

# Tuberculosis

This factsheet updates an earlier LAIA factsheet, 92/5, which included data up to 1990. In this factsheet, we have included more background information about tuberculosis and updated and expanded the data presented to include the whole of the UK to 2004. All our sources for the data are listed at the end.

## What is tuberculosis?

Tuberculosis (TB) is a chronic, curable infectious disease caused by bacteria of the *Mycobacterium tuberculosis* complex. The great majority of cases are due to *Mycobacterium tuberculosis* itself. The rarer variants, *M. bovis* and *M. africanum* cause an identical illness and account for about 1% of TB in the UK. A careful distinction needs to be drawn between *infection* with TB bacteria and active *disease* due to TB (see below).

In 1993, the World Health Organisation (WHO) declared TB to be a global health emergency, and their current estimate is that one third of the world's population is infected with tuberculosis. In 2003 there were 8.8 million new cases of active TB and 1.75 million deaths attributed to tuberculosis. This makes it one of the top infectious disease killers in the world, along with acute respiratory infections, HIV/AIDS, diarrhoeal diseases and malaria. TB is a leading cause of death among people with HIV. One of the United Nations Millennium Development Goals is to halve TB prevalence and death rates by 2015. In the UK, TB declined substantially through the twentieth century but the number of cases has risen in recent years particularly in London.

## Spread of infection & disease progression

Tuberculosis is a contagious disease and spreads when an individual with active TB of the lungs coughs, sneezes or spits. Bacteria are released into the air and can be inhaled by others and so the primary site of the infection is usually the lungs. This primary infection (when the individual is exposed to the TB organism) is usually asymptomatic and most people are unaware that they have been infected. The majority will recover from this infection but about 10% of those infected will go on to develop clinical tuberculosis. About 5% become ill over the course of weeks or months and another 5% become ill later in life through the re-activation of previously dormant bacteria. The chances of both direct progression to active disease and of reactivation of latent infection are greatly increased by impaired immunity. It is very rare for children with TB disease to be infectious and they tend to catch TB from adults with active respiratory TB.

The lungs and respiratory system are the commonest site for active disease. Pulmonary tuberculosis means TB of the lungs alone and respiratory tuberculosis refers to TB of the lungs and/or associated tissues such as the pleura and intrathoracic lymph nodes. Spread may also occur to other parts of the body, both at the time of the primary infection or later. This is known as non-respiratory tuberculosis. Lymph node TB is the commonest form of non-respiratory TB, and other less common sites include the gut, the kidneys, the bones and the brain. Up to 50% of patients with HIV co-infection or from non-white ethnic groups can present with non-respiratory disease.

## Symptoms and diagnosis

The first symptoms of active tuberculosis disease are often dismissed as the effects of a cold or 'flu - the individual may get tired easily, feel slightly feverish or cough frequently. Other symptoms include fever, night sweats, loss of appetite and weight loss. In the UK, general awareness of TB is low and so people often do not seek the advice of a doctor until they have pronounced symptoms, such as haemoptysis (coughing up blood from the lungs). Pulmonary tuberculosis is usually diagnosed by chest X-ray and/or sputum analysis (microscopy and culture); serological tests are increasingly available. Not all cases are confirmed bacteriologically, often because no samples (or inappropriate samples) are submitted to the laboratory. However the presence of TB bacilli in the sputum ("open TB") in adults poses a risk of cross-infection. Children who have just presented with pulmonary TB have very low infectivity.

## Risk Factors

The risk of contracting TB increases with the frequency of contact with people who have open pulmonary disease. Other risk factors include crowded or unsanitary living conditions and poor nutrition. Infants, the elderly, and individuals who are immunocompromised (for example, those with AIDS, those undergoing chemotherapy or those on long-term steroid treatment) are at higher risk of disease progression and reactivation of dormant disease.

