Guidelines for Tuberculosis Control in New Zealand
2010
Chapter 1: Epidemiology and Surveillance of Tuberculosis in New Zealand
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Summary

For the latest epidemiological information, see the Public Health Surveillance website (http://www.surv.esr.cri.nz).

**Epidemiology of tuberculosis**

Recent tuberculosis (TB) notification rates in New Zealand have been around 10 per 100,000. Incidence has decreased slightly in recent years to around 7 per 100,000.

Higher rates of disease in New Zealand compared to other developed countries may be attributed to socioeconomic deprivation and immigration from high-incidence countries. Over two-thirds of all TB cases in New Zealand are in foreign-born individuals.

The highest rates of disease are seen in individuals:
- in urban areas, particularly Auckland and South Auckland
- of non-European ethnicity, particularly ‘Other’ and Pacific People.

**Type, management and outcome of tuberculosis cases**

Two-thirds of TB cases are pulmonary. Of the extra-pulmonary cases, the most common sites of infection are lymph nodes.

Morbidity and mortality from TB have been declining in recent years.

Multi-drug resistance occurs in less than 1% of all TB isolates.

**Surveillance of tuberculosis**

Surveillance is important for supporting the local management of TB, monitoring disease incidence and identifying risk factors.

A medical practitioner who diagnoses or suspects a case of new or relapsed TB must, under the Tuberculosis Act 1948, notify the case to the local medical officer of health.

It is not a legal requirement for clinicians to notify the local medical officer of health about people receiving treatment for latent TB infection. However, clinicians are asked to report cases to the local medical officer of health, for monitoring purposes, if the cases are of latent TB infection that are, or are recommended to be, under treatment.

Recent changes to surveillance include:
- alterations to the TB case report form
- the production of an annual surveillance report for TB (see the Public Health Surveillance website, http://www.surv.esr.cri.nz)
- DNA fingerprinting of all isolates.

Recent improvements to the system include:
- laboratory notification of positive results to identify un-notified cases
- regular review of surveillance data to inform policy development.
Introduction

This chapter:

- reviews the epidemiology of tuberculosis (TB) in New Zealand using EpiSurv notification data from 2002 to 2007
- describes the system of TB surveillance adopted in New Zealand.

The information in this chapter was obtained from:

- recent reviews of TB epidemiology in New Zealand\textsuperscript{1,2}
- data from the Institute of Environmental Science and Research (ESR).

For the latest epidemiological information, visit the Public Health Surveillance website (http://www.surv.esr.cri.nz).
1 Epidemiology of Tuberculosis

1.1 Trends in incidence

Compulsory notification for all forms of TB was introduced in New Zealand in 1940.\(^1\) Notifications peaked in 1943 with 2600 cases, a rate of 142 per 100,000 (see Figure 1.1). After this peak in cases around the time of the Second World War there was a steady decline in disease incidence.

**Figure 1.1:** Tuberculosis notification rates, 1943–2009

Between 1995 and 2004, the incidence of TB increased in New Zealand (see Figure 1.2),\(^2\) and a similar trend was observed in other developed countries. Occurrence of human immunodeficiency virus (HIV) infection and acquired immune deficiency syndrome (AIDS), emergence of multi-drug-resistant organisms, and increased immigration from high incidence countries, have been implicated as causes for the TB increase.\(^3\) The findings of a New Zealand study in 2006 indicated that HIV is making only a small contribution to TB incidence in New Zealand, unlike some other countries, and that migration from high TB-incidence countries was the predominant source of TB in New Zealand.\(^4\) Since 1997, there is some evidence that incidence is decreasing, resulting in a low of 290 TB disease notifications in 2007 — the lowest figure since records began.
The current average annual rate of TB in New Zealand of around 7–10 per 100,000 is lower than that reported from the United Kingdom (15 per 100,000), but is higher than that reported from the United States (4 per 100,000), Canada (5 per 100,000) and Australia (6 per 100,000).5

Although the validity of international comparisons is limited by variations in case detection and reporting practices, higher rates in New Zealand have raised concerns about the effectiveness of current prevention and control activities. Sociodemographic factors such as poverty, overcrowding and migration from countries of high incidence have been identified as contributing to the disease’s resurgence in New Zealand.4,6 In late 2004 TB screening was introduced for international students staying more than six months in New Zealand and in late 2005 new migrant health screening requirements (including for TB) were implemented in New Zealand.

