may merit high priority in higher risk settings (eg, certain types of workplaces where employees may be commonly exposed to the pathogen(s) in question).
Ila: Highest Priority Infectious Diseases

1 Vaccine-preventable diseases in children

Immunisation is one of the most cost-effective interventions for preventing infectious diseases, especially in children (Turner et al 2000; Grant 2000). The consensus within the infectious diseases sector, and endorsed by the New Zealand Health Strategy, is that improving immunisation rates is the top priority area in infectious diseases. Improving immunisation coverage will improve child health (along with other well-child care interventions) and can reduce inequalities in health outcomes.

New Zealand has low levels of immunisation coverage, particularly among Māori and Pacific children; for example, a 1996 North Health survey showed 62% coverage overall at age two, but only 45% coverage for Māori and 53% for Pacific children (Rainger et al 1998).

Although the introduction of hepatitis B and haemophilus influenza (Hib) vaccines has had a significant impact on the incidence of these diseases, and polio transmission has been eliminated, outbreaks of measles, rubella and pertussis (whooping cough), will continue to occur unless coverage is significantly improved (National Health Committee 1999). The 1997 measles epidemic resulted in nearly 2000 notified cases (Jones et al 1998) and cost approximately $7.5 million to control through a mass vaccination campaign, out of a total immunisation budget in 1998/99 of $12.8 million. The 1999–2001 pertussis epidemic has resulted in 5781 cases, the highest rates being in children under one year, with 420 hospitalisations and one death since it began in June 1999 (ESR 2001). Hepatitis B carriage in Māori and Pacific adults is estimated to be 10 times that of other New Zealanders (Blakely, Salmond et al 1998b), and rates of primary liver cancer, a late sequela of hepatitis B carriage, are estimated at being 7-18 times as high in Māori and Pacific peoples, and nearly 26 times higher in those of Chinese descent, than in other New Zealanders (Blakely, Bates et al 1998).

Meningococcal B disease, another potentially vaccine-preventable disease, is occurring at rates at least nine times higher than in most other developed countries. Tamariki Māori and Pacific children, and those living in overcrowded situations, are most affected. A preliminary estimate of the annual economic cost to society of the present meningococcal B epidemic in New Zealand is over $NZ 75 million (Evers et al 2001).

The following are current problems that need to be addressed.

- There is no national register or linked regional/local data to provide accurate coverage rates, and to ensure that children who are not immunised can be effectively followed up. Existing data is based on claims to Health Benefits, is not timely, and is incomplete.
• There is low coverage in tamariki Māori and Pacific children, which needs to be addressed so that all children can access effective, quality vaccination services and benefit from immunisation.

• There are difficulties providing services to hard-to-access and highly mobile groups.

• More support is needed for a co-ordinated national strategy that provides accurate information to help parents make an informed choice about immunisation.

• There is poor monitoring of adverse events.

Other issues related to increasing the effectiveness of the immunisation programme include:

• the introduction of new vaccines and maintaining the quality of vaccines (for example, meningococcal B and conjugated pneumococcal vaccines, combination vaccines)

• predicting and responding to future epidemics (especially measles and influenza)

• international responsibilities (for example, the global goal to eliminate polio and the future goal of measles elimination).

The failure of the 1995 National Immunisation Strategy, Immunisation 2000, to improve coverage contrasts with improvements in other countries such as the USA, UK and Australia during the same period. Failure to address the central problems with current immunisation programmes - including adequate funding, leadership, information systems and provider responsibility - are key reasons behind the failure to improve coverage in New Zealand to date (National Health Committee 1998; Ministry of Health 2000).

However, since 1999 a number of strategies have been implemented, including increasing the range of immunisation providers and expanding outreach services, improving recall systems in primary care, implementing ‘catch-up’ programmes, and developing a research, evaluation and surveillance programme. Work on local and national information systems to improve coverage data is ongoing.

Objective

To control or eliminate vaccine-preventable diseases through the delivery of safe and effective vaccination programmes.

Target

95% of children are fully immunised by 2005.5

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5 See Appendix C for previously agreed coverage targets. Achieving these targets clearly relies on having the information systems to evaluate baseline and future rates.
Strategies

- Establish and maintain a comprehensive online surveillance system which integrates data on local, regional and national progress on immunisation. This needs to be able to provide accurate data to providers across New Zealand on a child’s immunisation status.

- Enhance surveillance for vaccine-preventable diseases in the community, including laboratory notification and sero-surveillance.

- Continue to improve access to immunisation services by:
  - increasing the range of service provision (appropriate language and ethnicity of providers, development of specific community-based services to meet Māori and Pacific children’s needs, increasing the flexibility of existing services, a wider range of vaccinators, increased sites and hours of access, opportunistic immunisation (for example, by after-hours clinics), ensuring integration of immunisation and well-child services, so both activities are undertaken by the same provider)
  - implementing policies to ensure that providers are motivated to immunise hard-to-contact groups and to provide information (this includes ensuring equitable and adequate resourcing and support for immunisation co-ordination and vaccinator training and support services).

- Remove immunisation disparities between socioeconomic and ethnic groups, by supporting health promotion, education and care by Māori and Pacific providers and by those services working with disadvantaged groups.

- Ensure that appropriate information is available to address providers’ and parents’ needs for knowledge about immunisation, through a co-ordinated, consistent communication strategy at the national, regional and local levels.

- Establish a policy framework and process for the assessment of new and existing vaccines (such as varicella), including cost-benefit analysis and enhanced surveillance of those diseases.

- Evaluate meningococcal B vaccine for introduction to the schedule.

- Aim for the elimination of measles transmission by 2005.

- Undertake planning to improve preparedness for vaccine-preventable disease outbreaks (health workforce development, enhanced surveillance, pandemic planning, etc.).

- Audit and evaluate services/providers for effectiveness in improving coverage.
References


Table 2: Vaccine-preventable diseases in children: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central and regional government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The top priority in infectious diseases for the Ministry of Health and political leadership, policy and programme development</td>
<td>- Setting of local immunisation targets in line with national ones by DHBs</td>
<td>- Pro-immunisation, child-friendly policies</td>
<td>- Appropriate information and communication strategy developed, with community input</td>
<td>- Integration of primary sector data through local networks and/or a national system</td>
<td>- Assessment of new vaccines (efficacy)</td>
<td>- DHBs achieve targets for their populations</td>
</tr>
<tr>
<td>- An online database allowing access to individual immunisation records by providers</td>
<td>- Removal of provider disincentives</td>
<td>- Adequate public transport</td>
<td>- Involvement of non-health providers - marae, church and other community-based programmes (eg, sites at McDonalds, Pacific churches)</td>
<td>- Provide adequate information to providers to motivate higher rates of follow-up</td>
<td>- Quantitative and qualitative research into how better to deliver vaccines to children</td>
<td>- Coverage rates for measles</td>
</tr>
<tr>
<td>- An online national network of immunisation coverage data</td>
<td>- Integrated communication and promotion strategy, tailored to the needs of different groups</td>
<td>- Early childhood centre and school-based options</td>
<td>- Sero-prevalence and coverage surveys to confirm routine surveillance data</td>
<td>- Improve lab diagnostic capacity</td>
<td>- Progress on a national register or linked data networks by end 2001</td>
<td></td>
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<tr>
<td>- Setting the schedule and national targets</td>
<td>- Flexible hours, home vaccination services and opportunistic vaccination policies</td>
<td>- Specific services designed to meet the needs of tamariki Māori</td>
<td>- Outbreak preparedness: - modelling and prediction of outbreaks; outbreak response and pandemic planning; prompt notification of disease</td>
<td>- Maintain quality vaccines</td>
<td>- Attitudinal research (public, providers)</td>
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</tr>
<tr>
<td>- Evaluate and introduce meningococcal B vaccine</td>
<td>- Provision of services to meet the needs of Pacific populations</td>
<td>- Provision of services to meet the needs of tamariki Māori</td>
<td>- - improve lab diagnostic capacity</td>
<td>- Research on adverse vaccine reactions</td>
<td>- Evaluation of outbreak and control</td>
<td></td>
</tr>
<tr>
<td>- Develop a framework/process for assessment of new vaccines</td>
<td>- Resources for promotion and education available in Māori, Pacific and other appropriate languages</td>
<td>- Resources for promotion and education available in Māori, Pacific and other appropriate languages</td>
<td>- - health workforce planning</td>
<td>- Vaccine transport and storage quality</td>
<td>- Research on adverse vaccine reactions</td>
<td></td>
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<tr>
<td>- Free health care under 6 years</td>
<td>- Resources for promotion and education available in Māori, Pacific and other appropriate languages</td>
<td>- Resources for promotion and education available in Māori, Pacific and other appropriate languages</td>
<td>- - maintain quality vaccines</td>
<td>- New laboratory testing methods</td>
<td>- Resources for promotion and education available in Māori, Pacific and other appropriate languages</td>
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</table>
2 Vaccine-preventable diseases in adults

Vaccination of adults provides protection from infectious disease through:

- boosting, or maintaining immunity to those diseases covered by the scheduled childhood vaccination programme (for example, tetanus, hepatitis B)
- protection against conditions that cause high morbidity and mortality in adult life (such as influenza and pneumococcal disease)
- building capacity and mechanisms to use in a pandemic situation (for example, influenza pandemic planning).

Although in New Zealand the highest hospital admission rates for influenza are found in the very young, the worst outcomes are in the elderly, and are higher for Māori than non-Māori, with mortality rates of 1.6 per 100,000 compared with 0.9 per 100,000 (Jennings, Huang et al 2001).

Influenza vaccine coverage in New Zealand is estimated from claims data. In 2000, vaccine coverage reached 59% of the over-65 years population but only 29% of the other high-risk population: those under 65 years with health conditions that place them at high risk of influenza complications. Influenza immunisation has been offered free to these groups since 1997 and 1999 respectively, which has accelerated coverage. Influenza surveillance is carried out through laboratory surveillance of isolates, sentinel general practice surveillance for influenza-like illness, hospital discharge and mortality data, and vaccine coverage surveillance. The virus’s capacity for change (antigenic drift and antigenic shift) necessitates annual review of vaccine composition and New Zealand is part of the global World Health Organization network of countries involved in influenza surveillance.

Pneumococcal vaccine is recommended for persons over 65 years, and those who are immuno-compromised (due to illness such as HIV or myeloma), asplenic or at high risk of pneumococcal disease and its complications (those with chronic diseases) (Ministry of Health 1996). It is not currently funded on the immunisation schedule. The immune response in children under two years to the polysaccharide vaccine is poor, although conjugated pneumococcal vaccines for use in infancy have been licensed by the US Food and Drug Administration and are currently being assessed in Australia.

Cases of tetanus, although rare in New Zealand, continue to be reported. Nearly 80% of cases are over the age of 40 years: universal immunisation in New Zealand only began in 1960, which means that older people may not be immune (Ministry of Health 1996). The appropriate delivery of vaccines to the adult population requires clear policy guidelines, adequate surveillance and coverage information, education of the at-risk population and effective action by providers.
Objective

To control or eliminate vaccine-preventable diseases through the delivery of effective vaccination programmes across all communities.

Targets

To increase the proportion of the defined high-risk population immunised annually against influenza to 75% or more.6

Zero cases of adult tetanus.

Strategies

• Provide targeted education to providers and the public to address negative attitudes to immunisation through a co-ordinated communication strategy at national, regional and local levels.

• Provide accessible services with an appropriate range of providers and appropriate provider incentives for adult immunisation.

• Assess the cost–benefit of new vaccines (for example, live virus vaccines, conjugated pneumococcal vaccine) for use in high-risk adults, as well as infant populations.

• Regular review of the adult vaccine schedule, including the need for new vaccines and control strategies, and additional funding for high-risk groups (for example, MMR for non-immune adults, hepatitis B for those at risk of occupational exposure, new pneumococcal vaccines for the asplenic or immuno-compromised).

• Ensure that development of electronic individual immunisation records considers maintaining databases of immunisation status through into adulthood.

• Ensure adequate planning for pandemics, including developing the capacity to immunise the adult population.

References


6 New Zealand health outcome target 1999.
**Table 3:** Vaccine-preventable disease in adults: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide, promote, fund and monitor vaccine delivery for target groups, including evaluation of coverage</td>
<td>• Ensure access and education</td>
<td>• Good employment practices</td>
<td>• Workplace funding and support</td>
<td>• Ongoing under notifiable disease framework</td>
<td>• Effectiveness of current vaccine strategy: reduction in illness, complications and deaths</td>
<td>• High coverage rate in target populations (influenza)</td>
</tr>
<tr>
<td>• Regular review of the adult vaccine schedule, including the need for coverage of high-risk groups</td>
<td>• Vaccine promotion for risk groups, including refugees and immigrants</td>
<td>• Collaboration with pandemic planning measures</td>
<td>• Worker education and promotion of vaccination through unions and employers</td>
<td>• Sentinel and other forms of community surveillance of influenza</td>
<td>• Attitudinal research to examine specific risk groups and target groups</td>
<td>• Zero cases of adult tetanus</td>
</tr>
<tr>
<td>• Influenza pandemic planning</td>
<td>• Appropriate delivery mechanisms for immunisation of adults</td>
<td>• Involvement of older people’s support groups (eg, Grey Power)</td>
<td>• Appropriate services for Māori and Pacific peoples</td>
<td>• Influenza pandemic planning</td>
<td>• New treatment and prevention strategies</td>
<td>• National and regional influenza pandemic plans exist and are updated regularly</td>
</tr>
<tr>
<td>• Assess benefits and costs of new vaccines</td>
<td>• Appropriate services for Māori and Pacific peoples</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Promote the role of Corrections, Armed Forces, Police and Education in promotion of vaccination</td>
<td></td>
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</tbody>
</table>
3 Blood-borne diseases

Infectious diseases transmitted via exposure to infected blood are a major public health issue. The most important blood-borne diseases in New Zealand are viral: hepatitis B, hepatitis C and HIV. There are two key areas of control, which to address effectively require markedly different strategies:

- ensuring the safety of blood transfusion, organ and tissue transplantation
- minimising the transmission of diseases through the more common non-transfusion routes – primarily injecting drug use, and to a lesser extent skin penetration (skin piercing, tattooing and, rarely, through some health care interventions).

Blood safety

The New Zealand Blood Service has primary responsibility for assuring the supply of safe blood and blood products in New Zealand. It also must be responsive to potential new infection risks, such as variant Creutzfeldt-Jakob disease (vCJD), which threaten blood safety. As a result of improved blood donor selection, screening and viral neutralisation techniques, the risks of transfusion-transmitted infections of HIV and hepatitis B and C are extremely low. The New Zealand Blood Service estimates the risks for HIV infection as less than 1 case in every 1,000,000 transfusions in New Zealand. No cases have been reported since HIV testing commenced in 1985. For hepatitis B and C, the risk is less than 1 case in 100,000 transfusions (less than 1 case per year in New Zealand). The cost of achieving blood safety is high, and further steps to increase blood safety need to be weighed against other areas for health gain.

Non-transfusion-transmitted infection routes

The group at highest risk of contracting blood-borne diseases, particularly hepatitis C, are those people who share the use of injecting drug equipment. To a lesser extent, transmission risk is also associated with tattooing/skin piercing, skin penetration (needle-stick injuries) or, more rarely, in other forms of blood-to-blood contact such as in health care settings.

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7 See also sections on STIs (hepatitis B and HIV), vaccine-preventable diseases (hepatitis B), vector-borne and imported disease; the National Drug Policy (Ministry of Health 1998), especially overall priorities 4 and 5 – Reducing prevalence of illicit drug use and associated health risks, and priorities of Part II (Illicit and other drugs).

8 vCJD is a new and more aggressive strain of CJ disease, identified in the UK in 1996. Precautionary measures have been taken to maintain the safety of the blood supply and protect against the theoretical risk posed by vCJD. No cases after transfusion have been reported worldwide.
Key strategies for reducing disease transmission in injecting drug users (IDUs) relate to harm-reduction programmes and minimising risks of infection. However, IDUs can be difficult to reach with conventional health services due to the illegality of the practice, stigma and associated marginalisation. High proportions of prisoners and prison entrants are hepatitis C sero-positive, due to the higher proportion of this population with histories of injecting drug use.

**Objective 1: Transfusion/transplantation safety**

To minimise the risks of transmission of blood-borne infectious agents through the blood supply and the transplantation of human tissues and organs, by ensuring effective measures are in place for voluntary donation, screening and disease testing.

**Target**

The safety of transfusion and transplantation in New Zealand is maintained (and the very low risk of disease transmission remains unchanged).

**Strategies**

- Maintain a consistent approach to donor assessment, selection, education and testing.
- Ensure the capacity for identifying and responding to new threats.
- Maintain surveillance of transfusion-associated infections in order to correct their cause and prevent recurrence.
- Develop a mechanism for consideration of new technologies and their roles in maintaining transfusion/transplantation safety, including cost–benefit analysis.

**Objective 2: Non-transfusion routes**

To prevent the spread of blood-borne infections and reduce the impact of disease, particularly among those people at high risk (for example, current and past injecting drug users and people in institutional settings, including prisons).

**Targets**

Harm reduction policies implemented by all government agencies, especially in high-risk populations.

Reduced risk behavior (unsafe use of injectable drugs) among IDUs.
Strategies

- Promote harm minimisation as an effective approach to reducing drug-related harm (including transmission of infectious diseases) in all government agencies.
- Promote effective drug education policies to reduce uptake of injecting drug use.
- Promote safe injecting behavior (education and access to clean needles and other injecting equipment; needle exchange programmes; safe disposal).
- Provide at-risk groups with safe sex education.
- Provide hepatitis B immunisation for injecting drug users.
- Increase access to methadone treatment to reduce dependency on injectable drugs.
- Provide appropriate screening for hepatitis B and C, and HIV, in institutional settings, including prisons.
- Promote guidelines to help the skin-piercing industry protect their clients and consider local bylaws to enforce compliance.
- Ensure the use of post-exposure prophylaxis protocols (if appropriate) for needle-stick injury (in occupational and non-occupational settings).
- Ensure proper sterilisation and/or disinfection procedures and single-use policies for medical equipment.
- Provide education and establish procedures and practices in health care and other occupational settings to minimise the potential for transmission of blood-borne viruses (including guidelines for cleaners, and management of injuries in the workplace).
- Produce protocols for healthcare workers with positive hepatitis C sero-status.
- Produce protocols for other key occupational groups (such as food handlers).

Reference

Table 4: Blood-borne diseases: strategies, responsibilities and partnerships*

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Harm-reduction policies in all government departments</td>
<td>• Testing of people with risk factors</td>
<td>• Harm-reduction policies, education and raised awareness (eg, guidelines for tattooists and other risk groups)</td>
<td>• Action around drugs and life skills education</td>
<td>• Improve hepatitis C surveillance (including in institutions and needle exchanges)</td>
<td>• Effectiveness of harm minimisation measures in prisons</td>
<td>• Hepatitis C prevalence rates/trends</td>
</tr>
<tr>
<td>• Assessment of new treatment/drug therapies</td>
<td>• Ensure safety of blood/tissue services</td>
<td>• Needle exchange schemes: one-for-one needle exchange</td>
<td>• Peer education</td>
<td>• Analysis of effectiveness of needle exchange programmes</td>
<td>• No increase in transmission rates via blood/organ transplantation</td>
<td></td>
</tr>
<tr>
<td>• Protocols for health workers and other occupational groups at risk</td>
<td>• Greater access to methadone programmes</td>
<td>• Support for non-governmental organisations and support groups</td>
<td>• Support groups and non-governmental organisations for IDUs and other high-risk groups</td>
<td>• Evaluating impact of harm prevention/reduction programmes</td>
<td>• Introduction of harm-minimisation policies in prisons and high-risk institutions, including screening and offer of hep B immunisation</td>
<td></td>
</tr>
<tr>
<td>• Corrections policy – harm minimisation, peer education approaches</td>
<td>• Appropriate assessment, advice and treatment programmes for Māori and Pacific peoples</td>
<td>• Awareness of blood safety and donor requirements</td>
<td>• Risk factor / risk behaviour surveillance</td>
<td>• Drug resistance in treatment of hepatitis</td>
<td></td>
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</tr>
<tr>
<td>• Review of Misuse of Drugs Act 1975 and regulatory framework pertaining to needle-exchange programmes and needle possession (Crimes Act 1961)</td>
<td>• Increased provision of advice by primary health workers and appropriate training for service providers (see NDP)</td>
<td>• Protocols for sero-positive health workers and post-exposure prophylaxis</td>
<td>• Effective harm minimisation measures in prisons</td>
<td></td>
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</tr>
</tbody>
</table>

* Also refer to Ministry of Health 1998
4 Infectious respiratory diseases

Infectious respiratory diseases disproportionately affect both the young and the elderly in our communities. Transmission of these diseases, especially in children, is closely linked with overcrowding and poverty (Baker et al 2000; Gant and Parton 2000; Cohen 1999). Effective interventions need to address how to reduce the risk of contracting respiratory diseases, as well as how best to diagnose and treat them.

Viral respiratory diseases (particularly respiratory syncytial virus (RSV) in young children) contribute a large proportion to both the community and hospital burden of respiratory infections. Admission rates are significantly higher in New Zealand than in Australia. This burden is unequal, with hospital admission rates for pneumonia in Pacific children in Auckland, for example, six times that of Pākeha, and twice that of Māori children (Tukuitonga, Bell et al 2000). Other data indicate that if infectious disease admission rates, amongst which respiratory infections are prominent, were reduced in young Māori children to that in non-Māori, young Māori admissions would more than halve, with large potential savings (McNicholas, Lennon et al 2000). Reduction of overcrowding and access to primary care are key prevention strategies, although in future specific vaccines and treatments are likely to become available.

Recent outbreaks of tuberculosis (TB), the continuing meningococcal B epidemic and high rates of rheumatic fever (with national surveillance data showing Māori and Pacific rates nearly 15 and 30 times Pākehā rates respectively) are other current concerns (ESR 2000). Acute rheumatic fever hospitalisation rates showed a decline up until the late 1980s, but the annual hospitalisation rate has remained at an average of 9 per 100,000 over the last decade. Children under 15 years comprise 70% of cases (Ministry of Health 1999). Pneumococcus is estimated to account for 40% of hospital admissions for bronchopneumonia (Wilson 1995).

The long-term consequences of some of these conditions also contribute to the burden of disease and the costs to the health system. For example, it was estimated in 1993 that rheumatic heart disease cost $3.6 million in Auckland, with three-quarters of this attributable to the management of chronic rheumatic heart disease (North Heynes et al 1993). The direct costs from meningococcal B disease are estimated at $28.69 million per year (Evers et al 2001).

TB, traditionally associated with poverty and overcrowding, remains a problem. Although rates in New Zealand are moderate by international standards, the highest number of cases in 20 years was notified in 2000 and we have double the rate seen in Australia (Martin 2000). Immigrants from high-prevalence areas are at higher risk, and rates in Māori and Pacific peoples remain higher than in other New Zealanders (nearly five and 12 times higher) (ESR 2000).

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9 See influenza under section 2.
10 Personal communication, Professor Diana Lennon.
Appropriate screening for immigrants and refugees is important to minimise risks of imported cases. Access to culturally appropriate health services that can respond to the needs of high-risk groups, and to effective drug treatment or chemoprophylaxis is essential. Multi-drug-resistant TB (MDR-TB) is an emerging threat, as half of all TB cases in New Zealand are imported from countries where MDR-TB rates are often considerably higher than here.

Directly observed treatment – short course (DOTS) is being promoted by the World Health Organization as an effective means of ensuring that people with TB receive full courses of treatment, with subsequent reduction in relapse rates and drug resistance, and this is being successfully adapted here.

Objective 1

To reduce the transmission of infectious respiratory diseases.

Targets

Reduce current TB rates for Māori and Pacific peoples by 50% by 2005.

Reduce the age-standardised hospital discharge rate for acute rheumatic fever rates in Māori under 30 years to 14 per 100,000 or less by 2005, and to 21 per 100,000 or less for Pacific peoples.