**Treatment**

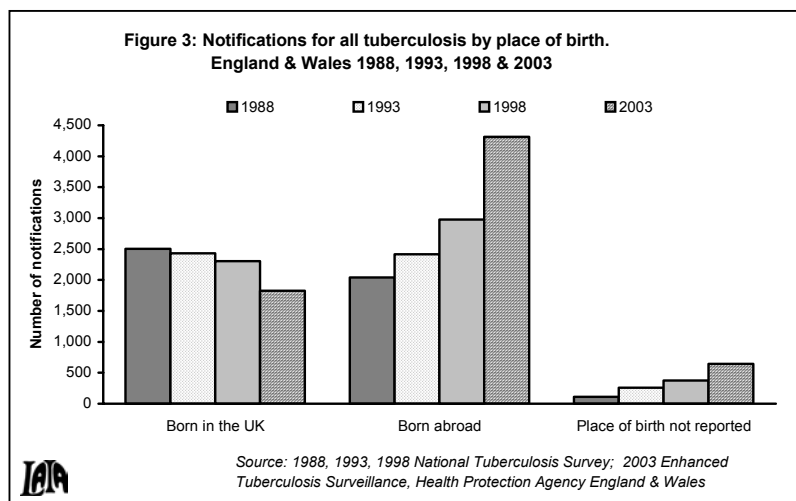
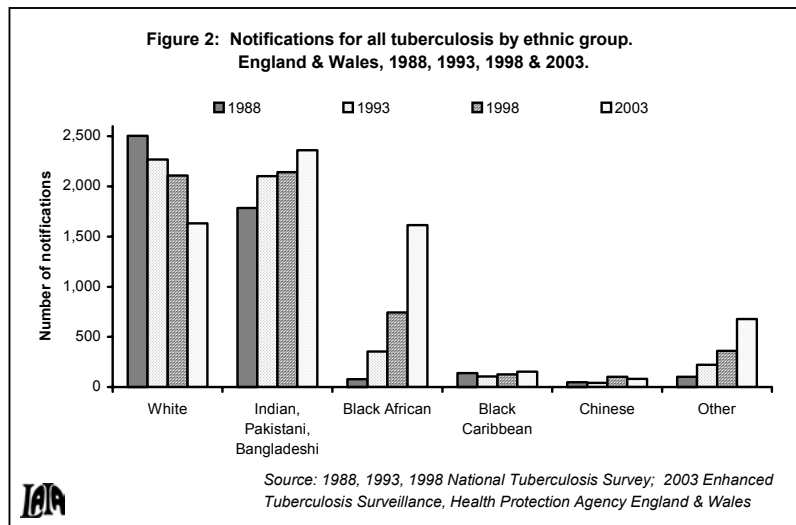
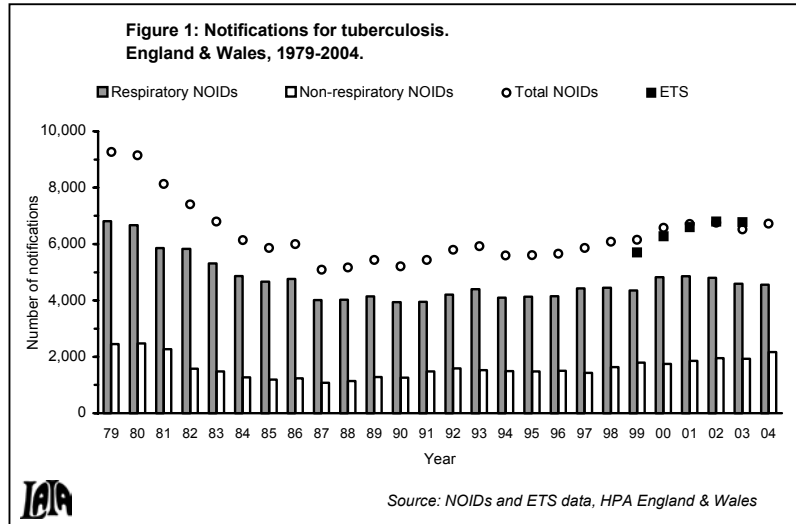
To treat TB, a combination of drugs is taken for at least six months. The first line drugs used are isoniazid, rifampicin, pyrazinamide and ethambutol, which all have common side-effects. Modern anti-TB drugs are very effective and most treated TB patients are not infectious. Patients may begin to feel better after a few weeks of treatment and might stop taking their medication. However, it is very important that the drugs are taken for the time prescribed as incomplete treatment of TB infections can contribute to the emergence of drug-resistant strains of bacteria