1.2 Outbreaks

An estimated 10% of all notified TB cases occur as part of recognised TB outbreaks. Accurate reporting of outbreak-related cases of TB is limited by incomplete recording of outbreak numbers on EpiSurv. Large outbreaks, involving 12–61, cases have occurred in a school, church group and prison.7–9
1.3 Incidence by District Health Board

In New Zealand, several District Health Boards (DHBs) report consistently high rates of TB. In 2008, Auckland (12.3 per 100,000), Counties-Manukau (12.0 per 100,000) and Hutt Valley (12.0 per 100,000) had the highest rates.10 This is consistent with overseas findings that disease tends to persist in urban areas,11 and is consistent with the geographic distribution of ethnic groups most affected by the disease.

Several studies have examined the epidemiology of TB in the Auckland12–14 and Wellington regions.15,16 The clustering of cases in areas of socioeconomic deprivation and the importance of immigration from countries with a high incidence of TB have been noted in both areas.

1.4 Incidence by age

The majority of TB cases occur in adults, with the highest rates per 100,000 in those aged 20–29 years followed by those aged 70 and over (see Table 1.1). Children aged under 15 years account for 7–14% of all cases, but this proportion varies significantly by ethnicity (25% of cases in Pacific peoples, 14% in Māori, 5% in Europeans and 4% in ‘Others’). Although the incidence of TB in children remains low, it has not fallen in recent years.17

Table 1.1: Tuberculosis notification numbers and average rates by age, 2005–09

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Total 2005–09</th>
<th>% cases Census population 2006</th>
<th>Average rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>0.8%</td>
<td>4.4</td>
</tr>
<tr>
<td>1 to 4</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>40</td>
<td>2.6%</td>
<td>3.6</td>
</tr>
<tr>
<td>5 to 9</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>29</td>
<td>1.9%</td>
<td>2.0</td>
</tr>
<tr>
<td>10 to 14</td>
<td>9</td>
<td>19</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>41</td>
<td>2.6%</td>
<td>2.7</td>
</tr>
<tr>
<td>15 to 19</td>
<td>17</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>8</td>
<td>87</td>
<td>5.6%</td>
<td>5.8</td>
</tr>
<tr>
<td>20 to 29</td>
<td>85</td>
<td>88</td>
<td>53</td>
<td>59</td>
<td>64</td>
<td>349</td>
<td>22.3%</td>
<td>13.6</td>
</tr>
<tr>
<td>30 to 39</td>
<td>62</td>
<td>58</td>
<td>51</td>
<td>58</td>
<td>53</td>
<td>282</td>
<td>18.0%</td>
<td>9.8</td>
</tr>
<tr>
<td>40 to 49</td>
<td>51</td>
<td>48</td>
<td>33</td>
<td>29</td>
<td>48</td>
<td>209</td>
<td>13.4%</td>
<td>6.9</td>
</tr>
<tr>
<td>50 to 59</td>
<td>30</td>
<td>33</td>
<td>29</td>
<td>35</td>
<td>39</td>
<td>166</td>
<td>10.6%</td>
<td>6.8</td>
</tr>
<tr>
<td>60 to 69</td>
<td>28</td>
<td>26</td>
<td>34</td>
<td>39</td>
<td>30</td>
<td>157</td>
<td>10.0%</td>
<td>9.6</td>
</tr>
<tr>
<td>70+</td>
<td>34</td>
<td>45</td>
<td>39</td>
<td>42</td>
<td>30</td>
<td>190</td>
<td>12.1%</td>
<td>10.9</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0.1%</td>
<td>–</td>
</tr>
<tr>
<td>Total</td>
<td>333</td>
<td>354</td>
<td>284</td>
<td>293</td>
<td>300</td>
<td>1564</td>
<td>100.0%</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Source: EpiSurv - Institute of Environmental Science and Research.
1.5 Incidence by ethnicity

The TB rate among Māori is five times that among Europeans while in Pacific peoples it is 10 times higher than in Europeans and in Asian ethnic groups the rate is 25 times greater than in Europeans (see Table 1.2). Ethnic disparities have increased in recent times, although differences in TB incidence by ethnic group are confounded by place of birth.