Strategies

- Promote improved housing quality and alternative designs (for example, whānau/extended family designs) to assure appropriate occupancy rates and ambient temperatures.
- Reduce smoking rates and passive exposure to tobacco smoke (Ministry of Health 1998).
- Provide appropriate information to health providers and the public about prevention and identification of these diseases, especially in communities at high risk (for example, viral respiratory infections and rheumatic fever in Pacific communities).
- Assess the efficacy and cost–benefit of introducing new vaccines (for example, meningococcal, pneumococcal and viral vaccines) or revised immunisation strategies.
- Promote primary prevention strategies for rheumatic fever, viral respiratory infections and early diagnosis of meningococcal disease.
- Improve TB screening policies and treatment of latent TB infection for migrants and refugees from high-prevalence countries.
Objective 2

To ensure that best-practice diagnosis, treatment and secondary prevention measures are in place for the management of infectious respiratory diseases.

Targets

100% TB treatment completion rate (in those completing treatment in New Zealand).

Less than 5% mortality rate for meningococcal disease (for all ethnic groups).

Strategies

- Tailor health information to meet the needs of high-risk groups and their providers (for example, young mothers, teachers, GPs, Māori and Pacific families, Māori and Pacific providers) to reduce stigma, improve access, contact tracing and compliance.
- Reduce smoking rates, especially in youth, and passive exposure (increased tax, quit campaigns, advertising ban).
- Ensure affordable access to primary providers.
- Introduce meningococcal vaccine to shorten the current epidemic of meningococcal disease.
- Provide effective screening of new immigrants and asylum seekers for TB.
- Prevent outbreaks of TB in institutions by appropriate screening (for instance, prisons), and promote intersectoral collaboration to ensure rapid response to any outbreaks.
- Ensure effective treatment of TB by promoting DOTS and updated national TB guidelines to ensure consistent practice; use of culturally sensitive/appropriate providers where possible; and good contact tracing to minimise relapses and drug resistance.
- Improve feedback of surveillance data to providers.
- Increase treatment of latent TB infection (chemoprophylaxis).
- Establish surveillance of neonatal Bacillus Calmette-Guerin (BCG vaccine) coverage and increase coverage in high-risk groups to 80% of eligible infants by 2005.
- Promote research into key areas: factors affecting TB treatment compliance, cost-benefit of vaccines/varying strategies, improving diagnosis of respiratory viral infections, anti-viral treatments, etc.
- Evaluate primary prevention programmes for rheumatic fever and implement effective strategies in high-risk areas.
- Improve the coverage rate of benzathine penicillin for rheumatic heart disease prophylaxis.
References


### Table 5: Infectious respiratory diseases: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing:</td>
<td></td>
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</tr>
<tr>
<td>• Policy to address needs of low-income, and extended family/whānau (accessible rents, redesigned or larger houses, adequate ventilation and heating)</td>
<td>• DHBs to set sub-targets and indicators</td>
<td>• Reduced occupancy rates in houses, and redesigned dwellings for large/extended whānau/families</td>
<td>• Appropriate health promotion and education messages, especially for high-risk groups</td>
<td>• Prompt diagnosis, lab notification and contact tracing</td>
<td>• Factors affecting TB treatment compliance, cost-benefit of vaccines/varying strategies etc.</td>
<td>• Reduction in incidence rates (TB, rheumatic fever and meningococcal disease) for Māori, and Pacific peoples</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>• Introduction of meningococcal vaccine and assessment of other new vaccines (pneumococcal, varicella)</td>
<td>• Appropriate health promotion and education messages, especially for high-risk groups</td>
<td>• Increase the range of providers to meet special needs of Pacific peoples and Māori, especially in high-incidence areas</td>
<td>• Smoking reduction</td>
<td>• Antibiotic resistance surveillance</td>
<td>• Evaluation of services</td>
<td>• Increased provision of primary care services by Māori and Pacific providers in areas of high incidence of TB and rheumatic fever</td>
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<tr>
<td>New Zealand Immigration Service</td>
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<tr>
<td>• Appropriate screening programmes for refugees and migrants</td>
<td>• Rheumatic fever prophylaxis</td>
<td>• Peer educators and directly observed therapy community workers</td>
<td>• De-stigmatise TB through open discussion and culturally safe health promotion</td>
<td>• Monitoring of hospital data</td>
<td>• Evaluation of use of rheumatic fever prophylaxis in dentistry</td>
<td>• Research on effectiveness of rheumatic fever primary and secondary prevention programmes for tamariki Māori</td>
</tr>
<tr>
<td>Corrections</td>
<td></td>
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<tr>
<td>• Develop policy on screening and treatment of TB in prisons</td>
<td>• Effective diagnosis, treatment and contact tracing of TB, including appropriate use of directly observed therapy using culturally and language-appropriate directly observed therapy workers</td>
<td>• Information and discussion through marae and church-based programmes</td>
<td>• Peer educators and directly observed therapy community workers</td>
<td>• Antibiotic resistance surveillance</td>
<td>• Evaluation of tuberculosis occurrence, cost-benefit of vaccines/varying strategies etc.</td>
<td>• Increased provision of primary care services by Māori and Pacific providers in areas of high incidence of TB and rheumatic fever</td>
</tr>
<tr>
<td>Ministry of Foreign Affairs and Trade</td>
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<tr>
<td>• Co-ordinated development assistance for TB programmes in the Pacific region</td>
<td>• Access to primary providers and effective treatment of streptococcal infections</td>
<td>• Factors affecting TB treatment compliance, cost-benefit of vaccines/varying strategies etc.</td>
<td>• Prompt diagnosis, lab notification and contact tracing</td>
<td>• Monitoring of hospital data</td>
<td>• Evaluation of use of rheumatic fever prophylaxis in dentistry</td>
<td>• Research on effectiveness of rheumatic fever primary and secondary prevention programmes for tamariki Māori</td>
</tr>
</tbody>
</table>
5  Sexually transmitted infections\textsuperscript{\textsuperscript{11}}

Sexually transmitted infections (STIs) are an important preventable cause of ill health in New Zealand, predominantly affecting young people. This may reflect a need for enhanced sexual health care, and programmes that explore attitudes and beliefs and educate youth/rangatahi about sexual and reproductive health. Reducing the incidence of STIs would result in significant health gain.

However, the true extent of the problem is unclear. There is incomplete monitoring and surveillance of STIs as they are not notifiable diseases (with the exception of AIDS), and generally only sexual health clinic data (and, more recently, that from Family Planning and youth clinics) is compiled. This means that the size of the problem is unknown.

STIs predominantly affect young people. Most of the women being diagnosed with chlamydia are aged 15–24 years, and overall rates are highest in the 15–19 years age group. Gonorrhoea and genital warts show similar patterns.

The current data shows that rangatahi Mäori have higher rates of STIs than Päkehä. This is especially so for chlamydia and gonorrhoea, both of which can have long-term impacts on health, such as ectopic pregnancy and infertility. Men who have sex with men also have a higher prevalence of STIs.

Although the success in New Zealand in controlling the HIV epidemic has been notable, HIV contributes significantly to the burden of disease and remains a major issue that should not be marginalised. HIV infection is still largely affecting men who have sex with men (82.7% of total AIDS cases), although the number of women being diagnosed with HIV is rising (almost all are women migrants from high-prevalence HIV areas, or with partners from those regions). Over a thousand (1336) New Zealanders were newly diagnosed with HIV between 1983 and 1998. Especially vulnerable groups at higher potential risk include refugees and migrants from areas where HIV prevalence is high, men who have sex with men, sex workers, and injecting drug users. Specific programmes may be needed to address their needs for HIV prevention and care.

Strategies to reduce STIs need to be a component of a broader life skills approach, which encompasses sexual and reproductive health, cultural safety, and reducing discrimination towards marginalised groups (for example, injecting drug users and prisoners). The Sexual and Reproductive Health Strategy currently under development by the Ministry of Health explores in greater depth the issues outlined below.

**Objective**

To reduce STI and HIV rates (especially in the under-25 age group).

\textsuperscript{11} The Sexual and Reproductive Health strategy, currently under development, may override parts of this section and will provide greater detail on STI strategies.
Target

Reduce annual HIV infection incidence to 75 or less (2000 target), with specific targets for sentinel populations.

Strategies

- Provide appropriate sexual health education and information throughout the lifespan, within the whānau/church/school as appropriate (for example, whakapakari rangatahi, whānau and family-based approaches, peer sexuality support teams).

- Promote safe sex and good sexual health care by:
  - encouraging supportive, culturally safe environments where sexual health issues are de-stigmatised and can be openly discussed
  - encouraging delaying the age of first sexual intercourse and abstinence as options
  - improving the availability of condoms (for example, through allowing non-medical organisations to order on Bulk Supply Order)
  - minimising illness from STIs through improved access to quality sexual health care services.

- Provide free accessible sexual health services, including free opportunistic screening and treatment of contacts.

- Ensure there are adequate numbers of Māori and Pacific providers (especially male), and increase the range of skilled providers (for example, via increased nurse prescribing).

- Improve surveillance of STIs, including laboratory notification, to enhance contact tracing especially in outbreaks.

- Evaluate the cost-effectiveness of, and pilot chlamydia screening in, defined populations.

- Analyse the cost-benefits of the use of new tests for identifying STIs (such as urine and polymerase chain reaction testing).

- Extend free hepatitis B immunisation to high-risk groups.

- Introduce harm-reduction programmes into prisons and ensure that policies and practices in prisons protect people from HIV and STI transmission (provision of bleach, condoms).

- Assess whether other high-risk groups such as refugees and recent immigrants require targeted programmes.
Table 6: Sexually transmitted infections: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Human rights and anti-discrimination legislation (eg, prostitution law reform)</td>
<td>• Provide appropriate sexual health education and information throughout the lifespan</td>
<td>• Supportive, culturally safe environments</td>
<td>• Provide appropriate sexual health education and information throughout the lifespan</td>
<td>• Improve surveillance of STIs, including anonymous community laboratory surveillance</td>
<td>• Effectiveness of prevention and care programmes (eg, community-based, Māori/Pacific, youth peer education)</td>
<td>• Downward trend in chlamydia and ectopic pregnancy rates, HIV incidence and narrowing of gaps between groups</td>
</tr>
<tr>
<td>• Reorient policy towards youth and other high-risk groups</td>
<td>• Promote safe sex practices</td>
<td>• High-risk groups such as refugees and recent immigrants, sexual abuse survivors may require targeted programmes</td>
<td>• Promote whānau,fono and family-based approaches as appropriate</td>
<td>• Consider change in notification criteria (eg, for chlamydia)</td>
<td>• Improve contact tracing</td>
<td></td>
</tr>
<tr>
<td>• Chlamydia pilot screening</td>
<td>• Provide free accessible sexual health services</td>
<td>• Schools, youth organisations, non-governmental organisations and AIDS Foundation promote safe sex and sexual health care</td>
<td>• Encourage peer education approaches</td>
<td>• Risk factor surveillance</td>
<td>• Identify sexual health needs of older people/pakeke and kaumātua</td>
<td></td>
</tr>
<tr>
<td>• Introduce harm-reduction programmes into prisons and ensure that policies and practices in prisons protect people from HIV and STI transmission (needle exchange, condoms)</td>
<td>• Improve partner tracing</td>
<td>• Service development: ensure there are adequate numbers of Māori and Pacific providers (especially male), and increase the range of providers</td>
<td>• Risk factor surveillance</td>
<td>• Effectiveness of prevention and care programmes (eg, community-based, Māori/Pacific, youth peer education)</td>
<td>• Improve contact tracing</td>
<td></td>
</tr>
<tr>
<td>• Assess the use of new tests for identifying STIs</td>
<td>• Service development: ensure there are adequate numbers of Māori and Pacific providers (especially male), and increase the range of providers</td>
<td>• Service development: ensure there are adequate numbers of Māori and Pacific providers (especially male), and increase the range of providers</td>
<td>• Effectiveness of prevention and care programmes (eg, community-based, Māori/Pacific, youth peer education)</td>
<td>• Identify sexual health needs of older people/pakeke and kaumātua</td>
<td>• Cost-benefit of chlamydia screening for different groups</td>
<td></td>
</tr>
</tbody>
</table>

**New Zealand Immigration Service**
• Appropriate screening of refugee arrivals for STIs

**Ministry of Foreign Affairs and Trade**
• Co-ordinated development assistance that includes strategies to address the HIV epidemic

**Education**
• Appropriate schools-based prevention programmes
6 Enteric diseases – food borne

Over a century ago it was concern about food-borne disease such as cholera and typhoid fever that led to the ‘sanitary revolution’ which controlled these diseases in countries such as New Zealand. Now, newer pathogens such as toxin-producing E. coli have been identified and the increasingly centralised and global production of food creates another potential risk (Tauxe 1998). The adoption of risk management systems in all sections of the food chain ‘from farm to fork’, active surveillance systems, and new techniques such as molecular sub-typing can identify potential links between food production and disease that were previously unknown.

Ensuring that food is microbiologically safe is an essential element of public health, but it must also be a prime consideration of the food industry, food regulators (Health, Ministry of Agriculture and Forestry and territorial authorities) and other stakeholders who have an interest in the food supply.\(^{12}\)

The commonly notified food-borne diseases include campylobacteriosis, salmonellosis, shiga toxin-producing E. coli (STEC),\(^ {13}\) yersinosis and listeriosis. Other illnesses that are closely monitored include food poisoning from bacterial toxins. Notification data from 1995–99 shows an average of 8734 cases of campylobacteriosis, 1558 cases of salmonella, 28 of STEC and 488 of listeriosis (total) per year. Over 30 outbreaks of campylobacteriosis and 23 of salmonellosis annually were reported on average between 1995–99 (ESR 2000).

From international data (Wheeler et al 1999; Wall et al 1996; Mead et al 1999) it is known that food-borne disease is under-reported: only a small proportion of people ever seek medical care, or have a laboratory specimen taken and positive results notified, due to the often minor nature of their illness. In New Zealand, a recent study conservatively estimated there were 119,000 cases of food-borne infectious disease per year, with approximately 19,000 GP visits, 400 hospital admissions and two deaths (Lake et al 2000). However, food-borne infectious disease has been estimated as high as 823,000 cases year, with days of lost production and leisure estimated at 497,000 days/year. Total economic costs based on this data have been calculated at between $NZ55.1 million (Scott et al 2000) (with campylobacteriosis generating most costs) and $65 million per year (Ministry of Health 1999). These are conservative estimates as they exclude overhead costs to government of the food safety infrastructure or outbreak costs, but should also be compared with the costs of less common but more severe infectious diseases such as meningococcal disease.

Food-borne illness is preventable. The New Zealand food industry is moving towards the principles of risk management. Under such a framework:

- risks to food safety are identified and evaluated
- options for managing those risks are assessed

\(^{12}\) Ministry of Health has had primary responsibility for food safety in the domestic market.

\(^{13}\) Also known as verotoxin producing E. coli (VTEC).
decisions are made on the most appropriate risk management option and then implemented
• the implemented decision is monitored and reviewed.

The ‘Hazard Analysis Critical Control Point’ (HACCP) system is an internationally accepted example of this process, promoted by the Ministry of Health (Ministry of Health 2000).

Full implementation of this framework will ensure that decisions are taken that are proportionate to the health risks involved, allow innovation and flexibility, and take into account the costs as well as the benefits of each requirement (Ministry of Health and Ministry of Agriculture and Forestry 2001).

Supporting the introduction of risk management in the food industry is the surveillance system to detect and monitor food-borne disease. This operates via the primary care system and community laboratories, up to the national level (via notification, ESR typing, surveillance and reporting to the Ministry of Health).

As contaminated food may be widely distributed, a responsive national outbreak surveillance and investigation system has an important role in identifying dispersed outbreaks and co-ordinating cross-regional investigations. Outbreak investigations are crucial, not only to ensure prompt action to interrupt disease transmission, but also as a tool to monitor and evaluate the risk management approach.

The regulation of the food supply is currently a shared responsibility. For the domestic market the Ministry of Agriculture and Forestry regulates the primary production and some secondary production of animal products (under the Animal Products Act 1999 and the Dairy Industry Act 1952). Territorial authorities regulate the bulk of the remainder of the domestic market through their environmental officers (Health Act 1956 and Food Act 1981). Oversight of these regulatory functions, monitoring and regulation are carried out by the Ministry of Health and by health protection officers (public health teams). The control of imported products is important as these may cause disease or outbreaks in New Zealand, and a regulatory system is maintained for this by the Ministry of Health.

New Zealand also has obligations internationally (for example, under the Australian New Zealand Food Authority, Codex Alimentarius, and World Trade Organization regulations), which include standards for microbial levels in food, labelling and composition.

There are several areas of concern with the current food safety situation in New Zealand.
• The lengthy process to harmonise the activities of the regulatory agencies (only recently resolved) has delayed the introduction of HACCP (risk management) into the food industry. It has also limited resource allocation to enable facilitation of the reform process.
• There have been difficulties responding effectively to an increase in domestic food-borne illness, a lack of clarification of roles and accountabilities in outbreaks (particularly outbreak investigation in cross-regional outbreaks), and inadequate resources.
There is variable quality of data across and between regions for notifiable food-borne illnesses, and incompatibility of EpiSurv (the disease surveillance software) with FoodNet (the national database with information on food safety programmes, premises, etc).

Incomplete notification of food-borne diseases under-represents the true burden of disease in the community.

There is incomplete knowledge about different cultural food preferences and beliefs, food gathering and preparation that may result in higher risks from food-borne disease in some groups.

Objectives

To ensure food in New Zealand is microbiologically safe.

To recognise and manage outbreaks of food-borne enteric diseases effectively.

Target

100% of New Zealand food producers and retailers develop and implement HACCP systems by 2005.

Strategies

• Establish and develop an effective national co-ordination mechanism that is responsible for food safety.

• Create a strategy for the implementation of food safety programmes (based on a risk management framework) into the whole of the domestic food chain, and set a date when they will become compulsory for all food businesses.

• Ensure provision of suitable education programmes, training and human resources support for the food industry, regulators, health care providers and the public.

• Maintain local and national monitoring of food products and surveillance of food safety programme procedures in food production.

• Fully integrate a risk-based imported food control programme.

• Improve surveillance and outbreak investigation through electronic and laboratory notification, integration of hazard and disease surveillance, and more effective co-operation between the Institute of Environmental Science and Research Limited (ESR), regulatory and public health services.

• Enhance outbreak investigation through clarification of roles, resources and accountability.

• Co-ordinate research into food safety, disease transmission and prevention.
References


Table 7: Food-borne enteric diseases: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBS, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Agricultural and food production policies promote food safety using risk management approach (HACCP)</td>
<td>• Effective reporting by providers/primary care, labs</td>
<td></td>
<td>• Implementation of HACCP at all levels, and self-monitoring by industry</td>
<td>• Effective reporting</td>
<td>• Develop resources to aid implementation of HACCP-based food safety plans, including evaluation of food safety plans</td>
<td>• Effective co-ordination body for food safety created</td>
</tr>
<tr>
<td>• MAF-reduced contamination of meat (improving slaughter policies, waste disposal, etc.)</td>
<td>• Effective feedback and participation in outbreak investigation</td>
<td></td>
<td>• Training of food industry staff on risk management approach and food safety programmes</td>
<td>• Establish acceptable levels of food safety with consumers</td>
<td>• Appropriate amendments to legislation</td>
<td>• Extent of implementation of HACCP/food safety programmes in domestic food production</td>
</tr>
<tr>
<td>• Strategy for the implementation of food safety programmes (based on a risk management framework) - MAF Food and Ministry of Health</td>
<td>• Training of staff in response and investigation of outbreaks to allow rapid detection of source</td>
<td></td>
<td>• Enhance role of territorial authorities, environmental health officers and health protection officers in monitoring food safety programmes</td>
<td>• Good personal/community hygiene measures</td>
<td>• Feedback models to enhance outbreak detection</td>
<td>• Rates of food-borne enteric diseases reduced</td>
</tr>
<tr>
<td>• Overarching body established to promote and monitor food safety</td>
<td>• Promote food safety awareness in important cultural settings (eg, marae, fono)</td>
<td></td>
<td>• Promote food safety awareness in important cultural settings (eg, marae, fono)</td>
<td>• Critical point analysis of data collection process</td>
<td>• Studies to identify risk foods/food processes</td>
<td></td>
</tr>
<tr>
<td>• Integrated surveillance nationally</td>
<td>• Effective co-ordination body for food safety created</td>
<td></td>
<td></td>
<td>• Incorporate feedback models to improve outbreak identification (eg, in EpiSurv/PHEW systems)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Effective reporting
• Outbreak investigation procedures clarified ESR/Ministry of Health/regulatory agencies
• Integration of hazard (FoodNet) and disease surveillance
• Sentinel monitoring to evaluate HACCP systems
• Assess costs and benefits of molecular techniques to assist investigation of outbreaks
• Critical point analysis of data collection process
• Develop resources to aid implementation of HACCP-based food safety plans, including evaluation of food safety plans
• Appropriate amendments to legislation
• Extent of implementation of HACCP/food safety programmes in domestic food production
• Rates of food-borne enteric diseases reduced
7 Infections caused by antibiotic-resistant organisms

Organisms that are resistant to commonly used antibiotics are a growing global concern. This is not only because infection involving resistant organisms increases the complexity and cost of treatment (tuberculosis (TB) treatment in New Zealand costs approximately $3000 for a drug-susceptible strain, but up to $150,000 for a multi-resistant TB strain (MDR-TB)), but also because in some cases the infection may be untreatable.

In New Zealand, despite relatively low levels of antibiotic resistance, there are concerns about the monitoring, prevention and control of some key pathogens: multi-resistant Staphylococcus aureus (MRSA), MDR-TB, pneumococcus, enterococci, Neisseria gonorrhoeae, and acinetobacter. In 1999, 648 cases of MRSA were reported to ESR. The large majority (76.6%) of these were hospital patients, but there are growing numbers of MRSA cases reported in the community. Institutions caring for the elderly (rest homes and private hospitals) have a high level of transfer of patients to and from hospitals and may unknowingly act as reservoirs for drug-resistant organisms. The potential health impact of outbreaks of multi-drug resistant disease is large, as control and treatment are both difficult and expensive.

MDR-TB in New Zealand is still rare (an average of two cases notified per year), with all cases to date resulting from transmission overseas. However, it is a huge global problem: at least 1% of TB cases worldwide are multi-drug resistant (and up to 30% in some places; for example, Russia, Latvia), with up to 50 million people infected worldwide. As we have had no reduction in TB incidence over the last two decades (in 2000 the highest number of cases per year was notified since 1980) this is clearly a potential problem.

If patterns of antibiotic use do not change, simply developing new drugs is not a solution to the problem of antibiotic resistance: recognising the causes of antibiotic resistance-related disease is essential in developing effective strategies to reduce it in future. Causative factors include inappropriate use of antibiotics (over-use; poor prescribing; broad-spectrum rather than narrow; incomplete courses; and inappropriate prophylactic use) and poor infection control procedures (Lieberman and Wootan 1998). Other factors include widespread agricultural use in treatment and prevention of disease in animals, growth promotion and feed efficiency, and in agricultural sprays (MAF 2000; US ITAR 2000). Over 50% of the volume of antibiotics used in New Zealand is in agricultural production.

Imported cases and the impact of international travel and migration will also continue to play a role in the spread of antibiotic resistance.

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14 That is, MRSA resistant to two or more antibiotic classes in addition to β-lactams.

15 An example of this is linezolid, recently developed to treat infections caused by vancomycin-resistant enterococci; resistance has already been demonstrated (Gonzales et al 2001).
There have been some positive trends in New Zealand in recent years. Data from PHARMAC shows a reduction in expenditure on antibacterials from $37 million in 1996 to $23 million in 2000. Campaigns such as the Wise Use of Antibiotics in May 2000 and the Colds and Flu campaign in 1999 preceded drops in antibiotic use, and greater use of narrower spectrum drugs (for example, from amoxycillin/clavulanic acid to amoxycillin) (PHARMAC 2000). It is important to educate and inform both prescribers and the public of the risks of inappropriate antibiotic use.

**Objective**

To minimise the emergence of antibiotic-resistant organisms.

**Targets**

Reduce the total consumption of antibiotics in New Zealand.

Establish an effective surveillance system for antibiotic-resistant organisms in order to monitor antimicrobial-resistant infections.

**Strategies**

- Promote appropriate use of antibiotics in the health sector by:
  - public and provider education (for example, PHARMAC campaigns directed at prescribers and the public to ensure that prescription is necessary and appropriate, expectations of treatment are realistic, and to avoid incomplete courses)
  - encouraging implementation and ongoing review of antibiotic-prescribing policies in all hospitals as well as guidelines for primary care prescribers
  - ensuring that the TB diagnosis, treatment and tracing programme is effective (including appropriate use of directly observed therapy)
  - encouraging PHARMAC, PreMec and personal services to implement policies and set targets for rational antibiotic use, to prevent development of resistance
  - ensuring assessment of all new antimicrobials includes information on their use in the veterinary and agricultural sectors and possible effects on antimicrobial resistance.

- Collate regional and national community and hospital laboratory data on susceptibility of organisms, based on standardised lab testing (NCCLS).

- Improve surveillance of antibiotic resistance by incorporating current laboratory testing and prescription monitoring, with dissemination of information to prescribers.

- Promote research and cost–benefit analysis into the use of rapid diagnostic tests which may improve accuracy of antibiotic prescribing (for example, tests for Streptococcus).
• Promote influenza and pneumococcal vaccination in institutions (for example, rest homes and private hospitals for the elderly).

• Promote research into antibiotic resistance in primary and secondary health care, and in agriculture/food production.

• Work with the Ministry of Agriculture and Forestry (MAF) to develop a joint programme to minimise antibiotic resistance.

• In collaboration with MAF, promote the reduction of antibiotic use in agriculture and food production areas, particularly in feed and widespread prevention in animals, and encourage alternative practices.

• Maintain a global watch and link with international organisations (Communicable Diseases Centre, World Health Organization, etc.) to pre-empt emerging threats.

References


**Table 8:** Diseases caused by antibiotic resistant organisms: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regulation of pharmaceuticals, especially the introduction of new antimicrobials (PHARMAC, Ministry of Health)</td>
<td>• Accurate information for prescribers and patients</td>
<td>• Support for infection control in creches, schools, other institutions</td>
<td>• Informed patients; realistic expectations</td>
<td>• Lab-based surveillance tied with prescription monitoring and agricultural use of antibiotics</td>
<td>• Community-based/primary health care study to look at level of antibiotic resistance</td>
<td>• Antibiotic use trends (volume, type, expenditure)</td>
</tr>
<tr>
<td>• National policy and guidelines on key areas (MDR-TB, MRSA)</td>
<td>• Surveillance of antibiotic use (prescription monitoring and antibiotic resistance organisms (lab-based))</td>
<td>• Personal hygiene (hand washing, etc.)</td>
<td>• Reduced on-farm use of antibiotics in animal care</td>
<td>• Involvement of community labs and sentinel sites in data collation</td>
<td>• Links with agricultural use</td>
<td>• Surveillance data on MR-MRSA and MDR-TB—stable or declining rates</td>
</tr>
<tr>
<td>• Public education to reduce expectations for antibiotic prescription</td>
<td>• Antibiotic prescribing guidelines implemented</td>
<td>• Reduced on-farm use of antibiotics in animal care</td>
<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
<td>• Lab-based surveillance tied with prescription monitoring and agricultural use of antibiotics</td>
<td>• Piloting of rapid diagnostic tests (eg, for strep) and cost–benefit analysis</td>
<td>• Reduced antibiotic use in agriculture</td>
</tr>
<tr>
<td>• International role in antibiotic resistance reduction</td>
<td>• Effective policies for infection control in hospitals and institutions, including minimisation of prophylactic antibiotic use</td>
<td>• Informed patients; realistic expectations</td>
<td>• Lab-based surveillance tied with prescription monitoring and agricultural use of antibiotics</td>
<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
<td>• Community-based/primary health care study to look at level of antibiotic resistance</td>
<td>• Antibiotic use trends (volume, type, expenditure)</td>
</tr>
<tr>
<td>• Effective screening of immigrants (MDR-TB)</td>
<td>• Effective policies for infection control in hospitals and institutions, including minimisation of prophylactic antibiotic use</td>
<td>• Personal hygiene (hand washing, etc.)</td>
<td>• Reduced on-farm use of antibiotics in animal care</td>
<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
<td>• Links with agricultural use</td>
<td>• Surveillance data on MR-MRSA and MDR-TB—stable or declining rates</td>
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<tr>
<td>• Effective TB programmes</td>
<td>• Effective policies for infection control in hospitals and institutions, including minimisation of prophylactic antibiotic use</td>
<td>• Personal hygiene (hand washing, etc.)</td>
<td>• Reduced on-farm use of antibiotics in animal care</td>
<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
<td>• Piloting of rapid diagnostic tests (eg, for strep) and cost–benefit analysis</td>
<td>• Reduced antibiotic use in agriculture</td>
</tr>
<tr>
<td>• Promote reduction of antibiotic use in agriculture and food production areas (MAF)</td>
<td>• Effective policies for infection control in hospitals and institutions, including minimisation of prophylactic antibiotic use</td>
<td>• Personal hygiene (hand washing, etc.)</td>
<td>• Reduced on-farm use of antibiotics in animal care</td>
<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
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<td>• Global watch on emerging threats (Institute of Environmental Science and Research Limited, Ministry of Health)</td>
<td>• Piloting of rapid diagnostic tests (eg, for strep) and cost–benefit analysis</td>
<td>• Reduced antibiotic use in agriculture</td>
</tr>
</tbody>
</table>

An Integrated Approach to Infectious Disease
IIb: Medium Priority Infectious Diseases

8 Water-borne enteric diseases\textsuperscript{16}

Although drinking water in New Zealand is now very safe for the majority of New Zealanders and water-borne enteric disease is rare, maintaining current quality standards requires ongoing monitoring and preventive action.\textsuperscript{17} In addition, some poorer rural communities, and institutions such as rural schools, hospitals and marae, still lack good-quality water systems. Past efforts must be maintained to ensure health gain is maximised, and that safe drinking water is available as of right.

The public health implications of an outbreak of water-borne disease are potentially huge, due to the large population served by many water supplies. This is illustrated by the cryptosporidiosis outbreak in Milwaukee, which resulted in around 400,000 cases (39% of the population) and a substantial number of deaths (Hoxie et al 1997; Morris et al 1998).

The organisms responsible for most water-borne illness in New Zealand are campylobacter, salmonella, giardia, cryptosporidium and the emergent verotoxogenic E. coli.

In New Zealand, local authorities and private organisations or communities provide water, and these suppliers are responsible for water quality monitoring. The public health service carries out surveillance of the management of drinking water in each region. The 1999 annual review of drinking water quality (Ball 2000) showed that 82% of the population (compared to 70% in 1994) received water supplies compliant with the legislation, and that 89% of the population’s water (although only 31% of zones) was adequately monitored. Compliance tends to be lower in smaller supplies, especially in rural areas. Problem areas include private and commercial suppliers, rural schools and hospitals (for example, of eight hospitals not connected to municipal water, only two complied). Approximately 20% of the population lives in areas where compliance with giardia and cryptosporidiosis standards could not be demonstrated (Ball 2000).

Objective 1

To prevent water-borne disease by ensuring measures to promote microbiological compliance of all drinking water supplies with drinking water standards (DWS-NZ 2000\textsuperscript{18}) are in place.

\textsuperscript{16} Also see section on zoonoses.

\textsuperscript{17} New Zealand had an average annual incidence of 241.4 cases of campylobacteriosis per 100,000 between 1995 and 1999 (ESR 2000).

\textsuperscript{18} See the Ministry of Health website: www.moh.govt.nz
Targets

More than 95% of the population is provided with water supplies that comply with DWS 2000.

Determine potential transmission routes and reservoirs of water-borne infectious diseases in New Zealand in order to develop effective interventions.

Strategies

• Enable implementation of water monitoring and treatment programmes suitable for use in poor, dispersed, rural communities.

• Provide suitable surveillance of management of drinking-water systems through quality assurance and quality control processes, and through public health services, investigation and monitoring of non-compliant systems.

• Improve the quality of natural water sources through appropriate legislation and collaboration (for example, review water-quality management regulations under the Resource Management Act for water catchments, standardise water quality guidelines for beaches with local authorities), to ensure environmental protection and monitoring of national water guidelines.

• Collaborate with the Environmental Risk Management Authority, Ministry for the Environment, National Institute of Water and Atmosphere, Foundation for Research Science and Technology, Ministry of Agriculture and Forestry, Institute of Environmental Science and Research Limited, Health Research Council of New Zealand, academic institutions and industry to further co-ordinate relevant research into water quality and pathogen transmission.  

Objective 2

To rapidly identify and control outbreaks of water-borne disease.

Target

Reduce water-borne outbreaks of campylobacter and giardia by 25% by 2005.

19 For example, the Strategic Multidisciplinary Research Portfolio.
Strategies

- Maintain an effective and active disease surveillance system (including laboratory notification of key pathogens, linking Water Information New Zealand (hazard/risk factor data) to EpiSurv and Public Health Early Warning System to allow recording by water catchment, a national electronic database and web site for water-borne pathogens, and a sample collecting programme).
- Select and nationally standardise reference techniques for laboratory detection, identification and discrimination of water-borne organisms.
- Establish a culture collection repository for water-borne pathogens.
- Establish co-ordinated outbreak investigation mechanisms, involving ESR and the Ministry of Health, territorial authorities, environmental health officers and public health services that are integrated with the overall disease surveillance programme.
- Promote relevant intersectoral research to enable benchmarking for identification of water-borne diseases, including strain fingerprinting, dispersion and survival of pathogens, animal source loadings and other factors relating to transmission of pathogens in water catchments.

References


Table 9: Water-borne enteric diseases: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
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<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Drinking water standards reviewed, monitored and reported on annually</td>
<td>• Rapid identification and treatment of water-borne IDs</td>
<td>• Collaboration between public health services and environmental health officers</td>
<td>• Community run water services: risk management approaches</td>
<td>• Link EpiSurv and Public Health Early Warning System to Water Information New Zealand (hazard and disease data)</td>
<td>• Transmission routes of campylobacter, cyanobacteria and giardia, especially via cattle</td>
<td>• Compliance rates with NZDW 2000</td>
</tr>
<tr>
<td>• Appropriate legislative changes to ensure drinking water standards are mandated and roles of Ministry of Health extended to regional councils</td>
<td>• Outbreak detection and prompt investigation</td>
<td>• Environmental standards protection via Resource Management Act, territorial authorities</td>
<td>• Maraë and other community water systems</td>
<td>• Improve outbreak investigation, including use of molecular typing techniques</td>
<td>• Examine potential errors in diagnosis/reporting</td>
<td>• Reduced rates of campylobacter and giardia</td>
</tr>
<tr>
<td>• Environmental measures: protection of ground water and natural water sources (Ministry for the Environment, Department of Conservation)</td>
<td>• Environmental measures: protection of ground water and natural water sources, pest control</td>
<td>• Other environmental measures (protection of ground water and environmental protection in environmental action groups, etc.)</td>
<td>• Community action and health promotion on safe drinking water and environmental protection</td>
<td>• Improve data collection and standardise laboratory techniques</td>
<td>• Identify means of controlling water contamination routes and mechanisms (eg, zoonoses)</td>
<td></td>
</tr>
<tr>
<td>• Possum and other pest control (Ministry for Agriculture and Forestry)</td>
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</tbody>
</table>

An Integrated Approach to Infectious Disease
9 Hospital-acquired infections

Hospital-acquired infections (HAIs) include all those infections acquired in the hospital environment, whether related to surgical intervention, medical devices, sepsis or opportunistic infections. Hospitals have a duty of care to patients, including those who may be immuno-compromised in an environment where there are highly pathogenic organisms, to ensure that the risk of acquiring infection is minimised. HAIs generally reflect the quality of hospital care and infection control standards, and potentially present a significant cost to the health system. It is difficult at present to obtain an overall picture of the burden of disease of hospital-acquired infections, as apart from surveillance data on multi-resistant MRSA collated nationally by ESR there is no national analysis of data. Monitoring of blood-stream infection rates show an improving trend over 1998–2000 in aggregate levels in New Zealand hospitals (CCMAU 2000).

The key interventions to prevent and control hospital-acquired infections are the provision of appropriate prevention, surveillance and infection control mechanisms within hospitals. These should be combined with rational prescribing policies and health professional education.

Under existing hospital regulations and licensing legislation, hospitals are required to have infection control programmes and may be audited by the Ministry of Health as part of licensing procedure. With the enactment of the Health and Disability Services (Safety) Bill (currently in its third reading), hospitals will be required to undergo certification, which includes compliance with the NZ Standards on Infection Control. The standard outlines the basic principles and systems that are the foundation for effective infection control, including governance issues, policy and procedures, education, surveillance and antibiotic management.

Objective

To minimise the impact of hospital-acquired infections in New Zealand.

Target

The adoption and use of the NZ Standard for Infection Control by all hospitals in New Zealand.

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20 See also section on antibiotic-resistant infections.
21 This includes the Hospitals Regulations 1993, Hospitals Act 1957, and Health Act 1956.
22 NZ Standard Infection Control NZS 8142:2000, Standards NZ.
Strategies

- Promote the prevention and control of hospital-acquired infections by:
  - ensuring all health care facilities have infection control programmes
  - promoting and ensuring implementation of the national infection control standard through contractual mechanisms
  - auditing of hospitals to this standard (by the Ministry of Health via contracts/licensing - soon to be certification)
  - promoting a quality improvement culture in hospitals
  - education of health professionals - including greater use of trained epidemiologists focusing on HAIs and infection control
  - development of standardised guidelines for outbreak control in hospitals
  - development of national guidelines on key areas (for example, multi-resistant MRSA).

- Identify the priority for, and cost–benefit of, establishing a national surveillance programme for HAIs, including standardised definitions and data analysis, with local feedback mechanisms to clinicians.

Reference

<table>
<thead>
<tr>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NZ Standard for Infection Control implemented via Health and Disability Services (Safety) Bill and via contractual obligations</td>
<td>• Good governance: ongoing support and commitment from senior management for infection control programmes</td>
<td>• Surveillance systems for hospital acquired infections in place</td>
<td>• Ensure all hospitals have surveillance systems in place for hospital acquired infections and audit of their performance (including blood-stream, surgical wound and respiratory infections)</td>
<td>• Evaluation of existing infection control programmes</td>
<td>• Baseline and ongoing data on outbreaks of hospital acquired infection and blood-stream infection rates available</td>
</tr>
<tr>
<td>• Update of MRSA guidelines and any other key areas</td>
<td>• Infection control programmes in all health and disability facilities implemented and reviewed annually</td>
<td>• Prescribing is evidence-based and appropriate doses of the appropriate drug are used</td>
<td>• Establish a national system of surveillance (linked hospital data)</td>
<td>• Assessment for best practice guidelines</td>
<td>• Surgical wound infection rates</td>
</tr>
<tr>
<td>• Priority setting for hospital acquired infection surveillance</td>
<td>• Enhance epidemiology training for hospital management of hospital acquired infections and infection control</td>
<td>• Education of managers and staff in institutions, especially in the private sector (rest homes, etc.)</td>
<td>• Lab audit trails, especially concerning post-discharge hospital acquired infections</td>
<td></td>
<td>• % of hospitals fulfilling the NZ Standard</td>
</tr>
</tbody>
</table>

Table 10: Hospital acquired infections: strategies, responsibilities and partnerships
10 Infectious diseases transmitted by close physical contact, superficial infections and infestations

Transmission of infection through close physical contact is common to a broad range of infectious diseases, including skin infestations and infections (such as scabies, lice and impetigo), and infections transmitted via the oral–faecal route, including some diarrhoeas (giardia, rotavirus, helicobacter) and hepatitis A. Viral diseases such as Epstein Barr virus and fungal infections (dermatophytes, tinea, etc.) are also transmitted through close contact.

Transmission of these diseases is enhanced in overcrowded environments and other areas such as early childhood centres, schools and long-term residential facilities where there is frequently close contact. Improved housing, education and immunisation are factors in reducing transmission. Hepatitis A immunisation is recommended for travellers to high-prevalence areas and for high-risk groups, day-care centre employees, health care workers, sewerage workers, those with chronic liver disease, or recipients of blood products such as Factor VIII because of the risk of underlying liver disease (Ministry of Health 1996).

Notification data to the Institute of Environmental Science and Research Limited suggest giardiasis and hepatitis A are of most concern. The extent of the more common, less serious problems of head lice, scabies and impetigo are poorly documented.

Objective

To reduce the transmission of infectious diseases from close physical contact.

Target

Reduction in hospital admissions for conditions preventable by good primary care (for example, cellulitis).

Strategies

- Address the socioeconomic determinants of diseases transmitted by close physical contact (for example, improved housing, including designs for extended family groups, and for high-risk groups).
- Provide effective infection control in high-risk institutions (such as childcare centres and schools), especially basic hygiene measures such as hand-washing.
- Provide access to prevention, diagnosis and treatment for high-risk groups (including hepatitis A vaccination).
• Promote health education and hygiene promotion for families/whānau.
• Reduce secondary spread and severity of disease through improved access to primary care, rapid diagnosis, education, treatment and appropriate prophylaxis.

Reference

Table 11: Infectious diseases transmitted by close physical contact, superficial infections and infestations: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
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<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Housing policy to reduce overcrowding and unsanitary conditions</td>
<td>• Improved access to primary care, especially in deprived areas</td>
<td>• Efficient waste and sewage disposal</td>
<td>• Health promotion</td>
<td>• Rapid identification of outbreaks</td>
<td>• Community levels/burden of disease of head lice, scabies</td>
<td>• Reduced number of hospital admissions for conditions preventable by good primary care (e.g., cellulitis)</td>
</tr>
<tr>
<td>• Occupational Safety and Health Service standards implemented in workplaces</td>
<td>• Health/hygiene promotion</td>
<td>• Adequate facilities for hygiene (provision of hot water, etc.)</td>
<td>• Appropriate vaccination</td>
<td>• Data for prevention</td>
<td>• Head lice and treatment resistance</td>
<td></td>
</tr>
<tr>
<td>• Enhance access to primary care</td>
<td>• Effective diagnosis and treatment</td>
<td>• Good infection control practices and procedures in early childhood centres, etc.</td>
<td>• Good personal hygiene practices</td>
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<tr>
<td>• Infection control policies/standards in institutions, schools, etc.</td>
<td>• Hepatitis A vaccination to high-risk groups</td>
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<tr>
<td>• Appropriate care of prisoners and other institutionalised people</td>
<td>• Infection control in high-risk institutions monitored and audited</td>
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<tr>
<td>• Ongoing development of joint health-education protocols and health promotion</td>
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</tbody>
</table>
11 Zoonotic diseases linked to direct animal contact\textsuperscript{23}

Zoonoses are diseases that primarily infect an animal host (wild or domestic) but may be transmitted to and infect humans. Zoonotic pathogens are widely spread in the environment but the biology of these organisms, their transmission and the ways they cause disease are still incompletely understood.

They include:

- leptospirosis (usually in New Zealand from contact with infected livestock)
- typhus (although vector-borne, it may have a possum reservoir)
- cryptosporidiosis, campylobacteriosis, STEC/VTEC and other enteric diseases (cattle and domestic animal hosts; other potential routes/reservoirs are not well understood)
- toxoplasmosis and bovine tuberculosis
- hydatids, lyssaviruses and other emerging problems. A recent example is Salmonella brandenburg, which aborts lambs and kills sheep, and is causing diarrhoeal illness in farm workers and vets (NZPHR 1998).

Despite the decline in New Zealand’s rural population and with fewer workers now employed in the agricultural sector, diseases transmitted via direct contact with animals remain a public health problem. In addition to domestic and farm animals, wild animals such as possums, rodents and birds are also actual or potential disease-carriers (for example, psittacosis and salmonella from birds, Ross River virus and possums\textsuperscript{24}). Animals may also contaminate water supplies, potentially causing large outbreaks of water-borne disease.

National data from ESR shows incomplete notification of leptospirosis, with almost double the number of laboratory cases reported as notified cases. Hydatid disease is now rare in New Zealand with eight reported cases of hydatid disease in 1999, and an average of four over the last five years (ESR 2000). Brucellosis in cattle has been eradicated, with the last field strain reported in 1988 (MAF 1996). The enteric pathogens (campylobacter, cryptosporidium, STEC/VTEC) are already a sizeable public health problem, causing a spectrum of disease in humans.

Because of the involvement of animal hosts, a multi-sectorial approach is necessary in the research, prevention and control of these diseases. The Ministry of Agriculture and Forestry (MAF), the Department of Conservation and Occupational Safety and Health (OSH), regional councils and public health services all play a role.

\textsuperscript{23} See also sections on water-borne enteric, vector-borne, and occupational infectious diseases.

\textsuperscript{24} See vector-borne diseases section.
Education of high-risk groups (for example, occupations involved with animal handling), appropriate vaccination of animal herds and the ability to respond rapidly to outbreaks are key interventions.

**Objective**

Minimise transmission of zoonotic infectious diseases, especially in high-risk occupational groups.

**Targets**

100% vaccination coverage of animals/animal herds for leptospirosis (MAF).

Reduction of enteric zoonotic disease outbreaks through improved control of major transmission routes (including animal–human).

**Strategies**

**Prevention**

- Promote high coverage of leptospirosis vaccination and monitoring of hydatids in animal herds through MAF policy and legislation, and working with rural groups (farmers/farm workers, etc.).
- Promote good animal husbandry practices and herd testing.
- Ensure effective environmental management legislation and monitoring to control effluent and discharges.
- Increase industry and media awareness of zoonotic infections and public health risks.
- Educate and protect high-risk workers through the use of protective equipment and basic hygiene measures.
- Promote information and education for employers and unions via the Accident Compensation Corporation and the Occupational Safety and Health Service.
- Protect water sources from contamination by animals.
- Improve understanding, through cross-sectoral research, of disease transmission pathways and effective interventions to reduce disease in humans in New Zealand.

**Surveillance**

- Raise awareness among health professionals in primary care, especially in rural practice.
- Consider electronic laboratory notification of important zoonoses.
• Co-ordinate further research into the burden of zoonotic diseases in rural communities, transmission routes and prevention (Ministry of Research Science and Technology, Foundation for Research Science and Technology, Ministry of Agriculture and Forestry, Occupational Safety and Health Service, Ministry for the Environment/Department of Conservation, etc.).

• Review compatibility and linkages between the disease surveillance system with risk management systems (Occupational Safety and Health Service, Water Information New Zealand, etc.).

• Ensure that the surveillance system is capable of detecting potential (imported) diseases (such as hantavirus).

References


An example is the Ministry of Health steering group chaired by Professor Don McGregor to co-ordinate research in this area.
Table 12:  Zoonotic diseases linked to direct animal contact: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vaccination of herds, good husbandry, border control-prevention of further hazards (Ministry of Agriculture and Forestry)</td>
<td>• Primary care providers have awareness of common zoonoses</td>
<td>• Rodent/possum etc.: control</td>
<td>• Occupational safety and self-protection</td>
<td>• Lab notification</td>
<td>• Rural burden of disease</td>
<td>• Herd vaccination coverage</td>
</tr>
<tr>
<td>• Awareness and promotion (Occupational Safety and Health Service/Accident Compensation Corporation)</td>
<td>• Education about emerging threats (eg, hantaviruses)</td>
<td>• Protect natural and drinking water sources</td>
<td>• Informed unions and employers</td>
<td>• Linking hazard/Ministry of Agriculture and Forestry</td>
<td>• Transmission routes of key pathogens (eg, campylobacter)</td>
<td>• Reduction of zoonotic enteric diseases</td>
</tr>
<tr>
<td>• Possum/host control and protection of important water sources (Department of Conservation/Ministry for the Environment)</td>
<td>• Promote industry awareness of zoonoses</td>
<td>• Promote industry awareness of zoonoses</td>
<td>• Good husbandry techniques on farms</td>
<td></td>
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<tr>
<td>• Co-ordinate research and surveillance of zoonoses affecting human health (Ministry of Health)</td>
<td>• Enforce and monitor legislation</td>
<td>• Promote healthy practices and awareness of risks by Federated Farmers, Country Women’s Institute, etc.</td>
<td>• Promote healthy practices and awareness of risks by Federated Farmers, Country Women’s Institute, etc.</td>
<td>• Early detection of new threats</td>
<td></td>
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</table>
12 Travel-associated and imported infectious diseases

In today’s global environment with increasing frequency of international travel and migration, New Zealand is not immune to the importation of diseases normally unknown here. Whether through leisure or work-related travel, migration or long-term visitors, there are risks of importing infectious diseases that are of public health concern. Over 60,000 people arrive or return to New Zealand to settle each year. Nearly 3 million travellers arrive by air and over 3700 vessels and 21,000 aircraft enter New Zealand annually (New Zealand Customs Service 2000; New Zealand Immigration Service 2000).