Table 1.2: Age-specific tuberculosis notifications by ethnicity, 2005–09

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Total notifications</th>
<th>Annual rate per 100,000</th>
<th>Relative rate cf European</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>756</td>
<td>44.4</td>
<td>25.7</td>
</tr>
<tr>
<td>European</td>
<td>197</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Māori</td>
<td>254</td>
<td>9.0</td>
<td>5.2</td>
</tr>
<tr>
<td>Other</td>
<td>97</td>
<td>4.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Pacific peoples</td>
<td>207</td>
<td>18.3</td>
<td>10.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>44</td>
<td>5.2</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,555</strong></td>
<td><strong>7.7</strong></td>
<td><strong>4.5</strong></td>
</tr>
</tbody>
</table>

Source: EpiSurv - Institute of Environmental Science and Research.

1.6 Incidence by place of birth

Immigration has been an important factor contributing to the TB incidence in New Zealand (see Table 1.3 and Chapter 10).

Table 1.3: Tuberculosis in people born in and outside New Zealand, 2005–09

<table>
<thead>
<tr>
<th>Year</th>
<th>Number born outside New Zealand</th>
<th>Number born in New Zealand</th>
<th>Number for whom place of birth unknown</th>
<th>Total</th>
<th>Percent born outside New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>240</td>
<td>77</td>
<td>13</td>
<td>330</td>
<td>72.7%</td>
</tr>
<tr>
<td>2006</td>
<td>230</td>
<td>104</td>
<td>16</td>
<td>350</td>
<td>65.7%</td>
</tr>
<tr>
<td>2007</td>
<td>187</td>
<td>84</td>
<td>11</td>
<td>282</td>
<td>66.3%</td>
</tr>
<tr>
<td>2008</td>
<td>213</td>
<td>79</td>
<td>1</td>
<td>293</td>
<td>72.7%</td>
</tr>
<tr>
<td>2009</td>
<td>220</td>
<td>78</td>
<td>2</td>
<td>300</td>
<td>73.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1090</strong></td>
<td><strong>422</strong></td>
<td><strong>43</strong></td>
<td><strong>1555</strong></td>
<td><strong>70.1%</strong></td>
</tr>
</tbody>
</table>

Source: EpiSurv - Institute of Environmental Science and Research.

1.7 Social vulnerability as a risk factor for tuberculosis

TB has been described as a ‘barometer of social justice and equity’. Although TB affects people in all countries, it mostly affects the poorest and most vulnerable communities. The effect of poverty on rates of TB appears to be independent of ethnicity. In Auckland, notification rates among New Zealand-born individuals are 60 times higher in the least affluent parts of the region (NZDep 10) than in the most affluent (NZDep 1).
1.8 Other risk factors

The following are the known risk factors for contacting TB.

- **Contact with a known case of TB** – the most common risk factor for disease (see Chapter 7).

- **Institutional contact** — listed institutions include refugee camps and immigration centres, prisons, rest homes, and mental health facilities (see Chapters 9 and 12).

- **Occupational contact** – as a risk factor this is poorly documented. A study of Auckland medical students, residents and registrars found a risk of TB infection among medical staff.\(^{20}\)

- **Exposure to cattle, deer, possums and certain animal products** – this is a risk factor for the development of *Mycobacterium bovis* infection (bovine TB). Around 3% of TB cases are *M. bovis*. Low rates are attributable to herd testing and the widespread pasteurisation of milk.

- **Association with the HIV/AIDS epidemic** – TB in certain high-incidence countries is increasing because of the disease’s association with the HIV/AIDS epidemic. However, in New Zealand TB is uncommon in patients with HIV infection (around 1% of TB cases have HIV co-infection). See Chapter 6.
2 Type, Management and Outcome of Notified Tuberculosis Cases

2.1 Laboratory confirmation

The proportion of laboratory-confirmed cases increased from 44% in 1988 to 82% in 2009.

2.2 Site of infection

Of the notified cases for which the site of infection is recorded, 67% are pulmonary. The remaining cases are a combination of pulmonary and extra-pulmonary (5%) and extra-pulmonary alone (28%). A breakdown of extra-pulmonary cases by site of infection is in Table 2.1.