In recent years, dengue fever, malaria, schistosomiasis, typhoid and travel-related diarrhoeas have formed the majority of notifications nationally in this group of diseases (ESR 2000). Other infectious diseases such as leprosy, tuberculosis, HIV and Hepatitis A and B and other sexually transmitted infections may also be imported from high-prevalence areas, both by returning travellers or by migrants. Others such as Ross River virus are potential threats, given recent establishment of the mosquito vector in New Zealand.

Prevention measures are a key area for travellers, with up-to-date, accurate information and health protection advice being most important. Appropriate prophylaxis (for example, for malaria) and immunisations are also necessary. This requires that reliable and consistent information sources are available to the health professionals who provide this care to travellers.

Prevention is also a crucial aspect for migrants and refugees, with health screening and promotion important aspects of providing good personal health services for new New Zealanders, as well as protecting the public health.

Surveillance issues

There are some gaps in the present surveillance of travel-associated and imported diseases. These include incomplete notification of notifiable diseases (such as malaria and dengue), some diseases such as schistosomiasis not being currently notifiable, and lack of data on common but less serious health problems in returning travellers and migrants.

New Zealand has some international public health obligations in terms of surveillance and reporting: for example, yellow fever, cholera, plague, and polio. New Zealand could also contribute to regional surveillance through reporting imported cases to the Pacific regional surveillance centre (in Noumea, New Caledonia). There is a need to maintain a watch on global trends and emerging or new risks to travellers.

26 See other relevant sections for more detail on these.

27 See section on vector-borne diseases.
Objective 1
To ensure outgoing travellers minimise their risk of acquiring infectious diseases while out of New Zealand.

Target
All travellers are offered up-to-date, relevant health advice and vaccinations.

Strategies
- Ensure GPs and other health providers have a sound knowledge of health protection advice, so that travellers are offered good-quality, consistent advice and appropriate pre-travel vaccinations.
- Ensure up-to-date publications are available and easily accessible (for example, on Ministry of Health, Immigration and travel web sites, international web sites (CDC-Atlanta), via travel agents and airlines.
- Maintain international links to monitor travel-associated and imported diseases.

Objective 2
To ensure all returning travellers (and incoming tourists) with infectious diseases receive prompt diagnosis and treatment.

Target
100% notification of notifiable travel-associated or imported infectious diseases.

Strategies
- Establish an effective notification system for travel-associated and imported diseases, including laboratory notification, review of the notifiable diseases list and sentinel surveillance via travel medicine clinics.
- Ensure providers have a sound knowledge of diagnosis and treatment of travel-associated diseases (including access to regular updates and surveillance data, and access to specialist referral services).

Objective 3
To provide immigrants and long-term visitors to New Zealand with appropriate screening, diagnosis and treatment of infectious diseases.
Target

All migrants and asylum seekers are appropriately screened, in a safe and culturally sensitive manner.

Strategies

• Work with and advise Immigration on border issues and resettlement policies, to ensure that a balance between public health and other priorities is achieved.
• Ensure that screening of immigrants and asylum seekers is timely, effective and carried out in a sensitive and safe manner.

References


Table 13: Travel associated and imported infectious diseases: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
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<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Health and Immigration:</td>
<td>• Good-quality information for providers</td>
<td>• Travel agents informed</td>
<td>• Travellers informed of risks and take appropriate precautions</td>
<td>• Lab notification</td>
<td>• How to improve uptake of health screening by migrants</td>
<td></td>
</tr>
<tr>
<td>• Collaboration on screening of migrants and asylum-seekers</td>
<td>• Non-threatening, safe environments for asylum-seekers and migrants to seek health care</td>
<td>• Non-threatening, safe environment for asylum-seekers and migrants to seek health care</td>
<td>• Monitoring of global risks</td>
<td>• Updates and surveillance reports from NZ Public Health Report</td>
<td>• Experience of returning travellers</td>
<td></td>
</tr>
<tr>
<td>• Up-to-date accurate information is accessible</td>
<td>• Updates and surveillance reports from NZ Public Health Report accessible to providers</td>
<td>• Support from migrant and refugee groups</td>
<td>• Regional surveillance</td>
<td>• NZ Public Health Report</td>
<td>• Quality of travel advice given</td>
<td></td>
</tr>
<tr>
<td>• International links maintained, with dissemination of information to the public/travellers</td>
<td>• Access to specialist referral services</td>
<td></td>
<td>• Emerging diseases</td>
<td></td>
<td>• Emerging diseases</td>
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</tr>
<tr>
<td>• Border control (vectors, etc.)</td>
<td>• Networking of travel clinics</td>
<td></td>
<td></td>
<td></td>
<td>• % of refugees accessing health screening in a timely fashion</td>
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<td></td>
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<td></td>
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<td></td>
<td>• Rates of key imported disease notifications</td>
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</table>
13 Diseases from the environment

Infectious pathogens in the environment have the potential to cause large outbreaks of disease. Some of these pathogens, such as legionella and amoebae, are always present in the natural environment and require ongoing monitoring and prevention measures. Others may be introduced, such as through contamination by animal or human effluent. Infectious agents that are of major public health concern in New Zealand include legionella, amoebae, protozoae (for example, cryptosporidium) and campylobacter.

Incidence rates of some of these diseases are low: for example, laboratory cases of legionella confirmed at the Institute of Environmental Science and Research Limited average 83.4 per year (1995–99 data). Likewise, amoebic meningoencephalitis is rare.

Key sites of importance in monitoring disease are recreational water sites, air conditioning and ventilation systems, and swimming pools.

Control relies largely on prevention of contamination, environmental monitoring and surveillance, and rapid investigation and response to any possible outbreaks. The key legislation protecting the environment is the Resource Management Act 1991.

Objective

To reduce the incidence and impact of infectious diseases acquired from the environment.

Targets

All buildings comply with codes/standards.

All recreational water sources and swimming pools meet national standards for water quality.

Strategies

- Minimise the man-made impact on the environment through protection of water sources and pollution standards, particularly on farms.
- Audit territorial authorities’ monitoring of standards for pools and other recreational water.
- Audit local authority monitoring of building codes (Occupational Safety and Health Service/local authorities).
- Provide health education to the public concerning measures to prevent disease.

See also sections on water-borne diseases and occupational infectious diseases.
• Maintain an effective surveillance system so that outbreaks are rapidly detected.
• Respond effectively to outbreaks.
Table 14: Diseases from the environment: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Appropriate building codes (Building Act 1992 and Building Code)</td>
<td>• Recognition, diagnosis and treatment of cases</td>
<td>• Administration of the RMA (regional councils, territorial local authorities)</td>
<td>• Health education</td>
<td>• Audit of regional council/local authority monitoring</td>
<td>• Transmission routes, ongoing work on zoonoses (Ministry for the Environment, Ministry of Health, Institute of Environmental Science and Research Limited, etc.)</td>
<td>• Incidence rates of legionellosis and amoebic meningitis</td>
</tr>
<tr>
<td>• Water standards (Ministry for the Environment recreational water quality guidelines)</td>
<td>• Health education</td>
<td>• Enforcement of building codes (territorial local authorities)</td>
<td>• Appropriate pool maintenance</td>
<td>• Lab notification of cases</td>
<td></td>
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<tr>
<td>• Environmental protection (RMA)</td>
<td>• Monitoring of water and pools (territorial local authorities)</td>
<td>• Awareness in Māori communities of potential risks in geothermal waters</td>
<td>• Health education</td>
<td>• Outbreak investigation</td>
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<tr>
<td>• Occupational Safety and Health Service standards enforced (Health and Disability Act)</td>
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An Integrated Approach to Infectious Disease 57
14 Congenital and perinatal infections

Although congenital and perinatal infections contribute relatively little overall to the burden of infectious disease, the long-term consequences of these diseases are often devastating and costly. They are also largely preventable through good maternity care, including immunisation (rubella and hepatitis B). Therefore the key strategies focus on the provision of quality maternity care and the ongoing education of health professionals responsible for this.

Young Māori and Pacific women have higher rates of STIs and teenage pregnancy, lower immunisation rates and less access to health care, which increases the risk of congenital and perinatal infections in their babies.

Maternal rubella infection in the first 8–10 weeks of pregnancy results in foetal damage in up to 90% of infants. Congenital rubella syndrome includes mental retardation, cardiac malformations, cataracts and deafness. New Zealand continues to have rates 5–10 times that of the USA. The present two-dose vaccination strategy, given current rates of coverage, has reduced the background incidence of rubella and prevented rubella epidemics but is inadequate to interrupt/eliminate transmission, as in Finland (Ministry of Health 1996).

Hepatitis B vaccine efficacy is 80–95% in preventing infection; immunisation prevents both the acute illness and disease complication (chronic carrier status, chronic active hepatitis, cirrhosis and hepatocellular carcinoma (liver cancer). Hepatitis B infection in pregnancy may result in severe disease for the mother and active infection of the newborn. Infants born to carrier mothers have a high risk of becoming chronic carriers (95%) and should be offered hepatitis B immunoglobulin and vaccine at birth, as well as vaccine at six weeks, three and five months.

Quality maternity care includes screening women at risk for STIs and other infections that have the potential to cause congenital or perinatal infection. Current guidelines for HIV screening in pregnancy do not recommend routine screening, but risk assessment followed by counselling and voluntary testing. It has been recently recommended that HIV testing be routinely offered, given the low number of women currently tested and the benefit knowledge of maternal HIV status has for the infant in prevention of transmission. This has yet to be implemented.

Objective

Minimise the risk of congenital and perinatal infections in infants.

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29 See also sections on STIs, vaccine-preventable and blood-borne diseases.

30 Rates are very low: only two cases of CRS were reported in the 1989-90 New Zealand outbreak (Ministry of Health 1996).
**Target**

All pregnant women are offered appropriate screening, treatment and prevention for congenital and perinatal infections.

**Strategies**

- Inform and educate young women and their partners of the risks of congenital and perinatal infections.
- Promote rubella/hepatitis B vaccination to ensure adequate population coverage.
- Offer routine screening to all pregnant women (with informed consent) for an appropriate range of potential congenital infections, including:
  - hepatitis B, HIV, STIs (chlamydia, herpes simplex virus, gonorrhoea, syphilis)
  - group B streptococcus.
- Ensure appropriate training and ongoing education for lead maternity carers and obstetricians/GPs, including evidence-based guidelines for care.
- Review and implement proposed national policy on BCG immunisation for high-risk infants.
- Consider notification of all women who are hepatitis B carriers in pregnancy to ensure appropriate immunisation of their babies.

**Reference**

Table 15: Congenital and perinatal infections: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
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<th>Research</th>
<th>Indicators of progress</th>
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</thead>
<tbody>
<tr>
<td>• Improve immunisation coverage</td>
<td>• Provide quality maternity care, including services designed to meet the needs of young wahine Māori and Pacific women</td>
<td>• Reduction of environmental exposure to toxoplasmosis and listeria (food safety)</td>
<td>• Well-informed public</td>
<td>• Reconsider status of hepatitis B in pregnancy</td>
<td>• Evaluation of maternity care providers practice re HIV testing</td>
<td>• 95% vaccination coverage for rubella, with CRS (congenital rubella syndrome) cases reduced to zero</td>
</tr>
<tr>
<td>• National guidelines on appropriate screening, including identification of at-risk women, and update immunisation schedules</td>
<td>• Appropriate routine screening of pregnant women</td>
<td>• Training for lead maternity carers on sexual health counselling or interviewing</td>
<td>• Planned pregnancies</td>
<td>• Lab notification to improve data completeness</td>
<td>• Cost-benefit of routine HIV and chlamydia screening in pregnancy</td>
<td>• Reduced incidence of neonatal (ophthalmic) gonorrhoea and chlamydia</td>
</tr>
<tr>
<td>• Recconsider notification of hepatitis B carriage in pregnancy to improve vaccination of infants</td>
<td>• Continuing education for lead maternity carers (eg, on sexual health counselling)</td>
<td>• Prevent food-borne congenital infections through food safety monitoring</td>
<td></td>
<td>• Sentinel surveillance of high-risk groups</td>
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<tr>
<td>• Ensure quality training, audit and accountability of health professionals</td>
<td>• Appropriate audit and accountability of practice</td>
<td>• Evaluation of maternity care providers practice re HIV testing</td>
<td></td>
<td>• Sentinel surveillance of high-risk groups</td>
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<td></td>
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<tr>
<td>• Food safety – listeria, toxoplasmosis</td>
<td>• Prevent food-borne congenital infections through food safety monitoring</td>
<td>• Cost-benefit of routine HIV and chlamydia screening in pregnancy</td>
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<td>• Sentinel surveillance of high-risk groups</td>
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<tr>
<td></td>
<td>• 95% vaccination coverage for rubella, with CRS (congenital rubella syndrome) cases reduced to zero</td>
<td>• Reduced incidence of neonatal (ophthalmic) gonorrhoea and chlamydia</td>
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<td>• Sentinel surveillance of high-risk groups</td>
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IIc: Lower Priority Infectious Diseases

15 Occupational infectious diseases

The major disease in this group affecting the New Zealand population is leptospirosis. This is best controlled through the vaccination of cattle. Tuberculosis (TB) (via bovine TB), legionnaires disease, hepatitis B and some enteric diseases such as salmonella may also be acquired through occupational exposure. Agricultural and meat workers may be exposed to orf virus and ringworm. Brucellosis and hydatids have now been practically eliminated in New Zealand. Health care workers, cleaners and others may be exposed to a range of infectious diseases in the work place.

The priority is to prevent transmission through education and prevention programmes aimed at farm and meat industry workers, health workers and other high-risk occupational groups.

The Occupational Safety and Health service of the Department of Labour (OSH) is a key provider of information and education for workers. The Ministry of Agriculture and Forestry, unions and employers, and other industry groups are important groups to collaborate with in occupational infectious disease control.

Objective

To reduce the incidence and impact of occupationally acquired infections.

Target

All workplaces have guidelines consistent with national standards and comply with OSH regulations (Health and Safety in Employment Act 1992 and regulations 1995).32

Strategies

• Provides risk management frameworks and appropriate regulations for safe working environments through health and safety legislation.
• Ensure high vaccination coverage of herds (leptospirosis).
• Maintain herd testing for bovine TB and possum culling.

See also sections on zoonotic, enteric, blood-borne and other diseases, as appropriate.

See OSH web site: www.osh.dol.govt.nz.
• Provide appropriate employer, union and worker education (leptospirosis, Hepatitis A & B, TB, legionella).
• Make occupational disease guidelines available and implement these in all workplaces.
• Ensure effective infection control programmes (including monitoring) are operating in all workplaces.
• Monitor hepatitis B status, vaccination and education for high-risk occupational groups.
• Rapidly identify occupational infectious disease, including raising awareness among primary care providers, workers and their families, and ensuring adequate laboratory diagnostic capacity.
• Immunise health care workers exposed to vaccine-preventable diseases appropriately.
• Ensure access of other workers to appropriate immunisation (for example, food workers and hepatitis A).
### Table 16: Occupational infectious diseases: strategies, responsibilities and partnerships

<table>
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<tr>
<th>Healthy public policy (central government)</th>
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<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Effective Occupational Safety and Health Service legislation provides overall framework and risk management approach</td>
<td>• Effective infection control programmes (including monitoring) operating in all workplaces</td>
<td>• High vaccination coverage of herds (leptospirosis)</td>
<td>• Personal work safety</td>
<td>• Occupational Safety and Health Service notification system-linkages with infectious disease notification</td>
<td>• Co-ordinated with Ministry of Agriculture and Forestry</td>
<td>• Rates of leptospirosis</td>
</tr>
<tr>
<td>• Integrated national surveillance systems</td>
<td>• Monitoring of hepatitis B and other vaccines (eg, influenza) status and education for high-risk occupational groups</td>
<td>• Herd testing for bovine TB and possum culling</td>
<td>• Worker education</td>
<td>• Integrated national surveillance systems</td>
<td>• Immunisation coverage in health care workers</td>
<td></td>
</tr>
<tr>
<td>Ministry of Agriculture and Forestry/Department of Conservation:</td>
<td>• Public Health Services provider awareness of high-risk groups and diagnostic syndromes</td>
<td>• Appropriate employer and worker education</td>
<td>• Involvement of relevant organisations (eg, Federated Farmers)</td>
<td>• Herd surveillance for TB/leptospirosis (Ministry of Agriculture and Forestry)</td>
<td></td>
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</tr>
<tr>
<td>• Cattle vaccination and possum control policies</td>
<td>• Lab capacity</td>
<td>• Monitoring of hepatitis B and other vaccines (eg, influenza) status; provision of vaccination and education for high-risk occupational groups</td>
<td></td>
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<td></td>
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<tr>
<td>• Education of agricultural workers</td>
<td></td>
<td>• Occupational disease guidelines available and implemented in all workplaces</td>
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<td>• Effective infection control programmes (including monitoring) operating in all workplaces</td>
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</table>
16 Vector-borne diseases

Vector-borne diseases are transmitted to humans primarily by arthropod vectors, such as mosquitoes, sandflies and ticks. Climate change, ecological degradation, international travel and global trade are all factors contributing to the increased risk of these vectors becoming established in New Zealand, and thus the potential for disease transmission. In addition the population is not immune to these diseases and is highly susceptible to infection (Hearnden et al 1999).

Currently there are several introduced vectors causing concern, including the salt-marsh mosquito (*Aedes camptorhynchus*), which is capable of transmitting Ross River virus and Barmah forest virus. Three other exotic mosquitoes are already well established (*Aedes australis*, *Aedes notoscriptus* and *Culex quinquefasciatus*). Other recent intercepted visitors include mosquitoes capable of transmitting dengue, Japanese encephalitis and other viral fevers (*A. Albopictus*, *A. japonicus*, etc.). Yellow fever, malaria and filariasis (*W. bancrofti*) are thought to present a lower risk to New Zealand, but they require consideration as elevated temperatures and rainfall could lead to an increase in the range and number of habitats that could support the vectors transmitting these diseases. Cases of rickettsial fevers have been identified in Northland, while other potential vectors such as exotic sandflies (transmitting viral fevers and leishmaniasis) require surveillance.

Strategies to address these infectious diseases primarily depend on vector control or eradication (biosecurity measures, surveillance and border control, vector eradication or control campaigns). As has been seen with the salt-marsh mosquito recently, eradication is not always a feasible option. Therefore vector and disease surveillance, reduction of exposure risk and effective diagnosis and treatment are secondary steps in disease control.

**Objective 1**

To reduce the risk of vector-borne diseases becoming established in New Zealand through effective biosecurity measures, including border control.

**Target**

Minimise the introduction of exotic vectors to New Zealand.

**Strategies**

- Develop and maintain international links for monitoring vectors, climate change and environmental factors.
- Support efforts to reduce and reverse global warming.
- Strengthen border control for potential imported vectors.
• Enhance and maintain an effective surveillance system for mosquitoes and other vectors.
• Develop and maintain a capacity for effective exotic vector eradication or control programmes.

Objective 2
To maintain an effective health sector capacity to respond to vector-borne diseases.

Target
All vector-borne diseases are promptly notified.

Selected regional labs are capable of diagnostic testing for an appropriate range of vector-borne diseases.

Strategies
• Develop and maintain the ability to identify and respond to outbreaks of vector-borne diseases through:
  – effective surveillance (including the primary care level)
  – primary prevention strategies (for example, educating the public about how to avoid infection through mosquito avoidance, etc.)
  – education of primary health practitioners and the public about diagnostic syndromes
  – ensuring that rapid diagnostic tests (including polymerase chain reaction) are available when required.

Reference
<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• International scanning re-vectors, climate change, environmental factors</td>
<td>• Education of primary health practitioners about diagnostic syndromes</td>
<td>• Maintain an effective surveillance system for mosquitoes and other vectors</td>
<td>• Community awareness of risks</td>
<td><strong>Vector surveillance:</strong></td>
<td>• Risk assessment</td>
<td>• Vector interception episodes</td>
</tr>
<tr>
<td>• Support efforts to reduce and reverse global warming</td>
<td>• Ensure that rapid diagnostic tests are available when required</td>
<td>• Develop and maintain a capacity for effective exotic vector eradication or control programmes</td>
<td>• Mosquito avoidance via appropriate education and behaviour change</td>
<td>• Maintain an effective surveillance system for mosquito and other vectors</td>
<td>• Effectiveness of control interventions</td>
<td>• Results of eradication and control programmes</td>
</tr>
<tr>
<td>• Strengthen border control for potential imported vectors</td>
<td></td>
<td>• Screening of houses</td>
<td></td>
<td><strong>Disease surveillance:</strong></td>
<td></td>
<td>• Zero ‘indigenous’ vector-borne infectious diseases</td>
</tr>
<tr>
<td>• Maintain an effective surveillance system for mosquitoes and other vectors</td>
<td>• Public information and education on mosquito avoidance and infection recognition</td>
<td></td>
<td></td>
<td>• Early identification of the organism with polymerase chain reaction testing and rapid laboratory notification</td>
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<tr>
<td>• Develop and maintain a capacity for effective exotic vector eradication or control programmes</td>
<td></td>
<td></td>
<td></td>
<td>• Linking of vector and disease surveillance systems (including geographic information systems)</td>
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</table>
17 Bio-terrorism agents

Threats to public health from bio-terrorism (the use of biological weapons such as anthrax or other pathogens by terrorist organisations) are perceived as low risk in New Zealand. Currently much greater emphasis is placed on preventing the importation of animal disease because of the potential impacts on our export industry. However, bio-terrorism is an area of considerable concern and debate in larger nations such as the USA. Given the ease of international travel, New Zealand cannot be insulated from such threats.

Border control is the major prevention mechanism. Monitoring international trends and maintaining a bio-terrorism contingency plan as part of a broader civil defence response to emergencies are the other key elements.

Objective

To keep New Zealand free of bio-terrorism agents.

Target

Develop an effective public health emergency plan to respond to bio-terrorism threats.

Strategies

- Monitor and keep up to date with international information on possible agents and protocols on bio-terrorism, to identify current and future threats.
- Develop and maintain an effective contingency plan, identify key national and international contacts, and maintain effective border control and suitable laboratory facilities.
- Collaborate with other agencies, including Civil Defence, Ministry of Agriculture and Forestry and the police/armed forces.
- Ensure adequate legislative provisions are in place to implement such a plan.
Table 18: Bio-terrorism agents: strategies, responsibilities and partnerships

<table>
<thead>
<tr>
<th>Healthy public policy (central government)</th>
<th>Health services (DHBs, health providers, public health services)</th>
<th>Supportive environments (regional councils, local authorities, schools, etc.)</th>
<th>Community action and personal skills</th>
<th>Surveillance</th>
<th>Research</th>
<th>Indicators of progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Scan international information and protocols on bio-terrorism</td>
<td>• Co-ordinated civil defence planning</td>
<td>• Civil defence awareness</td>
<td>• Lab facilities suitable for surveillance</td>
<td>• Transmission routes</td>
<td>• Evaluation of effectiveness of emergency plans internationally</td>
<td>• A national public health emergency plan is developed</td>
</tr>
<tr>
<td>• Develop and maintain an effective public health emergency plan, with key national and international contacts, effective border control, suitable lab facilities, based on the Civil Defence inter-agency model</td>
<td>• Involved and informed of risks in civil defence planning</td>
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<td>• Ensure legislative provisions are updated</td>
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<tr>
<td>• Consider armed forces role and vaccination policies (eg, anthrax)</td>
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</table>
Part III: Surveillance

General principles

Effective communicable disease control relies on effective surveillance and response systems. Information on priority communicable diseases is a key part of public health decision making in all countries. It is essential for priority setting, planning, resource mobilization and allocation, prediction and early detection of epidemics, monitoring and evaluation of disease prevention and control programmes. Disease surveillance is a critical component of health systems, providing essential information for optimal health care delivery and cost effective health strategies (WHO 2000).

A surveillance system must provide (WHO 2000):
• timely, complete, regular and high-quality information
• early detection and prediction of epidemics
• objective assessment of interventions during epidemics
• efficient monitoring of intervention programmes
• evidence-based criteria for priority setting and resource allocation.

An integrated approach to disease surveillance involves:
• co-ordination and integration of surveillance activities and functions
• building on existing resources
• building of response capacity
• promotion of the most effective use of health resources (WHO 2000).

In New Zealand, surveillance for infectious diseases control should be placed within a broader public health surveillance framework (including hazard systems) and the overall national health information system, recognising future trends towards electronic health records (EHRs), integrated care data systems (such as the WAVE project33), and international linkages.

Surveillance for a disease or disease grouping should begin by:
• defining the information needs of providers, public health services and the Ministry of Health
• defining appropriate data quality standards and data timeliness
• establishing criteria for evaluation and measuring system effectiveness.

33 Working to Add Value through E-information – the health information strategy being developed by the Ministry of Health.
An additional factor that requires consideration is the resources required to do this: the person time and financial costs to public health workers, clinicians and other providers.

The following table summarises, by disease grouping, what (and how) data are currently collected, gives an overview of information requirements, the gaps and problems identified in the development of the IAID.
### Table 19: Current and future information needs, gaps and problems

<table>
<thead>
<tr>
<th>Grouping of diseases</th>
<th>What exists</th>
<th>Current status (N, L, SS*)</th>
<th>Information needs</th>
<th>Gaps/problems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highest priority</strong></td>
<td>Notification of many vaccine-preventable diseases</td>
<td>N, L except pneumococcal and varicella</td>
<td>• National coverage data for each vaccine, and % totally immunised children</td>
<td>• The immunisation status of the child/person in front of them</td>
</tr>
<tr>
<td>Vaccine-preventable diseases in children: measles, mumps, rubella, varicella, pertussis, hepatitis B, haemophilus (Hib), polio, tetanus, diphtheria, pneumococcal disease</td>
<td>• GP registers</td>
<td></td>
<td>• DHB want coverage data by area, % totally immunised children, by ethnic, etc.</td>
<td>• % vaccine coverage in their patient population in order to evaluate their immunisation activities</td>
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<td></td>
<td>• Payment data: Health Benefits, Independent Practitioners Association and capitation data</td>
<td></td>
<td>• Impact of vaccination on disease (eg, Hib, efficacy of new meningococcal B vaccine)</td>
<td>• Outbreak surveillance, ie, notification of cases is timely</td>
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<td></td>
<td>• KidzNet: initial phase</td>
<td></td>
<td>• Swift identification of emerging problems and outbreaks cases is timely and accurate</td>
<td>• Outbreak data to assist patient education, improving practice and diagnostic support</td>
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<td></td>
<td>• Proposal for online linking, integrated with Child Health Information Strategy</td>
<td></td>
<td>• Sero-prevalence data (eg, for measles, to confirm coverage data)</td>
<td>• No online integrated national system of individual immunisation records: needs to link to existing data, based on NHI number, and be compatible with other planned health information systems</td>
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<tr>
<td></td>
<td>• Diseases are notifiable</td>
<td>N, L except pneumococcal and varicella</td>
<td>• Adverse event monitoring, especially for new vaccines</td>
<td>• Inadequate data for calculation of vaccine coverage by region/DHB/nationally</td>
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<td></td>
<td></td>
<td></td>
<td>• Modelling to predict future outbreaks</td>
<td>• Incomplete/slow notification of vaccine-preventable diseases for outbreak purposes, and international needs (AFP, measles in future) - need for lab notification to assist completeness.</td>
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<td></td>
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<td>• Need strengthening of outbreak and epidemic preparedness</td>
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</table>

N = notifiable disease
L = some existing laboratory surveillance via ESR
SS = sentinel sites
<table>
<thead>
<tr>
<th>Grouping of diseases</th>
<th>What exists</th>
<th>Current status (N, L, SS*)</th>
<th>Information needs</th>
<th>Gaps/problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine-preventable diseases in adults: influenza, pneumococcal disease, tetanus, hepatitis B</td>
<td>• Hepatitis B, tetanus are notifiable</td>
<td>N, L SS (influenza)</td>
<td>• As for vaccine-preventable diseases in children, including % of high-risk groups covered (eg, &gt;65 years for influenza coverage by DHB and nationally)</td>
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<tr>
<td></td>
<td>• Sentinel surveillance for influenza</td>
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<td>• Swift notification of cases (eg, tetanus) or outbreaks</td>
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<td></td>
<td>• AIDS notifiable; HIV not but laboratory information is collated</td>
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<td>• Acute hepatitis B&amp;C, and Creutzfeldt-Jakob disease are notifiable - national Creutzfeldt-Jakob Disease register</td>
<td></td>
<td>• HIV surveillance - lab information for national control programme evaluation</td>
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<td></td>
<td>N (AIDS, Hepatitis B,C, Creutzfeldt-Jakob disease), L (human immunodeficiency virus)</td>
<td></td>
<td>• Risk factor surveillance</td>
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<td>• Surveillance of transfusion-related infections for future blood bank policy</td>
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<td>• Prevalence of hepatitis C by genotype to determine future burden of disease</td>
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<td></td>
<td>• Emergence of new pathogens (eg, variant Creutzfeldt-Jakob disease)</td>
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<td>Blood and tissue-borne diseases: hepatitis C, HIV/AIDS, human T-cell lymphotrophic virus 1&amp;2, Creutzfeldt-Jakob disease and newly-recognised blood-borne diseases</td>
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<td></td>
<td>• Hepatitis B&amp;C surveillance improved in institutions (so can offer immunisation, treatment and evaluate education and health promotion activities)</td>
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<td></td>
<td></td>
<td></td>
<td>• Risk factor surveillance</td>
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<tr>
<td>Grouping of diseases</td>
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<td>Gaps/problems</td>
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</table>
| **Infectious respiratory diseases:** meningococcal disease, TB, rheumatic fever, pneumococcal disease, mycoplasma, respiratory syncytial virus and other viral respiratory diseases | • Hospital data  
• TB, rheumatic fever and N. meningitidis invasive disease are currently notifiable  
• Meningococcal disease and TB data near complete through combining lab and notification data  
• Some community surveillance and research programmes (eg, rheumatic fever project by the Institute of Environmental Science and Research Limited in South Auckland schools) | N (TB, rheumatic fever, N. meningitidis) L |  
**TB:**  
• Trends in rates, by ethnicity and in migrants (entry screening)  
• Rates of cure/relapse/MDR-TB (for programme evaluation)  
• DNA finger-printing of TB strains for epidemiological linkage  
**Meningococcal disease:**  
• Mortality rates  
• Vaccine-preventable in future need for sensitivity/specificity and quality data  
• Information for evaluation of effectiveness of rheumatic fever interventions | • Information for contact tracing for TB, especially for mobile populations  
• Outbreak/epidemic data (eg, meningococcal disease to assist diagnostic response and lower case fatality rates)  
• Information for evaluation of effectiveness of rheumatic fever interventions  
• Information on diagnosed cases who need long-term prophylaxis | • DNA typing for outbreak detection/investigation  
• Poor data on screening of migrants, students and arrivals from high-risk countries  
• Lack of surveillance in high-risk institutions (eg, prisons; poor transfer of information between community/institution)  
• Lack of mandatory lab reporting to aid completeness  |
| **TB:**  
• Rates of cure/relapse/MDR-TB for programme evaluation  
• Improved data for contact tracing  
**Meningococcal disease:**  
• Swift complete data on every new case: hospital/GP/MOH and lab notification  
• Outbreak/epidemic data  
• Information for evaluation of effectiveness of rheumatic fever interventions, including recurrence rates |  |  |  |  |
| **TB:**  
• DNA typing for outbreak detection/investigation  
• Poor data on screening of migrants, students and arrivals from high-risk countries  
• Lack of surveillance in high-risk institutions (eg, prisons; poor transfer of information between community/institution)  
• Lack of mandatory lab reporting to aid completeness |  |  |  |  |

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An Integrated Approach to Infectious Disease
<table>
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<tr>
<th>Grouping of diseases</th>
<th>What exists</th>
<th>Current status (N, L, SS*)</th>
<th>Information needs</th>
</tr>
</thead>
</table>
| *Sexually transmitted infections:* chlamydia, gonorrhoea, syphilis, human immunodeficiency virus/AIDS, human papilloma virus, herpes simplex virus, hepatitis B | - Family Planning Association and sexual health clinic data, some community surveillance data (Bay of Plenty/ Waikato)  
- Acute hepatitis B&C and AIDS currently notifiable  
- Occasional behavioural risk data from surveys | SS, L (STD clinics/Family Planning Association) | - Trends in STIs  
- Data for programme evaluation and resource priority setting  
- HIV: trends in affected populations (targeting of prevention, future burden of disease, etc.)  
- Behavioral risk factor data | - Prevalence and incidence of STIs, especially chlamydia and gonorrhoea, to evaluate programme effectiveness, resource priorities, etc.  
- Data for effective treatment of individuals, contact tracing, and targeting of prevention and treatment programmes | - Incomplete data for evidence base for policy development and programme evaluation, and for calculation of population incidence rates  
- No notification (clinical or lab), with duplication of information systems currently to obtain data  
- Lack of behavioral risk factor surveillance |
| *Enteric disease with food-borne transmission:* campylobacteriosis, salmonellosis, verotoxin producing *E. coli*, yersiniosis, listeriosis, Norwalk-like virus, food intoxicants (eg, staphylococcal), botulism, marine biotoxins | - Notification of more severe diseases; currently acute gastro (food handlers, etc.) campylobacter, hepatitis A, salmonella, giardia, cholera/typhoid, etc.  
- Some surveillance of food hazards (FoodNet, food surveys) and of marine biotoxins | N (campylobacter, etc.) L | - Timely data for national outbreak detection  
- Links with FoodNet to ensure hazard data linked with outbreak; also with Water Information New Zealand/Occupational Safety and Health Service given multiple modes of transmission | - Need for outbreak detection and improved control  
- Links with FoodNet to ensure hazard data linked with outbreak; also with Water Information New Zealand/Occupational Safety and Health Service given multiple modes of transmission  
- Outbreak data for point source identification and prevention of secondary cases  
- Community incidence and prevalence | - Outbreak data for identification of the sources in common-source outbreaks and prevention of secondary cases  
- Incomplete and poor-quality data; need to define the degree of completeness and accuracy that is required, especially for mild disease  
- Little integration yet between hazard data (FoodNet) and EpiSurv  
- Poor predictive capacity for outbreaks: notification not timely  
- Should surveillance for microbiological food hazards be part of larger food hazard system (potentially greater hazards from other sources)? |
<table>
<thead>
<tr>
<th>Grouping of diseases</th>
<th>What exists</th>
<th>Current status (N, L, SS*)</th>
<th>Information needs</th>
<th>Gaps/problems</th>
</tr>
</thead>
</table>
| **Diseases caused by antibiotic-resistant organisms**: penicillin resistant pneumococci, vancomycin resistant enterococci, MDR-TB, penicillinase producing Neisseria gonorrhoeae (gonococci), and newly emerging resistance organisms | • Collated hospital lab data  
• Some ESR data (lab typing) and monitoring of specific organisms (S. pneumoniae, N. meningitidis, H. influenzae)  
• Notifiable diseases (eg, TB)  
• National point prevalence surveys  
• Some data on prescribing and antibiotic use | Generally not N, some L  
• National trend data and information on new antibiotic resistance pathogens that emerge  
• Problem areas (eg, specific hospitals)  
• Linking changing prescribing patterns to trends in antibiotic resistance  
• Need national co-ordinated system  
• Need better knowledge of community levels of resistance – best via surveys or SS networks | • Problem areas (eg, specific hospitals)  
• Monitoring of infection control standards  
• Levels of resistance in the community  
• Guidelines for infections control and appropriate antibiotic use based on evidence | • Only voluntary contribution of lab data: no formal national linkage of hospital and/or community antibiotic resistance data  
• Little research into community levels of antibiotic resistance; focus has been on key hospital organisms (eg, MR-MRSA)  
• Need for linking of antibiotics resistance in animals and agricultural use of antibiotics and human health impacts  
• No systematic surveillance of antibiotic prescribing  
• Global trend is for increasing levels of resistance and resistance by more organisms; increasing costs |
| **Medium priority Enteric disease with water-borne transmission**: cryptosporidiosis, giardiasis, campylobacteriosis | • Some notifiable: cryptosporidiosis, giardiasis, campylobacteriosis (ie, most important ones) | N (crypto, hep, giardia, campylobacter) L  
• National trends in waterborne pathogens  
• Information for monitoring of drinking water safety  
• Linkages in transmission between animal, humans and water sources | • Information for timely outbreak investigation through rapid identification of cases  
• Identification of point sources in outbreaks | • Incomplete data on range and incidence concerns re standards of lab testing and data quality  
• The role of water-borne transmission is difficult to identify in sporadic cases; poor hazard-disease surveillance linkages; software incompatibility with Water Information New Zealand and EpiSurv; poor geographic information systems data on water distribution zone boundaries and populations served |
<table>
<thead>
<tr>
<th>Grouping of diseases</th>
<th>What exists</th>
<th>Current status (N, L, SS*)</th>
<th>Information needs</th>
<th>Ministry of Health</th>
<th>DHBs and public health services</th>
<th>Providers</th>
<th>Gaps/problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital-acquired infections: MRSA, <em>clostridium difficile</em>, legionellosis, surgical-site infections, bloodstream infections, device-related infections and opportunistic infections</td>
<td>• Few are notifiable: legionella&lt;br&gt;• Some under lab-based surveillance (MRSA)&lt;br&gt;• Hospital data and quality assurance/infection control programmes; some hospitals have specific systems</td>
<td>N (legionella); others not</td>
<td>• Need for a national picture of hospital acquired infections, with emerging trends/data over time – requires linked datasets and analysis&lt;br&gt;• Monitoring hospital performance and infection control practice</td>
<td>• Hospitals and health services need surveillance programme that feeds back into clinical practice and infection control activities&lt;br&gt;• Identification of imported cases&lt;br&gt;• Linking lab and clinical data (eg, as for TB)&lt;br&gt;• Information for monitoring provider practice and hospital performance</td>
<td>• Information to identify specific problems associated with procedures, practices and individual providers so that improvements can be made</td>
<td>• No integrated regional or national system for hospital acquired infections&lt;br&gt;• No linking of hospital and community lab data&lt;br&gt;• Need to link hospital acquired infection outbreaks into national outbreak systems</td>
<td></td>
</tr>
<tr>
<td>Diseases from close physical contact, superficial infections and infestations: giardiasis, rotavirus, helicobacter, hepatitis A, Epstein Barr virus adenovirus, skin infections and cellulites, scabies, impetigo, etc.</td>
<td>• Largely not notifiable&lt;br&gt;• Little other data</td>
<td>Largely not N or L</td>
<td>• Information on burden of disease and emerging problems</td>
<td>• Data for rapid outbreak detection and investigation (eg, in child care centres)</td>
<td>• Outbreak data to aid diagnosis and prevention measures</td>
<td>• Lack of data on burden of most of these diseases and the effectiveness of interventions&lt;br&gt;• Unable to assess extent of needs and resources required</td>
<td></td>
</tr>
<tr>
<td>Zoonotic disease linked to direct animal contact: leptospirosis, typhus, emerging diseases (eg, lysisavirus, hantaviruses, verotoxin producing <em>E. coli</em>, cryptosporidiosis and other enteric diseases)</td>
<td>• Important zoonoses are notifiable&lt;br&gt;• OSH data (via NODS system)&lt;br&gt;• Some lab data via ESR&lt;br&gt;• Severe cases from hospital data&lt;br&gt;• MAF carries out active surveillance of some animal diseases</td>
<td>Leptospirosis and typhus notifiable</td>
<td>• Incidence&lt;br&gt;• Risk factors/vector surveillance&lt;br&gt;• Imported cases&lt;br&gt;• Emerging and new pathogens</td>
<td>• Data for outbreak management and monitoring of animal management practices&lt;br&gt;• Data to identify risk factors&lt;br&gt;• Vector surveillance to enable prediction of future outbreaks</td>
<td>• Information for patient education and prevention&lt;br&gt;• Diagnostic information</td>
<td>• See also water-borne and food-borne enteric diseases&lt;br&gt;• Typing and other molecular techniques could assist in outbreak investigation&lt;br&gt;• Links between health and veterinary surveillance and outbreak response systems are not well developed</td>
<td></td>
</tr>
<tr>
<td>Grouping of diseases</td>
<td>What exists</td>
<td>Current status (N, L, SS*)</td>
<td>Information needs</td>
<td>Gaps/problems</td>
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<tr>
<td><strong>Diseases from the environment:</strong> legionellosis, cryptosporidiosis, amoebic meningoencephalitis</td>
<td>Notifiable diseases data, Lab data (legionella), Hospital data, Some hazard data (public health services)</td>
<td>N, L</td>
<td>Ministry of Health: National trends and prevalence, Monitoring of water supplies and building codes adherence, Prediction of future threats</td>
<td>• Incomplete lab notification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Travel-associated and imported infectious diseases:</strong> dengue fever, malaria, rabies, schistosomiasis, yellow fever, typhoid, cholera, shigellosis, traveller's diarrhoea, hepatitis A, etc.</td>
<td>Some notifiable- malaria, rickettsial diseases, Hospital and lab data</td>
<td>N (malaria, rickettsial diseases, etc.)</td>
<td>Ministry of Health: Incidence, importation of new cases, trends over time to guide travel health advice, Data for policy-making (eg, screening of immigrants), Identification of new vectors and emerging disease threats</td>
<td>• No national collection and analysis of travel clinic data (post-travel illness and risk factors)</td>
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<tr>
<td><strong>Congenital and perinatal infections:</strong> hepatitis B, listeriosis, congenital rubella syndrome, toxoplasmosis, group B streptococcal disease and cytomegalovirus</td>
<td>Notifiable data – hepatitis B, rubella, listeriosis, Paediatric surveillance unit, Hospital data</td>
<td>N</td>
<td>Ministry of Health: Incidence and trends over time, Information for evaluation of antenatal care and maternity care policy-making, Case detection</td>
<td>• Need to know vaccine/ human immune-deficiency virus/ hepatitis B status of antenatal patient to ensure appropriate immunisation and care of infant</td>
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<tr>
<td><strong>Providers</strong></td>
<td>DHBs and public health services: Cases for outbreak management, Monitoring of water and building codes adherence</td>
<td>Providers: No co-ordinated hazard surveillance of potential disease sources (swimming pools, etc.)</td>
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<tr>
<td><strong>Ministry of Health</strong></td>
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<td>• Data re introduction of new vectors</td>
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<tr>
<td><strong>DHBs and public health services</strong></td>
<td></td>
<td>• Immediate identification of cases of new ‘indigenous’ disease (eg, Ross River virus)</td>
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<tr>
<td><strong>Providers</strong></td>
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<td>• No formal screening/study at central level re future threats (eg, prions, hantaviruses, etc.)</td>
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<td></td>
<td></td>
<td>• Inadequate screening at border: no accurate surveillance data from immigrants/travellers</td>
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<td></td>
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<td></td>
<td>• Increase surveillance of HIV in pregnancy required if rates were to increase, given availability of treatment to prevent vertical transmission</td>
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<td></td>
<td></td>
<td>• Constraints to immunisation surveillance as above</td>
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<tr>
<td>Grouping of diseases</td>
<td>What exists</td>
<td>Current status (N, L, SS*)</td>
<td>Information needs</td>
<td>Gaps/problems</td>
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<tr>
<td><strong>Lower Priority</strong></td>
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<tr>
<td><strong>Occupational infectious diseases:</strong> hepatitis B, leptospirosis, enteric diseases in some occupational groups</td>
<td>OSH data, Hospital data, Notifiable data</td>
<td>Mostly N</td>
<td>Linking of OSH data to disease data to enable hypotheses re specific transmission routes, Linking of disease data to occupational exposure (e.g., hepatitis B&amp;c and HIV), Legislative requirements and monitoring/audit of good employment practices</td>
<td>Incidence by site/employer, Information that can link lab/notified data to geographic sites or hazard/pathogen transmission routes and occupational exposure, Outbreak data to assist diagnostic capacity and advise workers</td>
<td>Lack of linkages between disease notifications (EpiSurv) and Occupational Safety and Health Service (NODS) dataset, Incomplete knowledge of disease transmission routes, Occupational coding and potential occupational exposures incompletely recorded</td>
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<tr>
<td><strong>Vector-borne diseases (especially with introduction potential):</strong> Ross River virus, dengue fever, etc.</td>
<td>Surveillance of vector, Important diseases are notifiable (e.g., Ross River virus, dengue)</td>
<td>N</td>
<td>Identification of introduced vectors, disease cases and/or emerging threats, Outbreak detection and investigation, Monitoring of vector control programmes and border control activities</td>
<td>Surveillance for vectors (e.g., mosquitoes), Immediate notification of new ‘indigenous’ cases (e.g., Ross River virus disease), Linking of geographic data (vector) with disease data</td>
<td>Information re new and emerging diseases, Likely high-risk groups/individuals, Information for diagnosis and management</td>
<td>No laboratory notification of vector-borne diseases at present, Vector surveillance may need upgrading to detect further mosquito/vector incursions, Present and future international obligations in infectious diseases control (e.g., yellow fever) must also be considered</td>
<td></td>
</tr>
<tr>
<td><strong>Bioterrorism agents:</strong> anthrax and other agents</td>
<td>Some links between health, civil defence and security forces to detect emerging hazards</td>
<td>Some N</td>
<td>Emerging global threats, Rapid notification of introduction of any threats (border surveillance)</td>
<td>Dissemination of information from national level, Assistance with diagnosis of unusual diseases</td>
<td>Ongoing scanning for emerging threats/issues, Future international obligations need to be considered</td>
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</tbody>
</table>
Given the above table, some over-arching problems are identified, common to several or all disease groupings.

- There is no clarity or consensus over information needs, and different needs exist at different levels of the health system. Surveillance should enhance public health action. A priority should be defining local/regional information needs for local analysis and action.
- There is no defined national co-ordination unit or centre of expertise for infectious disease surveillance and control (a New Zealand ‘CDC’ role).
- There are no integrated hazard and disease systems; there has sometimes been insufficient effort to identify, measure and address ‘upstream’ hazards that contribute to communicable disease events.
- Notifiable diseases data is incomplete and of poor quality for many diseases: there are no incentives for providers to provide data nor penalties for non-provision, notification methods are outdated, there are no explicit criteria for which diseases should be notifiable, and changes to the list are problematic.
- Primary care/community-based data is lacking for many infectious diseases.

**Future directions and priorities**

In order to improve and develop the system for surveillance of infectious diseases in New Zealand there is a need to:

- establish a national centre of excellence for infectious diseases surveillance, with clearly identified national functions and responsibilities, including technical support for regional public health services and DHBs
- support the co-ordination and development of integrated national systems that:
  - integrate disease surveillance (for example, EpiSurv, NZHIS hospital data, laboratory-based surveillance and specialised systems, along with future health information developments, for example the WAVE project\(^{34}\) which can integrate primary care data)
  - are compatible and interface with hazard surveillance systems (for example, EpiSurv and FoodNet and Water Information New Zealand, EpiSurv and immunisation coverage surveillance)
  - improve linkages between animal, vector and human disease surveillance
- support the rapid development of an effective system for vaccine-preventable diseases that provides online individual immunisation records which are accessible to providers and which provide timely and accurate coverage surveillance at provider, DHB and national levels

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\(^{34}\) The WAVE (health information systems) project is designed to integrate primary and secondary care information systems using a unique personal identifier and electronic health records.
• enhance laboratory notification and/or collection of anonymised laboratory data (for STIs, but also generally for existing notifiable diseases in addition to clinical notification), to improve data quality and completeness. This would also involve changes to notification route (that is, allow data transfer by email, web, fax, etc.)

• review the current list of notifiable diseases and establish criteria for inclusion. There is a need to focus on diseases where a swift response is required for each case to protect the case and their contacts (for example, consider adding STIs)

• improve data quality and audit: there are concerns about clinical diagnosis, the quality and lack of standardisation of laboratory testing (for example, for strain typing), the need for benchmarking and audit of laboratory practice, the duplication of NHI numbers and poor data entry, confidentiality issues, problems with ethnicity coding, etc.

• improve pro-active surveillance and outbreak prediction. Methods for early detection and recognition of important outbreaks require enhancement. Scanning and disease modelling (for example, for measles and influenza) are essential in predicting disease outbreaks and identifying emerging threats.