Table 2.1: Extra-pulmonary tuberculosis cases, by site, 2002–07

<table>
<thead>
<tr>
<th>Site of extra-pulmonary tuberculosis</th>
<th>Number</th>
<th>Proportion of extra-pulmonary cases(^\ast) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node (excluding abdominal)</td>
<td>404</td>
<td>27.7</td>
</tr>
<tr>
<td>Intra-abdominal (excluding renal)</td>
<td>96</td>
<td>6.6</td>
</tr>
<tr>
<td>Pleural</td>
<td>151</td>
<td>10.4</td>
</tr>
<tr>
<td>Renal/urinary tract</td>
<td>30</td>
<td>2.1</td>
</tr>
<tr>
<td>Tuberculous meningitis</td>
<td>24</td>
<td>1.6</td>
</tr>
<tr>
<td>Miliary tuberculosis</td>
<td>17</td>
<td>1.2</td>
</tr>
<tr>
<td>Bone/joint</td>
<td>113</td>
<td>7.8</td>
</tr>
<tr>
<td>Other(^\d)</td>
<td>92</td>
<td>6.3</td>
</tr>
<tr>
<td>Not stated or unknown</td>
<td>584</td>
<td>40.1</td>
</tr>
<tr>
<td>Total</td>
<td>1511</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
\(\ast\) Some patients had disease at more than one site, so the percentages total more than 100.
\(\d\) Other includes TB of the skin.

Source: Institute of Environmental Science and Research.
2.3 Morbidity and mortality

Although the incidence of disease has decreased slightly over recent years, the proportion of all cases hospitalised or dying (the case fatality rate) as a result of TB changed only slightly between 2002 and 2008 (Table 2.2).

Table 2.2: Morbidity and mortality of tuberculosis cases, 1997–2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of notifications</th>
<th>Annual notification rate</th>
<th>Number of hospitalisations</th>
<th>Number of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>323</td>
<td>8.5</td>
<td>229</td>
<td>15</td>
</tr>
<tr>
<td>1998</td>
<td>365</td>
<td>9.6</td>
<td>252</td>
<td>8</td>
</tr>
<tr>
<td>1999</td>
<td>446</td>
<td>11.6</td>
<td>267</td>
<td>14</td>
</tr>
<tr>
<td>2000</td>
<td>354</td>
<td>9.2</td>
<td>204</td>
<td>8</td>
</tr>
<tr>
<td>2001</td>
<td>369</td>
<td>9.5</td>
<td>208</td>
<td>2</td>
</tr>
<tr>
<td>2002</td>
<td>381</td>
<td>9.6</td>
<td>200</td>
<td>6</td>
</tr>
<tr>
<td>2003</td>
<td>423</td>
<td>10.5</td>
<td>236</td>
<td>6</td>
</tr>
<tr>
<td>2004</td>
<td>375</td>
<td>9.2</td>
<td>222</td>
<td>6</td>
</tr>
<tr>
<td>2005</td>
<td>330</td>
<td>8.0</td>
<td>187</td>
<td>4</td>
</tr>
<tr>
<td>2006</td>
<td>350</td>
<td>8.4</td>
<td>188</td>
<td>5</td>
</tr>
<tr>
<td>2007</td>
<td>283</td>
<td>6.7</td>
<td>152</td>
<td>3</td>
</tr>
<tr>
<td>2008</td>
<td>296</td>
<td>6.9</td>
<td>171</td>
<td>4</td>
</tr>
<tr>
<td>2009</td>
<td>306</td>
<td>7.1</td>
<td>182</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Institute of Environmental Science and Research.

Nearly two-thirds (65%) of TB hospitalisations are in adults. Hospitalisation and mortality rates are highest for adults aged 70 years and over.
## 2.4 Antibiotic resistance

Despite the high proportion of imported cases of TB in New Zealand, multi-drug-resistant TB is not a major problem in New Zealand (see Table 2.3). Multi-drug resistance is resistance to at least the antibiotics isoniazid and rifampicin.

### Table 2.3: Resistance patterns among culture-positive cases of TB notified in 2003–08

<table>
<thead>
<tr>
<th>Resistance</th>
<th>Number (%) of isolates</th>
<th>Resistance pattern&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Number (%) of isolates with each pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully susceptible</td>
<td>1359 (84.5)</td>
<td>H</td>
<td>71 (4.4)</td>
</tr>
<tr>
<td>Resistant to one agent</td>
<td>190 (11.8)</td>
<td>S</td>
<td>66 (4.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Z</td>
<td>49 (3.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>3 (0.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Resistant to two agents</td>
<td>43 (2.7)</td>
<td>HS</td>
<td>36 (2.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HZ</td>
<td>3 (0.2)&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR</td>
<td>2 (0.1)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HE</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZS</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Resistant to three agents</td>
<td>8 (0.5)</td>
<td>HRE</td>
<td>2 (0.1)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HRZ</td>
<td>2 (0.1)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HES</td>
<td>2 (0.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HZS</td>
<td>2 (0.1)</td>
</tr>
<tr>
<td>Resistant to four agents</td>
<td>5 (0.3)</td>
<td>HRES</td>
<td>3 (0.2)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HREZ</td>
<td>1 (0.1)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HEZS</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>Resistant to five agents</td>
<td>3 (0.2)</td>
<td>HREZS</td>
<td>3 (0.2)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Notes:

- H = isoniazid; R = rifampicin; E = ethambutol; Z = pyrazinamide; S = streptomycin.
- Includes 31 of the 34 *Mycobacterium bovis* isolates.
- Includes the remaining 3 *M. bovis* isolates.
- Multi-drug–resistant isolates (that is, resistant to at least isoniazid and rifampicin).