• review the need and possible mechanisms for national integration of surveillance for hospital-acquired infections and antibiotic-resistant pathogens. This process would include linking data on antibiotic use in humans and in agriculture

• maintain or develop community and primary care-based sentinel surveillance for some key syndromes and diseases such as influenza (including requirements for pandemic planning and vaccine selection) and gastroenteritis

• review information dissemination and access to information (existing publications, websites such as PHEW) and consolidate reporting; and ensure local data and local analysis are available for local action

• review the surveillance of chronic infections such as HIV, HBV, HCV to ensure longitudinal surveillance in high-risk populations and in order to identify approaches that support disease control objectives, such as improving secondary prevention and treatment

• identify mechanisms for early detection of new or unusual organisms and emerging disease threats.

Reference

WHO. 2000. Integrated Disease Surveillance Programme (www.who.int/emc/surveill). World Health Organization (also see Weekly Epidemiological Record 75: 17).
Part IV: Research Issues and the Integrated Approach to Infectious Disease

Research provides the evidence base for quality health services, and is therefore fundamental to achieving the objectives of the IAID and the New Zealand Health Strategy, and to improving the health of New Zealanders. New Zealand has a unique combination of socioeconomic, genetic and environmental factors (for example, meningococcal rates of Pacific children here are far higher than in the rest of the Pacific or Australia) requiring a specific research agenda. In an environment of scarce resources, research is an investment to ensure that resources are used in the most cost-effective and efficient way. As such, the research priorities for infectious diseases in New Zealand should be defined by the gaps in the existing knowledge base. Development of interventions, treatment and preventive actions must be evidence-based.

The Health Research Council has recently identified the following issues that create priority research questions in New Zealand.

- The disparities in health related to ethnicity and socioeconomic status that underlie the increased prevalence of such diseases as meningitis, pneumonia, tuberculosis and rheumatic fever in Māori and Pacific peoples provide a major challenge for researchers and government agencies.

- New infectious agents are continually being discovered. In addition, infectious diseases that have previously been controlled re-emerge in new forms, or become resistant to the standard treatments (for example, methicillin-resistant *Staphylococcus aureus*).

- Discovery of the role of infectious agents in the development of diseases where formerly no infection was thought to be involved, such as stomach ulcers (*Helicobacter pylori*) and cancers (*H. pylori*, hepatitis B and C viruses, papilloma virus and herpes group viruses), has placed a new emphasis on these diseases.

- Resistance to antibiotics, anti-viral and anti-fungal agents is threatening to make even the most powerful drugs unusable, and the prevalence of organisms with resistance to multiple antibiotics is increasing.

- There are increasing risks of introducing exotic diseases to New Zealand via migrants and returning travellers. Examples of such diseases include malaria, Ross River fever and leprosy. This problem is compounded by modern travel, ecological changes and the potential impacts of global warming.

The development of the IAID has identified further research issues and priorities within each disease grouping (see Table 20). A formal stocktake of all current research relevant to infectious disease control may be useful to further define gaps and priorities.
<table>
<thead>
<tr>
<th>Priority</th>
<th>Infectious disease category</th>
<th>Research gaps identified</th>
</tr>
</thead>
</table>
| Highest priority  | Vaccine-preventable diseases in children | • Quantitative and qualitative research into better delivery of vaccine programmes and assessment of effectiveness of alternatives  
|                   |                                    | • Sero-prevalence surveys  
|                   |                                    | • Attitudinal research to immunisation  
|                   |                                    | • Evaluation of outbreak and control, and vaccine cold-chain quality  
|                   |                                    | • Vaccine efficacy  
|                   |                                    | • Evaluation of outbreak and control  
|                   |                                    | • Adverse reactions  
|                   |                                    | • New laboratory testing methods  
|                   | Vaccine-preventable diseases in adults | • Many of the above also apply  
|                   |                                    | • Evaluating new treatment and prevention strategies  
|                   |                                    | • Evaluating the effectiveness of the current vaccine strategy, reduction in illness/death, etc.  
|                   | Blood-borne diseases              | • Effectiveness of harm reduction/prevention programmes, including in institutions (eg, prisons)  
|                   |                                    | • Hepatitis C rates (high-risk groups (eg, injecting drug users))  
|                   |                                    | • Drug resistance in hepatitis treatment  
|                   | Infectious respiratory diseases    | • Factors affecting tuberculosis treatment compliance  
|                   |                                    | • Cost-benefit of meningococcal vaccine and varying strategies (under way)  
|                   |                                    | • Role of rapid diagnostic tests (eg, for strep in improving treatment and reducing rheumatic fever)  
|                   |                                    | • Effectiveness of rheumatic fever primary/secondary prevention programmes  
|                   |                                    | • Evaluation of services  
|                   |                                    | • Improving viral respiratory tract infections diagnosis  
|                   | Sexually-transmitted infections    | • Evaluation of alternative programmes, especially the effectiveness of prevention efforts  
|                   |                                    | • Sexual health needs of older adults  
|                   |                                    | • Cost-benefit of chlamydia screening  
|                   | Enteric diseases with food-borne transmission | • Case studies to define critical control points in HACCPs/food safety plans and evaluation of food safety plans  
|                   |                                    | • Feedback models to enhance outbreak detection  
|                   |                                    | • Identification of risky food processes  

<table>
<thead>
<tr>
<th>Priority</th>
<th>Infectious disease category</th>
<th>Research gaps identified</th>
</tr>
</thead>
</table>
| Highest (cont'd)| Infections caused by antibiotic-resistant organisms                                         | • Levels of antibiotic resistance in the community/primary care  
• Links with agricultural use of antibiotics  
• Rapid diagnostic tests: effectiveness in reducing antibiotic use and cost-benefit |
| Medium          | Enteric disease with water-borne transmission                                               | • Transmission of campylobacter, giardia, etc. (in cattle/water/humans)  
• Means of controlling water contamination and routes of transmission  
• Evaluation of diagnostic/lab error |
|                 | Hospital-acquired infections                                                                | • Evaluation of existing infection control programmes  
• Assessment for best practice guidelines |
|                 | Infectious diseases transmitted by close physical contact, superficial infections and infestations | • Community burden of disease  
• Resistance to treatment (eg, scabies, head lice) |
|                 | Zoonotic diseases linked to direct animal contact                                            | • Rural burden of disease  
• Relative importance of transmission routes of key pathogens (eg, campylobacter, salmonella) |
|                 | Travel-associated and imported infectious diseases                                           | • How to improve uptake of screening of migrants and asylum seekers  
• Experience of returning travellers  
• Quality of travel advice |
|                 | Diseases from the environment                                                               | • Transmission routes, ongoing work on zoonoses |
| Lower           | Occupational infectious disease                                                             | • See ongoing current work on zoonoses  
• Attitudinal research (eg, in farm workers) |
|                 | Vector-borne diseases (especially with introduction potential)                              | • Risk assessment  
• Effectiveness of interventions and cost-benefit |
|                 | Bioterrorism agents                                                                         | • Evaluate existing model emergency plans |
A future research agenda for infectious diseases

There are three strands to a future research and development strategy.

**Health research**

This involves the search for new treatments, interventions, identifications of risk factors for prevention, etc. This type of research is funded by the Health Research Council (HRC) and other research bodies. The purpose is to enable the Ministry of Health to establish an evidence base in key priority areas related to infectious diseases. The HRC and other research bodies use contracting processes to ensure that research of the highest quality is purchased.

**Operational research**

This involves research that is required by the Ministry of Health and others to underpin services, and could include surveillance, identification of disease prevalence rates, pilot studies for diagnostics or new services.

**Evaluation of health services**

Evaluation is a responsibility of all funders and providers. The Ministry of Health, District Health Boards and providers need to fund and provide health services based on evidence of their efficacy, and to evaluate such services. At a national level, new initiatives such as the Immunisation Research Strategy and the Mental Health Research and Development Strategy have been developed to address such needs. These are run as a partnership between the Ministry of Health and the HRC, where the health sector identifies the priority research and development needs, and the HRC takes on the role of contracting the research, to ensure the highest-quality scientific merit and also that the research teams deliver the required outcomes.

**Partnership opportunities**

There are many other opportunities for research bodies such as the HRC to work more closely with the Ministry in developing the evidence base for the infectious diseases sector. These may be through feeding the results of key research projects to the relevant staff in the infectious diseases area, or by initiating more formalised partnerships where the Ministry charges research institutions such as the HRC with contracting research on their behalf.
The HRC has developed nine research portfolios, including one focused on communicable
diseases. The IAID can assist in guiding review of research strategies by clearly
identifying gaps and priorities for future research (as part of the Health Research Council’s
three-year strategic analysis cycle, the Communicable Diseases portfolio will undergo a
full strategic review in the coming financial year).

Research in communicable diseases needs to be multi-faceted. Basic science, clinical,
public health and social science research must all be used to advance and inform health
policy. Current infectious disease research includes that carried out by New Zealand
Health Information Service, the Institute of Environmental Science and Research, the
Public Health Intelligence group in the Ministry of Health, and Health Research Council-
funded projects in the health sector. Other research that can contribute to infectious
disease control is done outside the health sector, and is largely funded by the Ministry of
Agriculture and Forestry, the Foundation for Research and Technology and the Health
Research Council. This includes identifying water contamination and pathogen
transmission routes, zoonoses, biosecurity issues, Hazard Analysis Critical Control Point
models for food assurance programmes, and possum control.

The HRC is also developing joint research portfolios with other relevant agencies (for
biotechnology, food, nutrition and health, environmental health, occupational health and
safety, and socioeconomic determinants of health), which focus on developing links
between the health sector, and the research, science and technology system. These
initiatives will offer greater return on investment by pooling resources to focus on common
goals.

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35 The Health Research Council Indicative Portfolio Communicable Diseases accounts for 7.6% of Health
Research Council funding. Other research portfolios including the health sector management and services
and determinants of health research portfolios are also undertaking relevant research.
Part V: Legislation and the Integrated Approach to Infectious Disease

Why legislate?

A sound public health law infrastructure establishes the powers and duties of government to prevent disease and injury, and to promote the population’s health (Gostin 2000). The quality of legislation is a key factor in helping to achieve the Government’s wider economic and social goals.

The questions that are important in public health law are:

- What is the health status of the population?
- What broad societal measures can prevent disease and injury and promote the public’s health?
- What detrimental effects will government action have on personal and proprietary interests?

Legislation as a tool should be considered as part of the healthy public policy-making process, and needs to be linked to administrative systems, a competent workforce and funding processes to be effective. Legislation is just one of the means to control infectious diseases, with the statutory requirements acting as an important incentive for compliance.

Three commonly asserted justifications for public health infectious disease interventions are (Gostin 2000):

- risk to others
- risk to self
- protection of incompetent persons.

Because health is highly valued, it is sometimes assumed that government need not justify interventions in the sector. However, almost invariably, these intrude on individual rights and interests and incur economic costs. Changes in attitudes to human rights, authority and the role of government also need to be reflected in up-to-date legislation (the principal piece of public health legislation, the Health Act, was drafted in 1956). However, legislation does not exist in a policy vacuum. Proposals for legislative change to infectious disease provisions need to be supported by detailed analysis of policy proposals.
What have we got now?

The present communicable disease regulatory framework

Currently there is a range of legislation, some out-dated, spread across a number of acts and regulations. Surveillance, treatment and control of infectious diseases are primarily the responsibility of the health sector (while prevention measures are covered by many sectors). The principal focus for investigating and taking public health action is the public health service, provided through regional public health units. This system mainly relies on medical practitioners notifying cases of disease to local medical officers of health (employed by regional public health units and designated by the Director-General of Health to exercise regulatory powers). Medical officers of health may also be alerted to communicable disease problems in schools, early child-care centres, through local authority officers, quarantine services, Occupational Safety and Health Service, Ministry of Agriculture and Forestry, etc.

Local authorities also have an important part to play in infectious disease control. Certain diseases are notifiable by medical practitioners to local authorities under the Health Act 1956. Environmental health officers play a key role in infectious disease control; for example, the registration and inspection of food premises, sanitation issues, and the investigation and removal of ‘nuisances’.

Other areas of infectious disease control are carried out by specific health professionals; for example, hospital-acquired infection control is carried out primarily by hospital infection control committees, formed by nursing and medical staff.

Legislation administered by the Ministry of Health and primarily concerned with communicable disease includes:

- Health Act 1956
- Health (Burial) Regulations 1946
- Health (Diseases Communicated by Animals) Regulations 1965
- Health (Immunisation) Regulations 1995
- Health (Infectious and Notifiable Diseases) Regulations 1966
- Health (Needle and Syringes) Regulations 1987
- Health (Quarantine) Regulations 1983
- Tuberculosis Act 1948
- Tuberculosis Regulations 1951
- Venereal Disease Regulations 1982
- Anthrax Prevention Regulations 1987
The Ministry of Health is also responsible for administering the Drinking Water regulations, the Health and Disability Services (Safety) Act, and parts of the Biosecurity Act and Hazardous Substances and New Organisms Act 1996 (HSNO). Other key pieces of legislation outside the administration of the Ministry that contribute to infectious disease control include the Resource Management Act 1991, Health and Safety in Employment Act 1992 and Regulations 1995; Ministry of Agriculture and Forestry-administered food regulations, the Building Act 1991, the Misuse of Drugs Act 1975, and the Crimes Act 1961 (for example, current prostitution law reform).

**Brief summary of the key Acts**

The **Health Act 1956** and various sets of regulations made pursuant to that Act provide for powers and duties in relation to specific infectious and notifiable diseases listed in the First and Second Schedules to the Health Act 1956. They make provisions for and facilitate:

- statutory reporting of notifiable diseases by medical practitioners to the local medical officer of health when a person presents with, or is suspected of having, a disease specified in the schedules (in certain cases practitioners must also report to the territorial authority because of their public health responsibilities and powers)
- immediate control actions: field officers (principally medical officers of health and health protection officers) undertake various regulatory measures to prevent the spread of disease
- information provision, in order to adopt/adapt population-based strategies
- provision for sanitary works (for example, sewerage works and drinking-water supplies) to, among other matters, limit infectious diseases
- measures to prevent and control venereal disease
- quarantine requirements
- emergency and civil defence provisions for the prevention and control of infectious disease.

In practice, regulatory intentions are often achieved by other means, but sometimes direct statutory interventions are needed (for example, exclusion from school or work, compulsory medical examination or treatment).

The last revision of the notifiable diseases list came into effect on 1 June 1996. The old list had become overlong and unwieldy, containing diseases that no longer existed or were no longer a problem. Other changes included addition of vaccine-preventable diseases so as to monitor the effectiveness of control measures and immunisation strategies, and the addition of other diseases that had emerged as important to the public health.

The **Health (Infectious and Notifiable Diseases) Regulations 1966** provide health authorities with powers to manage and prevent the spread of infectious disease, covering such matters as disease notification forms, duties of health protection officers, technical and operational information, authority to limit contacts and carriers of diseases from engaging in certain occupations or from attending school, making transparent powers to limit personal freedoms, and certain miscellaneous provisions. Of the 27 sections in the
regulations, eight deal with smallpox vaccination (smallpox has been declared by the World Health Organization to be eradicated).

Provisions for tuberculosis notification, duties and powers of medical officers of health, and provisions for isolation and appeal are provided for in the **Tuberculosis Act 1948** and the **Tuberculosis Regulations 1951**. Various outdated provisions need revision as they relate to a time when there were few options for treatment, and draconian powers were considered necessary for the detainment, isolation and treatment of tuberculosis patients and contacts.

The **Health (Quarantine) Regulations 1983** facilitate disease control at the border. They also outline roles and responsibilities for captains of aircraft and ships arriving in New Zealand, as well as powers and duties of medical officers of health. They give effect to New Zealand’s responsibilities under the World Health Organization’s International Health Regulations.

The **Health (Diseases Communicated by Animals) Regulations 1965** provide five individual regulations and two schedules relating to the reporting by veterinarians or animal health laboratories of five communicable diseases: cysticercosis, leptospiral infections, ornithosis (psittacosis), trichinosis, and undulant fever (brucellosis). Ornithosis is no longer required to be notified to the medical officer of health.

What does the proposed Public Health Bill envisage?

**Purpose of the legislation**

The overall objective of the Bill (in relation to infectious diseases) should align with the IAID: to reduce the incidence and impact of infectious disease. It must provide for the effective surveillance and management of communicable and notifiable diseases.

In terms of legislation this requires:

- specifying responsibilities and accountabilities
- specifying control action for health authorities to protect the public health (prevention, control and management)
- making transparent powers to limit personal freedoms
- making apparent rights to appeal decisions by health authorities
- supporting the notification of specified diseases with personal information.

The Public Health Bill will also be consistent with key principles of the New Zealand Health Strategy (a healthy social environment, reducing inequalities in health status, Māori development in health, better physical health).
A risk management approach to development of new legislation

The focus of New Zealand’s proposed Public Health Bill is on public health risk management. A specific framework for evaluating new public health regulation proposes a five-step process to justify whether a particular legislative intervention is warranted (Gostin 2000). According to this process, it must be demonstrated that:

- there is significant risk based on objective scientific methods
- the intervention is effective
- economic costs are reasonable compared with benefits
- personal burdens/costs are reasonable compared with benefits
- the effects of public health interventions are fairly distributed.

A risk and intervention assessment methodology will be developed, consulted on, and mandated by an Order in Council, to be used in reviewing existing regulations, before any new regulations can be passed, and before the Director-General takes action under a Public Health Act to give effect to obligations under other legislation.

Other aspects will include the duty for the Director-General to consider alternative interventions (based on section 32 of the Resource Management Act 1991). This requires an evaluation of costs and benefits, recognises that a variety of other non-regulatory means are available, and that responses need to be proportionate to the risk (a hierarchy of responses).

A precautionary approach (based on section 7 of the Hazardous Substances and New Organisms Act 1996) will be taken, whereby all persons exercising functions, powers and duties under the Act shall take into account the need for caution in managing public health risks where there is scientific and technical uncertainty or incomplete information about those effects.

There will also be a general duty on all persons to prevent, remedy, or mitigate public health risks. ‘Risk generators’ (those whose services, goods or activities are subject to specific regulatory controls under the Public Health Bill) will be required to demonstrate compliance by certification; that is, those people subject to specific regulatory requirements will have to demonstrate compliance with the requirements. Monitoring and reporting on the state of public health, currently required under the Health Act 1956, may be extended to assess the effectiveness and performance of the health sector and other sectors to the extent that their functions affect public health.

Integration of existing pieces of legislation under one Act

Legislative provisions relating to infectious diseases should, as far as possible, be contained in one major piece of health legislation, namely the proposed Public Health Bill. Other secondary legislation will be referenced to the principal act. This would include integration of aspects of the existing Acts and regulations noted above, ensuring that all relevant legislation is aligned. At present there are ambiguities and discrepancies, as well as outdated provisions (for example, for tuberculosis control) in these regulations that need to be addressed by the revised Bill. There are now greater options to facilitate the control
of tuberculosis, and it is proposed that the legislation be brought into line with other infectious disease legislation.

Provisions within the proposed Bill concerning disease notification are likely to include the:

- criteria for making diseases notifiable and the process for amending the list
- procedure for notification
- duty to give notice of cases of notifiable diseases: medical practitioners, funeral directors, person in charge of a laboratory, veterinary surgeon (consolidated Health Act and Tuberculosis Act provisions)
- duty to take care with the provision of information
- offences for not notifying.

**Accountabilities, duties and powers**

The present law is inconsistent in that in some cases it is a medical officer of health who is empowered, while in other cases health protection officers are also authorised. Future legislation needs to clarify who should have what options available to them for infectious disease control. Other issues include:

- the additional powers of the Minister (amended section 15 Tuberculosis Act)
- the duties and powers of the Director-General of Health to control and prevent communicable disease (and other diseases) (new, section 78 Health Act)
- duties and powers of public health services (consolidated Health Act and Tuberculosis Act provisions)
- powers of entry in certain cases (amended section 77 Health Act, section 8 Tuberculosis Act)
- the duty of persons suffering from communicable diseases (amended section 88 Health Act, and aligned with the general duty not to cause risks to public health)
- measures to prevent infecting any person with disease (amended section 92 Health Act)
- the power, in certain cases, to require medical examinations (amended section 9 Tuberculosis Act)
- the power, in certain cases, to require isolation of persons likely to spread infection (amended section 79 Health Act and section 16 Tuberculosis Act)
- the power, in certain cases, to give directions as to precautions necessary to prevent spread of infection (amended section 10 Tuberculosis Act)
- the duty of public health services to consider alternatives to coercive powers (new).
Consideration should be given to defining the risk of the behaviour as a guide when determining whether compulsory detention and care are appropriate; for example:

- low risk - low frequency, or low probability of infection; consequences not severe
- medium risk - (somewhere in between high and low)
- high risk - high frequency (repeated), high probability of infection and severe consequences.

Certain types of behaviour may be considered high risk; for example, sex without informing partner of disease status, or violent behaviour likely to lead to transmission (such as biting, head-butting, sticking with a syringe).

At present the focus of the response is on isolating the individual. Future legislation should focus on means to ensure lasting compliance that protects the public health from infectious diseases. A greater range of options other than isolation in a hospital or at home need to be covered. These could include non-association orders, supervision, and directions to undertake community programmes. Legislation would require an escalating scale of actions (a ‘cascade of coercion’ approach) to be taken, without confining within the legislation what those actions might be, or by limiting a public health official’s ability to take more immediate action if the situation warrants.

Such a scale could include:
1. informing an individual of the risks/consequences of the disease
2. advice of precautionary actions
3. counselling to amend behaviour
4. advising, in the presence of legal support/family/whānau (for example, supervision, attendance at a community programme, institutional isolation) that coercive action is likely
5. compulsory action.

An assessment of the person’s degree of, or capacity for, responsibility may need to be taken at the different stages.

**Procedural safeguards and appeal rights**

Consideration must be given to issues of individual human rights versus public health issues. Public submissions on the Public Health Bill (1998) suggest that the individual rights of a person should only be curtailed if:

- the disease is serious
- the person in question poses a significant health risk to the community
- the disease has a high risk of transmission
- it is in the public interest that such restriction occurs
- such an opinion is made by a qualified competent person
- such decision and degree of action is peer-reviewed and/or accords with accepted guidelines
there is no other, less extreme, appropriate way of achieving the same end
all other options encouraging the individual to accept treatment have been pursued
the person involved has recourse to an appropriate timely review mechanism and can appeal the decision.

The New Zealand Bill of Rights Act 1990 provides for the right to refuse medical treatment. On rare occasions it is necessary to exclude from risk activities (for example, food preparation) those who do not agree to medical interventions (investigation or treatment) aimed at preventing the spread of infectious diseases.

A distinction should be made between those who are fully responsible for their actions, and those with diminished responsibility covered by mental health, intellectual disability, or child-related legislation. Contemporary legislation may require a higher burden of proof than suspicion that the person is ‘likely’ to spread infectious disease, as in the Health Act 1956. If so, consideration would have to be given to how it could be proven that one ‘knowingly’, ‘deliberately’ or ‘intentionally’ committed an act with the potential consequence of spreading infectious disease. Greater clarity should be sought on who can review cases and when, and this needs to be aligned with reviews held on a similar basis, such as those under the Mental Health (Compulsory Assessment and Treatment) Act 1992.

Emergency and quarantine provisions

The legislation should clarify the purpose and objectives of quarantine measures. Clear functions and responsibilities are necessary, including the roles of ministers, regulatory agencies, enforcement, and who/what is regulated. This may require formalising arrangements between the Ministry of Health and frontline border control agencies.

Reserve powers for public health emergencies that may arise in circumstances other than declared civil defence, biosecurity, or hazardous substance emergencies, and including limited override of other legislation, will be incorporated. It is proposed that the powers of the Director-General and public health officers to take measures (not otherwise authorised by the Act) to respond to an emergency be broadened. Such provisions should consider including:

• an overall purpose
• the procedure for the Director-General or public health officers to declare public health, emergencies and details of emergency powers
• the means to delegate powers to public health services and make regulations
• any immunities from prosecution for officers acting in good faith and with reasonable care
• compensation provisions and offences
• the ability to give directions to another sector where that sector’s performance is of critical importance to managing the risk; for example transport or agriculture.
Mechanisms for updating legislation

Future legislation should be consistent for all communicable diseases, and could also consider disease variants. New treatments may mean some diseases no longer need to be covered. Mechanisms need to be in place so that new or emerging diseases can be covered. The definition of ‘carrier states’ and what constitutes a ‘contact’ need to be reviewed.

References


Appendix A: Re-analysis of Infectious Disease Hospital Discharge and Mortality Data Using CDC-ID Recoding Analysis

Figure 1: Mortality data 1980–98, recorded by CDC-ID analysis

Figure 2: Hospital discharge data 1988–2000, recoded by CDC-ID analysis
Appendix B: Infectious Diseases in New Zealand: A Preliminary Estimate of Incidence and Public Health Impact

Interim report, 1 November 2000
ESR

Summary

Introduction
This report aims to provide information on the public health impact of infectious diseases in New Zealand. This information is intended to assist with identifying important disease control objectives.

Method
We categorised infectious diseases to reflect modes of transmission, populations that are affected, settings where transmission occurs, and potential control objectives. The public health impact of these diseases was assessed using available surveillance data. Criteria used were disease burden, potential future health impact, and equity impact.

Results
This process identified 17 functional categories of infectious diseases. Categories with a high public health impact include:

• vaccine-preventable diseases in children and adults, notably measles, pertussis, influenza, and pneumococcal disease
• respiratory diseases linked to socioeconomic deprivation and crowding, notably meningococcal disease, rheumatic fever and tuberculosis
• enteric disease with food-borne transmission, notably campylobacteriosis and salmonellosis
• sexually transmitted infections, notably chlamydia, gonorrhoea, HIV/AIDS.

Discussion and implications
The information in this report and its attachments should assist the process of formulating an infectious disease strategy by identifying groups of diseases with high public health impact. More work is needed to refine this methodology and integrate additional data on disease impacts (notably NZHIS discharge and mortality data) and information from the published literature.
Introduction

This interim report is a contribution to the development of the Ministry of Health’s Infectious Disease Control Strategy. The overall process aims to produce a sector-wide plan for the prevention and control of infectious diseases in New Zealand.

This report aims to provide a broad assessment of the public health impact of important infectious diseases in New Zealand. The specific aims were:

1. to identify important infectious diseases in New Zealand and divide these into functional categories
2. to summarise the public health impact of these diseases using currently available data.

The aim of this process is to provide an evidence base that can support identification of important disease control objectives for the infectious disease strategy. Important disease control objectives are those that have a high potential for health gain. Such objectives are likely to be: (1) applied to diseases with a high public health impact, and (2) capable of preventing these diseases (i.e., effective, affordable and practical). This relationship is illustrated in the figure below.

![Preventability with disease control objective](image)

Methods

Identification and categorisation of infectious diseases

The starting point for this process was the schedule of notifiable infectious diseases. To this we added the main sexually transmitted infections and key diseases under laboratory-based surveillance.

There are a large number of possible ways of categorising disease. Because this information is orientated towards guiding the development of strategies for prevention and control, we chose categories largely based on broad control mechanism. These categories reflect:
modes of transmission – including settings where transmission occurs and control measures are likely to be implemented, and affected populations

control measures – broad intervention areas and the sectors involved in providing and supporting these measures: national providers (with policy, regulatory and funding roles), local providers (with an investigation and/or delivery role) and surveillance, investigation and research service providers

Some diseases, with multiple modes of transmission, appear in more than one category. This reflects the fact that controlling such disease will require multiple interventions.

Criteria for assessing public health importance of infectious diseases

A range of approaches can be used for assessing public health importance of infectious diseases.

A Medline search did not reveal any papers on the subject of assessing infectious diseases for national control purposes. It is possible that other countries have developed strategic plans of the type being proposed for New Zealand. Such approaches may feature more in the ‘grey’ literature of unpublished reports. However, this search did identify three approaches that have been used to identify priorities for infectious disease surveillance purposes. One of these was a very limited priorisation carried out by the 15 European Union centres with responsibility for infectious disease surveillance (Giesecke 1999). This simply identified diseases with the highest priority for exchange of international information.

The Canadian federal surveillance centre carried out an exercise in 1987 to inform decisions about priorities for national infectious diseases surveillance across Canada (Carter 1991). They established goals and criteria, and then ranked diseases to measure their importance for national surveillance purposes. Criteria were WHO interest; Agriculture Canada interest; incidence; morbidity; mortality; case-fatality rate; communicability; potential for outbreaks; socioeconomic impact; public perception of risk; vaccine preventable; necessity for an immediate public health response.

Nick Wilson carried out a review of the potential for health gain from further communicable disease control as part of the process of developing a strategic plan for communicable diseases prevention and control in 1995 (Wilson 1995). He used potential for health gain based on health impact of diseases and preventability.

The public health laboratory service (PHLS) in the UK developed a set of work priorities in 1997 (Rushdy and O’Mahony 1998). They used a postal questionnaire of the views of PHLS senior staff, scientific committees, consultants in infectious disease control in district health authorities and several organisations of health professionals. The criteria they used included: present burden of ill health – morbidity, mortality, quality-adjusted life years (if available); social and economic impact – costs to individuals and society; potential threats – extrapolation of current trends, and changes in organism and environmental factors; health gain opportunity – potential to affect burden by PHLS activities, including diagnostic, research and surveillance strategies; public concern and confidence – assessed from media and public interest, including such sources as number of cuttings; PHLS ‘added value’ – special contribution that PHLS could make.
The more comprehensive approaches for assessing disease burden seek to combine morbidity and mortality. A quantitative approach to this task combines years of life lost (YLL) with years of life lost from disabilities (YLD) to give disability-adjusted life years (DALYS) (Ministry of Health 1999).

A range of measures and indicators of disease impact could therefore be used to inform the Ministry of Health strategy process (see Table A1).

Table A1: Possible indicators for assessing the public health impact of infectious diseases

<table>
<thead>
<tr>
<th>1 Disease burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>• incidence – number of new cases or infections/year</td>
</tr>
<tr>
<td>• short-term morbidity – hospitalisations/year</td>
</tr>
<tr>
<td>• long-term morbidity – chronic illnesses/year, years lost to disability (YLD)</td>
</tr>
<tr>
<td>• mortality – deaths/year, years of life lost (YLL)</td>
</tr>
<tr>
<td>• combined measure – disability adjusted life years (DALYS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 Potential future health impact/disease burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>• emergence potential, based on evidence or possibility of rise in incidence</td>
</tr>
<tr>
<td>• outbreak potential</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 Equity impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• gap between Māori and European, and between Pacific people and European</td>
</tr>
<tr>
<td>• gap between most and least socioeconomically deprived populations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 Societal impact – examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• economic cost</td>
</tr>
<tr>
<td>• public and political concern</td>
</tr>
<tr>
<td>• wider intersectoral impacts (eg, agriculture, foreign affairs and trade)</td>
</tr>
<tr>
<td>• international concern (eg, WHO priorities for control)</td>
</tr>
</tbody>
</table>

Because of time limitations, this interim report has focused on presenting data on the first three of these areas (excluding long-term morbidity, DALYS, and contribution to socioeconomic deprivation). We also investigated options for combining multiple pieces of data on incidence and impact to give an overall rating of the public health importance of specific diseases and groups of disease.

Data sources used in assessing the incidence and impact

To describe the incidence and distribution of these diseases, we used data from a range of surveillance sources that were readily available to ESR:

- notifiable disease surveillance system (collected on the EpiSurv database)
- outbreak surveillance system (collected on the EpiSurv database)
- STI surveillance system (collected from sexual health clinics by a specialised surveillance system, supplemented by data from some hospital laboratories)
- influenza surveillance system (based on a network of sentinel general practices and data from virus laboratories)
- laboratory-based surveillance system (based on ESR laboratories and virus laboratories)
• HIV/AIDS surveillance system (operated by the AIDS Epidemiology Group in Dunedin)
• CJD register (based at Dunedin Hospital).

Disease rates were calculated using the 1996 census population as a denominator. The rate calculations for Māori use a mixed ethnicity classification.

Results

Categories of infectious diseases

Proposed categories of infectious disease are listed in Tables A2 and A3. Table A2 includes information on transmission settings and affected populations. Table A3 describes broad intervention areas and the sectors involved in providing and supporting these measures. Interventions include primary prevention and some secondary prevention measures. These interventions are largely confined to population rather than personal health care strategies. This distinction becomes hazy for infectious diseases because effective personal health care frequently provides population health benefit by interrupting disease transmission.

Table A2: Suggested grouping of infectious diseases based on broad control measures, which reflect transmission settings and affected populations

<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Important examples</th>
<th>Transmission settings</th>
<th>Affected populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine-preventable diseases in adults</td>
<td>Influenza, Pneumococcal disease, Tetanus, Hepatitis B</td>
<td>Population, Workplace</td>
<td>Adults, especially elderly</td>
</tr>
<tr>
<td>Respiratory diseases (often linked to socioeconomic deprivation and crowding)</td>
<td>Meningococcal disease, Tuberculosis, Rheumatic fever, Mycoplasma, RSV, Pneumococcal disease, Respiratory infectious diseases generally</td>
<td>Home, especially deprived communities with high level of household crowding, Prisons</td>
<td>Socioeconomically deprived, Māori and Pacific people</td>
</tr>
<tr>
<td>Infectious disease category</td>
<td>Important examples</td>
<td>Transmission settings</td>
<td>Affected populations</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Enteric disease with food-borne transmission</td>
<td>Campylobacteriosis*</td>
<td>Home</td>
<td>All, especially children</td>
</tr>
<tr>
<td></td>
<td>Salmonellosis</td>
<td>Commercial food premises</td>
<td></td>
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<tr>
<td></td>
<td>VTEC*</td>
<td></td>
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<tr>
<td></td>
<td>Yersiniosis</td>
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<tr>
<td></td>
<td>Listeriosis*</td>
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<td></td>
<td>Norwalk-like virus</td>
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<td></td>
<td>Food intoxicants (eg, staphylococcal) Botulism Marine biotoxins</td>
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<tr>
<td>Enteric disease with water-borne transmission</td>
<td>Cryptosporidiosis*</td>
<td>Anywhere with a water supply</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>Giardiasis*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Campylobacteriosis*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diseases from close physical contact</td>
<td>Giardiasis*</td>
<td>Population</td>
<td>Children</td>
</tr>
<tr>
<td></td>
<td>Rotavirus</td>
<td>ECC and schools</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Helicobacter</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Hepatitis A*</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Adenovirus</td>
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<td></td>
<td>EBV</td>
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<td></td>
<td>Skin infections and cellulits</td>
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<td></td>
<td>Invasive streptococcal disease</td>
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<td></td>
<td>Impetigo</td>
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<td></td>
<td>Head lice</td>
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<td></td>
<td>Scabies</td>
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<tr>
<td></td>
<td>Mycotic diseases (including dermatophytes)</td>
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<tr>
<td>Zoonotic disease linked to direct animal contact</td>
<td>Leptospirosis*</td>
<td>Farms</td>
<td>All, especially in rural areas</td>
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<tr>
<td></td>
<td>Typhus</td>
<td>Homes with pets</td>
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<tr>
<td></td>
<td>Emerging diseases (eg, lysavirus) VTEC, cryptosporidiosis and other enteric diseases*</td>
<td></td>
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</tr>
<tr>
<td>Occupational infectious disease</td>
<td>Hepatitis B*</td>
<td>Workplaces, especially laboratories</td>
<td>All, especially farmers, health workers, laboratory workers</td>
</tr>
<tr>
<td></td>
<td>Leptospirosis*</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Enteric diseases in some occupational groups*</td>
<td></td>
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<tr>
<td>Diseases from contaminated environments</td>
<td>Legionellosis</td>
<td>Recreational water and pools</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>Cryptosporidiosis*</td>
<td>Contact with soil/compost Farms</td>
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</tr>
<tr>
<td></td>
<td>Amoebic meningoencephalitis</td>
<td></td>
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</tr>
<tr>
<td>Travel-associated and imported infectious diseases</td>
<td>Dengue fever</td>
<td>Overseas countries, especially developing countries</td>
<td>Travellers Immigrants, especially refugees</td>
</tr>
<tr>
<td></td>
<td>Malaria</td>
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<td></td>
<td>Rabies</td>
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<tr>
<td></td>
<td>Schistosomiasis</td>
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<tr>
<td></td>
<td>Yellow fever</td>
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<td></td>
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<tr>
<td></td>
<td>Typhoid</td>
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<td></td>
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<tr>
<td></td>
<td>Cholera</td>
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</tr>
<tr>
<td></td>
<td>Shigellosis</td>
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<td></td>
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<tr>
<td></td>
<td>Traveller’s diarrhoea</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Leprosy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hepatitis A*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tuberculosis*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIV/AIDS*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious disease category</td>
<td>Important examples</td>
<td>Transmission settings</td>
<td>Affected populations</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Vector-borne diseases (especially with introduction potential)</td>
<td>Ross River virus, Dengue fever*</td>
<td>New Zealand borders and airports, Potential New Zealand habitats</td>
<td>All, if diseases introduced</td>
</tr>
<tr>
<td>Congenital and perinatal infections</td>
<td>Hepatitis B*, Listeriosis*, Congenital rubella syndrome, Toxoplasmosis, Group B streptococcal disease, Cytomegalovirus</td>
<td>Maternal and neonatal care settings</td>
<td>Pregnant women, Neonates</td>
</tr>
<tr>
<td>Blood-borne diseases and those linked to transplants and sharing injecting equipment</td>
<td>Hepatitis C, HIV/AIDS*, HTLV 1&amp;2, CJD, Newly recognised blood-borne diseases</td>
<td>Population, Health care settings, Prisons</td>
<td>All, especially hospitalised, Injecting drug users</td>
</tr>
<tr>
<td>Sexually transmitted infections</td>
<td>Chlamydia, Gonorrhoea, Syphilis, HIV/acquired immune deficiency syndrome*, HPV, HSV, Hepatitis B*</td>
<td>Population</td>
<td>All, especially young adults, Men who have sex with men, Immigrant populations</td>
</tr>
<tr>
<td>Hospital acquired infections</td>
<td>MRSA, Clostridium difficile, Surgical-site infections (SSI), Blood-stream infections (BSI), Device-related infections, Opportunistic infections</td>
<td>Health care settings</td>
<td>All, especially elderly</td>
</tr>
<tr>
<td>Diseases caused by antibiotic-resistance organisms</td>
<td>Penicillin resistant pneumococci, VRE (enterococci), MDR TB, PPNG (gonococci), Newly emerging resistance organisms</td>
<td>Human populations, Animal populations, Health care, Veterinary, Farming</td>
<td>All, especially hospitalised</td>
</tr>
<tr>
<td>Bioterrorism agents</td>
<td>Anthrax, Other agents</td>
<td>Population, especially in government facilities</td>
<td>All, especially ‘first responders’</td>
</tr>
</tbody>
</table>

* Disease appears in more than one category because it has more than one important mode of transmission or control.
Table A3: Categories of infectious disease with examples of disease control objectives, and the national, local and surveillance/research agencies that provide, or could provide services to support these objectives

<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Examples of disease control objectives</th>
<th>National providers, with policy, regulatory and funding role</th>
<th>Local providers, with an investigation and/or delivery role</th>
<th>Surveillance, investigation and research service providers</th>
</tr>
</thead>
</table>
| Vaccine-preventable diseases in children         | High coverage with the childhood immunisation programme  
Highly effective system for swiftly assessing and introducing cost-effective new vaccines (eg, varicella, pneumococcal disease)  
Swift identification of VPD cases and outbreaks and effective vaccination or prophylaxis of contacts (eg, measles, pertussis, hepatitis B, Hib, polo, diphtheria) | MoH  
MoE  
TPK  
MPIA | 1° care  
PHS | PHS ESR  
ASM, IMAC |
| Vaccine preventable diseases in adults           | High coverage with the adult immunisation programme  
Highly effective system for swiftly assessing and introducing cost-effective new vaccines  
Effective measures to manage an influenza pandemic if it arose  
Effective screening and follow-up of hepatitis B carriers (2° prevent) | MoH | 1° care  
PHS | PHS ESR  
ASM, IMAC, CSM |
| Respiratory diseases (often linked to crowding and socioeconomic deprivation) | Reductions in socioeconomic deprivation and elimination of excessively crowded housing  
Effective infection control practices operating in all prisons  
Swift identification of all TB cases and effective treatment of them and infected contacts  
Swift identification of all meningococcal disease cases and prophylaxis of contacts  
Early recognition and treatment of all meningococcal disease cases (2° prevent)  
Effective follow-up and secondary prophylaxis of all ARF cases (2° prevent) | MoH  
MoSP  
HNZ  
TPK, MPIA  
Corrections Department | PHS  
HNZ  
LA  
Prisons | PHS ESR  
WSM |
| Enteric disease with food-borne transmission     | Pathogen contamination levels of key environments are carefully monitored and controlled to keep them within safe limits (eg, shellfish harvest areas)  
Food industry implements high levels of GMP/HACCP throughout production and distribution system (paddock to plate) and is monitored to ensure this  
High levels of safe food handling by all consumers  
Excellent surveillance of enteric disease and swift and effective identification and control of common source outbreaks | MoH  
MAF | Food industry  
PHS  
LA | PHS ESR  
MAF  
LA |
| Enteric disease with water-borne transmission    | All reticulated water meets microbiological safety guidelines and is monitored to ensure this  
Effective surveillance of potentially water borne diseases and swift and effective identification and control of water-borne outbreaks | MoH  
MFE | Water providers  
LA  
PHS | PHS ESR  
LA  
WSM |
| Diseases from close physical contact (especially in early childhood centres and schools) | Effective infection control practices operating in all ECC and schools, including exclusion criteria  
Wide availability of accessible, affordable, and effective medical treatment to interrupt transmission | MoH  
MoE | ECC  
PHSs  
LA  
1° care | PHS ESR |

An Integrated Approach to Infectious Disease 103
<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Examples of disease control objectives</th>
<th>National providers, with policy, regulatory and funding role</th>
<th>Local providers, with an investigation and/or delivery role</th>
<th>Surveillance, investigation and research service providers</th>
</tr>
</thead>
</table>
| Zoonotic disease linked to direct animal contact             | An effective leptospirosis control programme operates throughout New Zealand, including high coverage of leptospirosis vaccination in animal herds  
An effective infection control programme operates on all farms in New Zealand  
Effective surveillance and rapid response to emerging zoonotic diseases within New Zealand and the Australian–Pacific region | MoH  
MAF                                                           | PHS                                                      | PHS ESR  
MAF (NCDI)                                           |
| Occupational infectious disease                             | An effective infection control programme operating in all workplaces where staff are exposed to infectious material (eg, health care settings, meat processing)  
Swift identification of occupationally acquired cases and outbreaks and effective responses | MoH  
OSH                                                                                                                                                                                      | PHS  
OSH                                                      | PHS ESR  
OSH                                                    |
| Diseases from contaminated environments                     | All swimming pools have effective infection control practices and are monitored to ensure this  
All building air conditioning systems have effective practices to prevent legionellosis contamination and are monitored to ensure this  
Swift identification of cases and outbreaks linked to contaminated environments and effective responses | MoH  
OSH                                                                                                                                                                                      | PHS  
Pool operators                                          | PHS ESR                                                    |
| Travel-associated and imported infectious diseases           | All travellers to developing countries take appropriate precautions to minimise their risk of acquiring infectious disease  
All migrants to New Zealand are appropriately screened and treated for infectious disease | MoH  
MFAT                                                                                                                                                                                     | 1° care  
PHS                                                      | PHS ESR                                                     |
| Vector-borne diseases (especially with introduction potential) | Effective surveillance and control of exotic vector mosquitoes  
Effective surveillance of vector-borne disease and rapid investigation and control of any potential newly introduced organisms | MoH  
MAF                                                                                                                                                                                     | PHS  
MAF  
LA                                                      | PHS ESR  
WSM                                                     |
| Congenital and perinatal infections                         | Pregnant women take appropriate precautions to minimise their risks of infectious disease that pose a risk to their foetus  
All pregnant women are screened for an appropriate range of potential congenital infections and managed appropriately (eg, hepatitis B vaccination of neonates) | MoH                                                                                                                               | 1° care (maternity)  
2° care (maternity and perinatal)  
(pharmacotherapy) | PHS ESR  
NZPSU                                                   |
| Blood-borne diseases and those linked to transplants and sharing injecting equipment | Adoption of safe injecting behaviour by all IDUs  
Effective screening practices applied to blood products, human tissues and organs  
Effective infection control programmes operate in all prisons in New Zealand to minimise risk of blood-borne disease transmission  
Creation of an environment that is highly supportive for people with chronic infections, notably HIV/acquired immune deficiency syndrome, HCV (2°) | MoH  
NZBS  
Corrections Dept  
NZAF                                                                 | 1° care (D&A)  
2° care (NZBS)  
Prisons  
NZAF                                                      | PHS ESR  
AIDS Epi  
CSM  
NZBS                                                   |
| Sexually transmitted infections                             | Adoption of safe sexual behaviour by all of the sexually active population  
Swift identification and effective treatment of all people infected with STIs (cases and infected contacts), including systematic screening where necessary  
Creation of an environment that is highly supportive for people with STIs | MoH                                                                                                                               | 1° care (especially SHS, FPA)  
PHS                                                      | ESR                                                       |
<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Examples of disease control objectives</th>
<th>National providers, with policy, regulatory and funding role</th>
<th>Local providers, with an investigation and/or delivery role</th>
<th>Surveillance, investigation and research service providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital-acquired infections</td>
<td>An effective infection control programme operating in all health care settings Excellent HAI surveillance and control of infectious diseases in the workplace, including investigation of outbreaks</td>
<td>MoH Quality Health</td>
<td>2°care (especially infection control staff)</td>
<td>ESR</td>
</tr>
<tr>
<td>Diseases caused by antibiotic resistance organisms</td>
<td>Appropriate antibiotic prescribing behaviour universally adopted by medical practitioners Minimum necessary use of antibiotics in the agricultural sector Rapid detection of changes in antibiotic resistance patterns that are of clinical and public health significance and appropriate response</td>
<td>MoH</td>
<td>1°care 2°care Veterinarians Farming sector</td>
<td>ESR</td>
</tr>
<tr>
<td>Bioterrorism agents</td>
<td>An appropriate level of preparedness to prevent and/or respond in a co-ordinated way to a bioterrorism event</td>
<td>MoH, MAF MFAT Security forces Prime Minister’s Department</td>
<td>Police Fire service PHS</td>
<td>PHS ESR MFAT Security forces</td>
</tr>
</tbody>
</table>

Abbreviations:
- MoH Ministry of Health
- MoSP Ministry of Social Policy
- MAF Ministry of Agriculture and Forestry
- NCDI National Centre for Disease Investigation
- MfE Ministry for the Environment
- MoE Ministry of Education
- TPK Te Puni Kōkiri
- MPIA Ministry of Pacific Island Affairs
- Quality Health Quality Health NZ (formerly NZ Council of Health Care Standards)
- PHS Public health services
- LA Local authorities
- 1°care Primary care providers
- 2°care Secondary care providers
- SHS Sexual health services
- FPA Family Planning Association
- D&A Drug and alcohol services
- ECC Early childhood centre operators
- ESR Institute of Environmental Science and Research
- ASM Auckland University School of Medicine
- WSM Wellington School of Medicine
- CSM Christchurch School of Medicine
- AIDS Epi AIDS Epidemiology Group, Dunedin
- NZAF NZ AIDS Foundation
- IMAC Immunisation Advisory Centre
- NZPSU New Zealand Paediatric Surveillance Unit

**Not included**

Most community groups (eg, Meningitis Trust)  
Professional organisations (eg, NZ Venereological Society)
Results

The following table (Table A4) summarises the key features of these diseases in terms of incidence and impact.