Source: Institute of Environmental Science and Research.
3 Surveillance of Tuberculosis

3.1 Objectives

Notification of cases of TB forms the basis of the surveillance and public health follow-up of cases and contacts. The early identification of TB cases is central to the effective management and control of this disease.

The specific objectives of surveillance are to:

- support the local management of identified cases, contacts and screening programmes
- monitor the incidence and distribution of disease and infection, at both local and national levels
- identify risk factors to support interventions aimed at preventing TB
- monitor the process and outcome of disease control and screening programmes, so that improvements can be introduced
- monitor antibiotic susceptibility of *M. tuberculosis* and *M. bovis* to guide the appropriate use of antibiotics.

TB surveillance is overviewed in Appendix 1.1 at the end of this chapter.

3.2 Definitions of terms used in surveillance

The accurate classification of cases is essential for high-quality surveillance. ESR has produced a manual for public health surveillance in New Zealand, which explains how to complete the TB case report form. For current case definitions and terms, see the ESR website (http://www.surv.esr.cri.nz).

3.3 Notification and data collection

3.3.1 Tuberculosis disease: new cases

A medical practitioner who diagnoses or suspects a case of new or relapsed TB must, under the Tuberculosis Act 1948, notify the case to the local medical officer of health. Notification should be made by telephone or fax. The public health service will liaise with the diagnosing clinician. The clinician must complete the TB case report form. The public health service then enters details of the suspected case into the national TB computerised surveillance database (EpiSurv).

The details entered into EpiSurv are only provisional, since laboratory results and some other surveillance data are not usually available until some time after the initial diagnosis has been made. Once further results are obtained, the database is updated. When a presumptive case is subsequently shown not to meet the case definition, the clinician must notify the medical officer of health, so the record can be de-notified (that is, reclassified as ‘not a case’ in EpiSurv).
3.3.2 Tuberculosis disease: relapse or reactivation

Reactivated cases must be notified or re-notified to the medical officer of health. The TB case report form allows reactivated cases to be clearly distinguished from new cases of disease. Clinicians should record information about previous diagnoses and treatment on the relevant sections of the form. Importantly, the clinician must re-notify cases if treatment is started or the patient is rendered non-infectious and then becomes infectious again (as a result of treatment failure or non-adherence).

3.3.3 Tuberculosis: treatment of latent tuberculosis infection and tuberculosis infection – old disease on preventive treatment

Latent TB infection and TB infection cases are not legally required to be notified. However, clinicians are requested to report every case under treatment, or that is recommended to be under treatment, to the local medical officer of health for surveillance and control purposes (for example, adherence monitoring). The patient should consent to this.

3.3.4 Contacts

Contacts are identified as part of the investigation of cases by public health service staff. Details should be recorded on the summary of contact information form (see Chapter 7).

Where contacts are subsequently identified as cases of TB disease or are commenced on treatment for TB infection, public health service staff should complete a case report form and the data should be entered onto the EpiSurv database.
Appendix 1: 
Tuberculosis Surveillance Information Flows

CLINICAL/DIAGNOSTIC LEVEL

Specimens

Diagnosis and management by clinician

Lab results and reminder to notify

Laboratory investigation

Case notifications

Consultation regarding case management

Suspected cases referred

Suspected cases detected in the community

LOCAL PUBLIC HEALTH LEVEL

Case management (disease and infection)

Screening programmes

Contact investigation

TB disease and infection database

Identified contacts

TB contact database

Anonymised case and contact data

NATIONAL PUBLIC HEALTH LEVEL

Provision of isolation and sensitivity data on cases

National TB database (ESR:Health)

Analysis of national data

Reporting

Ministry of Health

KEY:  
☐ TB control activity  
☐ TB database  
☐ information flows

Guidelines for Tuberculosis Control in New Zealand 2010
Chapter 1: Epidemiology and Surveillance of Tuberculosis in New Zealand
References