Table A4: Summary of key features of the incidence and impact of groups of infectious diseases in New Zealand

<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Key features of the incidence and impact</th>
</tr>
</thead>
</table>
| Vaccine-preventable diseases in children | Current incidence – High, particularly for measles, pertussis, and varicella  
Future incidence – Future large outbreaks of pertussis and measles are likely. Continuing decline in hepatitis B and Hib is likely  
Health impact – Moderate numbers of hospitalisations, few deaths  
Contribution to gap – Consistently higher rates in Māori and Pacific people, related to lower vaccine coverage. |
| Vaccine-preventable diseases in adults | Current incidence – High, particularly for influenza  
Future incidence – No change in incidence is expected, unless vaccine coverage increases  
Impact – High hospitalisations and deaths, particularly in elderly  
Contribution to gap – Generally higher rates in Māori and Pacific people |
| Respiratory diseases, (often linked to socioeconomic deprivation and crowding) | Current incidence – High, particularly for meningococcal disease, tuberculosis, rheumatic fever  
Future incidence – Continuing high rates  
Impact – High hospitalisations and particularly high numbers of deaths, mainly from meningococcal disease, tuberculosis, and chronic rheumatic heart disease  
Contribution to gap – Consistently higher rates in Māori and Pacific people |
| Enteric disease with food-borne transmission | Current incidence – High, particularly for campylobacteriosis, salmonellosis  
Future incidence – Continuing high rates for enteric food-borne diseases generally, increasing rates of VTEC, high outbreak potential for all of these diseases  
Impact – High hospitalisations for campylobacteriosis, occasional deaths, particularly from listeriosis  
Contribution to gap – Generally lower rates for Māori and Pacific people |
| Enteric disease with water-borne transmission | Current incidence – The incidence of enteric water-borne disease is unknown, but may be low relative to food-borne enteric infections  
Future incidence – Occasional water-borne outbreaks are likely  
Impact – Few hospitalisations and deaths  
Contribution to gap – Probably low |
| Diseases from close physical contact (especially in early childhood centres and schools) | Current incidence – Probably high incidence but poorly measured because most conditions are not under any form of surveillance  
Future incidence – Continuing high rates and outbreaks are likely  
Impact – Some hospitalisations from giardiasis, rotavirus, hepatitis A. Deaths uncommon  
Contribution to gap – Probably, but poorly measured |
| Zoonotic disease linked to direct animal contact | Current incidence – Relatively high for leptospirosis. Direct zoonotic transmission is an important source for cryptosporidiosis, VTEC, salmonellosis and other enteric diseases  
Future incidence – Continuing gradual decline is likely for leptospirosis. Hydatids virtually eliminated. High and possibly increasing rates and occasional outbreaks can be expected for zoonotic enteric diseases. Significant potential for emergence of new zoonotic diseases in the Australia–Pacific region  
Impact – Hospitalisations and occasional deaths for leptospirosis and VTEC  
Contribution to gap – Probably none |
| Occupational infectious disease | Current incidence – Poorly defined, except for leptospirosis, because cases acquired in the workplace are not well distinguished from infections acquired in other settings  
Future incidence – Uncertain  
Impact – Uncertain  
Contribution to gap – Probably none |
<table>
<thead>
<tr>
<th>Infectious disease category</th>
<th>Key features of the incidence and impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases from contaminated environments</td>
<td>Current incidence – Moderate numbers of legionellosis cases. Contaminated swimming pools contribute to the incidence of cryptosporidiosis. Future incidence – Moderate outbreak potential for legionellosis and cryptosporidiosis from contaminated environments. Impact – Moderate number of hospitalisations and occasional deaths for legionellosis and cryptosporidiosis. Contribution to gap – Probably low.</td>
</tr>
<tr>
<td>Travel-associated and imported infectious diseases</td>
<td>Current incidence – Moderate numbers of imported cases of malaria and small numbers of dengue fever, schistosomiasis and typhoid. About half the cases of hepatitis A and shigellosis have a history of overseas travel. About half of New Zealand’s TB and AIDS cases are imported. Future incidence – Occasional outbreaks of dengue fever in the Pacific and other tropical countries are likely to increase exposure and hence travel-associated cases. Imported TB and AIDS cases may increase if more refugees are accepted from countries where these diseases have a higher prevalence than in New Zealand. Impact – Moderate numbers of hospitalisations from malaria, typhoid and shigellosis. Contribution to gap – Higher rates of travel-associated disease are seen in Pacific people.</td>
</tr>
<tr>
<td>Congenital and perinatal infections</td>
<td>Current incidence – Poorly measured as case ascertainment is often incomplete and most conditions are not under active surveillance. Future incidence – Uncertain. Impact – Congenital listeriosis causes several neonatal deaths a year. Contribution to gap – Low.</td>
</tr>
<tr>
<td>Blood-borne diseases and those linked to transplants and sharing injecting equipment</td>
<td>Current incidence – Poorly measured by current surveillance systems that focus on identifying acute cases. Future incidence – Prevalence of hepatitis C is likely to increase. Impact – Increasing, particularly for hepatitis C. Contribution to gap – Low.</td>
</tr>
<tr>
<td>Sexually transmitted infections</td>
<td>Current incidence – High for chlamydia and gonorrhoea, but surveillance is incomplete. Future incidence – Increasing incidence for chlamydia and gonorrhoea. Impact – High for AIDS as a cause of chronic disease and death, moderate for chlamydia and gonorrhoea as causes of pelvic infection, hospitalisation and infertility. Contribution to gap – Much higher rates of chlamydia and gonorrhoea among Māori and Pacific people.</td>
</tr>
<tr>
<td>Bioterrorism agents</td>
<td>Current incidence – No episodes known, though the introduction of RCV could be placed in this category. Future incidence – Unknown, but probably very low. Impact – Potentially large. Contribution to gap – None.</td>
</tr>
</tbody>
</table>
Discussion

Overall impact of infections diseases

There are a number of ways of assessing the overall impact of infection diseases in New Zealand. Table 5 summarised measures used in Our Health, Our Future (Ministry of Health 1999).

Infectious diseases constitute almost 10% of cases diagnosed in New Zealand hospitals. Acute respiratory and gastrointestinal infections are the predominant causes of these admissions.

They cause about 6% of deaths, the fourth major cause of death in New Zealand behind cardiovascular disease, cancer and death from injury. When age of death is taken into account, they are responsible for only 3% of years of life lost (YLL) before 65 (presenescence deaths), which reflects the relatively high rate of deaths from infectious diseases in older age groups. A better measure is premature mortality where infections account for 4% of years of life lost.

The overall burden of disease can be assessed by combining years of life lost with years of life lost from disabilities (YLD) to give disability-adjusted life years (DALYS). Infectious diseases account for over 18,000 DALYS a year in New Zealand, which is about 3% of the total.

Table A5: Measures of the overall impact of infectious diseases, based on 1996 data*

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number</th>
<th>Rate/1000</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalisations (1997)</td>
<td>63,000</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>Cause of death</td>
<td>1,800</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>YLL65</td>
<td>2,845</td>
<td>0.9</td>
<td>3</td>
</tr>
<tr>
<td>YLLed (Premature mortality)</td>
<td>12,191</td>
<td>2.4</td>
<td>4</td>
</tr>
<tr>
<td>YLD</td>
<td>5,916</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>DALYS</td>
<td>18,270</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

* Except for hospitalisation (see Ministry of Health 1999).

Notes: Cause of death by categorical attribution; YLL65 = Years of life lost, based on gap between age at death and 65 years; YLLed = Years of life lost, based on gap between age at death and the life expectancy remaining at that age, with a 3% discount rate; YLD = Years lost to disability; DALYS = Disability Adjusted Life Years.

Overall trends in infectious diseases mortality have been assessed for the period 1980–93. A detailed analysis found that these diseases were responsible for 6.9% of total deaths. The proportion was stable or declined only slowly during this period (Christie and Tobias 1998).

This burden of illness is not distributed evenly throughout the community. Māori, Pacific people, the very young and the elderly are disproportionately represented (Ministry of Health 1999).
Impact of specific groups of disease

This very limited analysis tends to confirm the following groups of infectious diseases as having particularly high public health impact:

- vaccine-preventable diseases in children and adults, notably measles, pertussis, influenza, and pneumococcal disease
- respiratory diseases linked to socioeconomic deprivation and crowding, notably meningococcal disease, rheumatic fever and TB
- enteric disease with food-borne transmission, notably campylobacteriosis and salmonellosis
- sexually transmitted infections, notably chlamydia, gonorrhoea, HIV/AIDS.

Other groups of disease which have an important impact include:

- zoonotic disease linked to direct animal contact – because of the continuing importance of leptospirosis in New Zealand and of enteric infections in the farming environment such as VTEC
- blood-borne diseases and those linked to transplants and sharing injecting equipment – largely because of the likely increasing importance of hepatitis C
- travel-associated and imported infectious diseases – because of the importance of imported tuberculosis and HIV infection
- diseases from contaminated environments – notably legionellosis.

For other groups of diseases, information is very incomplete, and impacts are hard to assess:

- diseases from close physical contact (especially in early childhood centres and schools)
- hospital-acquired infections
- diseases caused by antibiotic resistance organisms
- enteric disease with water-borne transmission
- occupational infectious disease
- vector-borne diseases (especially with introduction potential)
- congenital and perinatal infections
- bioterrorism agents.

Limitations of this analysis

This very limited analysis raises a number of questions for further discussion.

- Should it be extended by integrating additional NZHIS hospitalisation and mortality data?
- What indicators of disease impact should be included in an assessment of public health importance (see Table A1)?
• Should an attempt be made to quantify disease burden using a composite measure such as DALYs?
• Should we attempt to integrate multiple indicators of public health impact into a single measure of public health importance, and if so, how should this be done?

References

Appendix C: Ministry of Health and Health Funding Authority Immunisation Targets

Rather than a single target, the Health Funding Authority (HFA) and Ministry of Health agreed on two sets of targets, one for the individual immunisation episode (for example, MMR at 15 months), and the other for completion of the whole immunisation programme by age two. The overall target of 95% remains, but the target date depends on the coverage rate in December 2000. For example, if coverage in December 2000 is found to be 70% for Māori, 80% for the whole population and 85% for Nelson, the June 2001 targets will be 79%, 87% and 90% respectively.

Table A6: HFA and Ministry of Health immunisation coverage rate targets

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td></td>
<td>75</td>
<td>85</td>
<td>90</td>
<td>95</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>79</td>
<td>87.5</td>
<td>92.5</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>83</td>
<td>90</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>87</td>
<td>92.5</td>
<td>95+</td>
<td></td>
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<tr>
<td>85</td>
<td></td>
<td>90</td>
<td></td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>90+</td>
<td></td>
<td>93</td>
<td>95+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage fully immunised by age 2 years</th>
<th>Dec 2002</th>
<th>June 2003</th>
<th>June 2004</th>
<th>June 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
<td>80</td>
<td>90</td>
<td>95</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>84</td>
<td>93</td>
<td>95+</td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>88</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>90</td>
<td>95</td>
<td></td>
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<tr>
<td>90</td>
<td></td>
<td>93</td>
<td>95+</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td></td>
<td>95+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For example, MMR at 15 months.
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>Ability of people to reach or use health care services. Barriers to access can be: (1) a person's locality, income or knowledge of services available; or (2) by the acceptability or availability of existing services.</td>
</tr>
<tr>
<td><strong>AIDS</strong></td>
<td>Acquired Immunodeficiency Syndrome.</td>
</tr>
<tr>
<td><strong>Annual plans</strong></td>
<td>Operational plans covering a 12-month period.</td>
</tr>
<tr>
<td><strong>AR</strong></td>
<td>Antibiotic resistance.</td>
</tr>
<tr>
<td><strong>Avoidable or preventable hospitalisation or mortality</strong></td>
<td>Hospitalisation or death due to causes which could have been avoided by preventive or therapeutic programme</td>
</tr>
<tr>
<td><strong>Communicable disease</strong></td>
<td>See infectious disease</td>
</tr>
<tr>
<td><strong>Consultation</strong></td>
<td>The process of seeking the views of individuals or groups. These include both providers and health service users.</td>
</tr>
<tr>
<td><strong>Culturally appropriate services</strong></td>
<td>Services responsive to, and respectful of, the history, traditions and cultural values of the different ethnic groups in our society.</td>
</tr>
<tr>
<td><strong>Culturally effective services</strong></td>
<td>Services that are both culturally appropriate and clinically effective.</td>
</tr>
<tr>
<td><strong>Determinants of health</strong></td>
<td>The range of personal, social, economic and environmental factors that determine the health status of individuals or populations.</td>
</tr>
<tr>
<td><strong>Disability</strong></td>
<td>Incapacity caused by a congenital state, injury or age-related condition expected to last six months or more. A disability may or may not be associated with the need for assistance.</td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td>Disorder or pathology that affects health.</td>
</tr>
<tr>
<td><strong>Disparity (or deprivation)</strong></td>
<td>Socioeconomic or health inequality or difference relative to the local community or wider society to which an individual, family or group belongs.</td>
</tr>
<tr>
<td><strong>District Health Boards</strong></td>
<td>District Health Boards (DHBs) are organisations being established to protect, promote and improve the health and independence of a geographically defined population. Each District Health Board will fund, provide or ensure the provision of services for its population.</td>
</tr>
<tr>
<td><strong>DOT(S)</strong></td>
<td>Directly Observed Therapy (Short-course).</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Physical surroundings and conditions.</td>
</tr>
</tbody>
</table>

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36 Definitions have been derived from the glossary contained in The New Zealand Health Strategy and A Dictionary of Epidemiology, 3rd edition, ed JM Last, Oxford University Press, 1995.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemic measures</td>
<td>Those emergency procedures designed to limit the spread of infectious diseases that have developed widely in a group or community.</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>The scientific study of the distribution of disease.</td>
</tr>
<tr>
<td>EpiSurv</td>
<td>A disease surveillance software application managed by ESR for the surveillance of communicable diseases in New Zealand.</td>
</tr>
<tr>
<td>Equity (in health)</td>
<td>Equity means fairness.</td>
</tr>
<tr>
<td>ESR</td>
<td>Institute of Environmental Science and Research Ltd.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>A assessment against a standard. Evaluations can assess both the process (of establishing a programme to deliver an outcome) and outcomes (ultimate objectives).</td>
</tr>
<tr>
<td>Evidence-based practice</td>
<td>Clinical decision-making based on a systematic review of the scientific evidence of the risks, benefits and costs of alternative forms of diagnosis or treatment.</td>
</tr>
<tr>
<td>Foodnet</td>
<td>The national database with information on food safety programmes and food premises.</td>
</tr>
<tr>
<td>Funding agreement</td>
<td>This is the agreement the Crown enters into with any person or entity under which the person or entity agrees to provide or arrange the provision of services in return for payment. For District Health Boards, this will include the District Health Board Annual Plan, funding schedules and the District Health Board Statement of Intent.</td>
</tr>
<tr>
<td>Goal</td>
<td>A high-level strategic statement.</td>
</tr>
<tr>
<td>Hapü</td>
<td>Sub-tribe.</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard analysis, critical control points. A system that is intended to provide a high degree of food safety assurance.</td>
</tr>
<tr>
<td>HAI</td>
<td>Hospital-acquired infection.</td>
</tr>
<tr>
<td>Health education</td>
<td>Providing information and teaching people how to behave safely and in a manner that promotes and maintains their health.</td>
</tr>
<tr>
<td>Health gain (loss)</td>
<td>Health gain (loss) is a way to express improvement (or deterioration) in health outcomes. It can be used to measure: (1) the improvement (or deterioration) in population health status; or (2) the degree to which the level of health of a population has changed in response to a policy or other intervention.</td>
</tr>
</tbody>
</table>
| **Health information** | Health information, in relation to an identifiable individual, means information:  
| | • about the health of that individual, including that individual’s medical history  
| | • about any disabilities that individual has, or has had  
| | • about any health services or disability services that are being provided, or have been provided, to that individual  
| | • provided by that individual in connection with the donation, by that individual, of any body part, or any bodily substance, of that individual. |
| **Health needs** | This can be either: (1) what an individual requires to achieve or maintain health; or (2) an estimation of the programmes required to improve the health of populations. |
| **Health needs assessment** | A process designed to establish the health requirements of a particular population. |
| **Health outcomes** | A change in the health status of an individual, group or population which is attributable to a planned programme or series of programmes, regardless of whether such a programme was intended to change health status. |
| **Health policy** | A formal statement or procedure within institutions (notably government) that defines priorities and the parameters for action. |
| **Health promotion** | Health promotion is the process of enabling people to increase control over, and to improve, their health. It is a comprehensive social and political process. |
| **Health status** | A description and/or measurement of the health of an individual or population. |
| **Health target** | A change in the health status of a population that can be reasonably expected within a defined time period. |
| **Health workforce** | Providers of health care services such as doctors, nurses, physiotherapists or health promoters. |
| **Immunisation (syn: vaccination)** | Protection of susceptible individuals from communicable disease by administration of a living modified agent, a suspension of killed organisms, or an inactivated toxin (see vaccine). Temporary passive immunisation can be produced by administration of an antibody in the form of immune globulin in some conditions. |
| **Incidence** | The number of new events (new cases of illness or deaths) that occur in a defined population within a specified period of time. |
| **Indicator** | A measure that shows the degree to which an objective has been achieved. |
**Infection**
The entry and development or multiplication of an infectious agent in the body of humans or animals. Infection is not synonymous with infectious disease because the result may be inapparent or manifest.

**Infectious disease** (syn: communicable disease)
An illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal or reservoir to a susceptible host, either directly, or indirectly through an intermediate plant or animal host, vector or the inanimate environment.

**Informed consent**
A medico-legal doctrine that holds providers responsible for ensuring health service users or patients understand the risks and benefits of a procedure or medicine before it is administered.

**Injury**
Either: (1) unintentional injuries (damage to the body resulting from unplanned events such as road accidents, workplace accidents or accidents in the home); or (2) intentional injuries (resulting from assault, suicide, etc.).

**Intersectoral collaboration**
Projects involving various sectors of society including central and local government agencies (health, education, welfare and so on), community organisations (HIC, CCS, Māori Women’s Welfare League, etc.) and the private sector.

**Intervention**
A programme or series of programmes.

**Iwi**
Tribe.

**Lifestyle**
Lifestyle is a way of living based on identifiable patterns of behaviour based on an individual’s choice, and influenced by the individual’s personal characteristics, their social interactions, and socioeconomic and environmental factors.

**MAF**
Ministry of Agriculture and Forestry.

**Mana**
Integrity, prestige, jurisdiction, authority.

**Mode of transmission**
The mechanisms by which an infectious agent is spread to humans, including direct (skin to skin, sexual intercourse, etc.) and indirect (airborne, vector-borne, etc.).

**Monitoring**
The performance and analysis of routine measurements, aimed at detecting changes.

**Morbidity**
Illness, sickness.

**Mortality**
Death.

**MRSA**
Methicillin-resistant Staphylococcus aureus.

**Notifiable disease**
A disease that, by legal requirements, must be reported by medical practitioners to public health services (Health Act 1956).

**Objective**
Objectives state what is to be achieved and cover the range of desired outcomes to achieve a goal.
OSH
Occupational Safety and Health.

Pacific peoples
The population of Pacific Island ethnic origin (for example, Tongan, Niuean, Fijian, Samoan, Cook Island Māori, Tokelauan) incorporating people of Pacific Island ethnic origin born in New Zealand as well as overseas.

Partnership
The relationship of good faith, mutual respect, understanding and shared decision-making between the Crown and Māori.

PHARMAC
Pharmaceutical Management Agency Ltd.

Population-based funding
Population-based funding involves using a formula to allocate each District Health Board a fair share of the available resources so that each Board has an equal opportunity to meet the health and disability needs of its population.

Population health
The health of groups, families and communities. Populations may be defined by locality, biological criteria such as age or gender, social criteria such as socioeconomic status, or cultural criteria such as whānau.

Population health outcome
A change in the health status of a population due to a planned programme or series of programmes, regardless of whether such programmes were intended to change health status.

Population health status
The level of health experienced by a population at a given time. This may be measured by separately identifying patterns of death and illness in a population, or by means of one or more measures.

Prevalence
The number of instances of a disease or other condition in a population at a given time.

Primary health care
Primary health care means essential health care based on practical, scientifically sound, culturally appropriate and socially acceptable methods. It is universally accessible to people in their communities, involves community participation, is integral to, and a central function of, the country’s health system, and is the first level of contact with the health system.

Programme
A programme is a group of activities directed towards achieving defined objectives and targets.

Programme evaluation
The assessment of policies, materials, personnel, performance, quality of practice or services and other inputs and implementation experiences.

Provider
An organisation or individual providing health and disability services.

Public health
The science and art of promoting health, preventing disease and prolonging life through organised efforts of society.
<table>
<thead>
<tr>
<th><strong>Public health approaches</strong></th>
<th>The goals of public health are to focus on the determinants of health, build strategic alliances and implement comprehensive programmes to promote public health.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public health services</strong></td>
<td>Goods, services or facilities provided for the purpose of improving or promoting public health.</td>
</tr>
<tr>
<td><strong>Quality assurance</strong></td>
<td>Formal process of implementing quality assessment and quality improvement in programmes to assure people that professional activities have been performed adequately.</td>
</tr>
<tr>
<td><strong>Rangatahi</strong></td>
<td>Used in health to define Māori youth in the 15–24 years age range.</td>
</tr>
<tr>
<td><strong>Rate</strong></td>
<td>In epidemiology, a rate is the frequency with which a health event occurs in a defined population. The components of the rate are the number of events (numerator), the population at risk (denominator) and the specified time in which the events occurred. All rates are ratios, calculated by dividing the numerator by the denominator.</td>
</tr>
<tr>
<td><strong>Regulation</strong></td>
<td>The act of enforcing policies, rules or laws.</td>
</tr>
<tr>
<td><strong>Reservoir</strong></td>
<td>The ultimate and/or immediate human, animal arthropod, plant, soil, substance or combination of these that is the source of infection for a susceptible host.</td>
</tr>
<tr>
<td><strong>Risk behaviour</strong></td>
<td>Specific forms of behavior that are proven to be associated with increased susceptibility to a specific injury, disease or form of ill health.</td>
</tr>
<tr>
<td><strong>Risk factor</strong></td>
<td>An aspect of personal behaviour or lifestyle, an environmental exposure, or an inborn or inherited characteristic that is associated with an increased risk of a person developing a disease.</td>
</tr>
<tr>
<td><strong>Secondary care</strong></td>
<td>Specialist care that is typically provided in a hospital setting.</td>
</tr>
<tr>
<td><strong>Socioeconomic disadvantage</strong></td>
<td>A relative lack of financial and material means experienced by a group in society which may limit their access to opportunities and resources that are available to the wider society.</td>
</tr>
<tr>
<td><strong>Surveillance</strong></td>
<td>The continuing scrutiny of all aspects of occurrence and spread of a disease that are pertinent to effective control. Public health surveillance is the ongoing and systematic collection, analysis, and interpretation of health data in the process of monitoring a health event.</td>
</tr>
<tr>
<td><strong>STEC</strong></td>
<td>Shiga toxin producing E. coli (see also VTEC).</td>
</tr>
<tr>
<td><strong>STI</strong></td>
<td>Sexually transmitted infection.</td>
</tr>
<tr>
<td><strong>Strategic plans</strong></td>
<td>Plans produced by District Health Boards and the Ministry of Health that will outline the strategic direction over a five- to ten-year period.</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>A course of action to achieve targets.</td>
</tr>
</tbody>
</table>
TA  Territorial authority.
Tamariki  Children; can be used to include young people who have not yet reached adulthood. In this document, tamariki refers to children up to and including 14 years of age.
Target  A specific and measurable aim relating to an objective.
TB  Tuberculosis.
Tertiary care  Very specialised care, often only provided in a small number of locations.
Tikanga  Customary practice, rule.
Treaty of Waitangi  New Zealand’s founding document. It establishes the relationship between the Crown and Māori as tangata whenua (first peoples) and requires both the Crown and Māori to act reasonably towards each other and with utmost good faith.
Vaccine  An immunobiological substance used for active immunisation by introducing into the body a live modified, attenuated or killed inactivated infectious organism or its toxin.
Vaccinate  To inoculate with a vaccine to provide immunity to a corresponding infectious disease.
Vaccination  See immunisation.
VTEC  Verotoxin-producing E. coli (also known as shiga toxin-producing E. coli (STEC)).
Whānau  Family.
Well-child/Tamariki ora  Term used to describe all activities that promote health and prevent disease that are undertaken in the primary care setting for children and their families and whānau.
Wellness  A dimension of health beyond the absence of disease or infirmity, including social, emotional and spiritual aspects of health.
WTO  World Trade Organization.