**Notifications**

Tuberculosis has been a statutory notifiable disease in England and Wales since 1912. All cases of clinical TB (confirmed and suspected) should be notified through the Notifications Of Infectious Diseases system (NOIDs). In 1999, the Enhanced Tuberculosis Surveillance (ETS) system was started, replacing the five-yearly National TB surveys. The ETS collects more detailed information on reported tuberculosis cases. For the first few years, the numbers of cases notified through NOIDs exceeded those notified through ETS, until 2002 when ETS recorded more cases than NOIDs. The Health Protection Agency (HPA) recommend that the more recent NOIDs data are interpreted with caution (see Appendix 1).

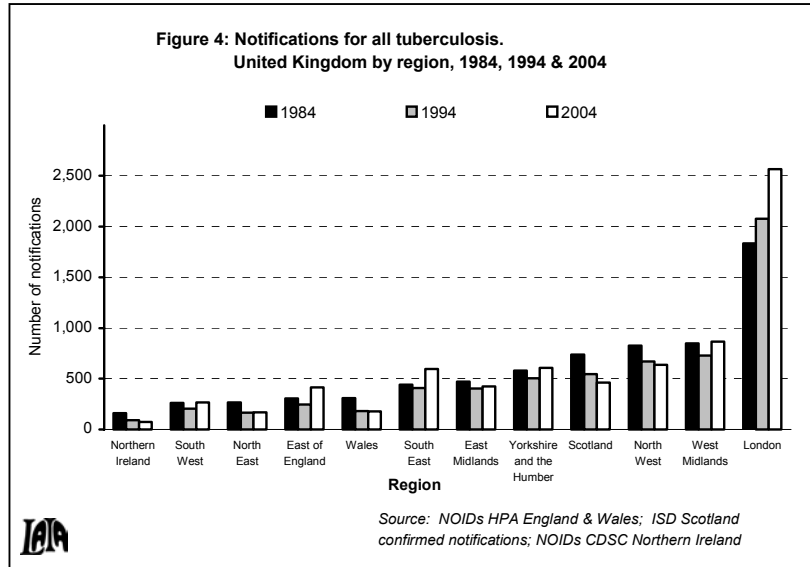
Figure 1 shows the trends in NOIDs notifications since 1979 and ETS notifications since 1999 in England & Wales. The numbers of NOIDs notifications declined in the early 1980s, but have been increasing again since the early 1990s: there were 6,723 notifications in 2004. The number of cases notified through the Enhanced Tuberculosis Surveillance has also increased and totalled 6,780 in 2003 (2004 figures are not yet available). Figure 1 also shows the differences between respiratory and non-respiratory TB over the same period – non-respiratory TB currently accounts for about 30% of all notifications.

The Enhanced Tuberculosis Surveillance system collects more detailed demographic information. Figure 2 shows the changes over time in confirmed cases of all tuberculosis for different ethnic groups. In 1988, there were 2,504 cases (54% of all new cases for that year) in the white ethnic group; this had fallen to 1,631 cases (25%) in 2003. In comparison, the numbers of cases have increased among the other ethnic groups. Black Africans represent many more cases in 2003 (25%) than in 1988 (1.7%). There has also been an increase in the number of TB cases amongst those not born in the UK, up from 2,043 (44%) in 1988 to 4,315 (64%) in 2003 (figure 3).



**Regional variations**

The sharpest increases in TB notifications have been seen in London (figure 4). The pattern is mixed across the rest of the country, with some regions experiencing an increase in notifications and some a decrease. In London, the notification rate for all TB rose from 23.6 per 100,000 in 1990 to 39.4 per 100,000 in 2001 and is currently 34.6 per 100,000 in 2004. (Similar rates for pulmonary TB in London are 16.2 per 100,000 in 1990, 25 per 100,000 in 2000 and 19.9 per 100,000 in 2004.) There is also variation between the London boroughs: in 2003, 14 out of 33 London boroughs had rates for all TB of over 40 per 100,000.

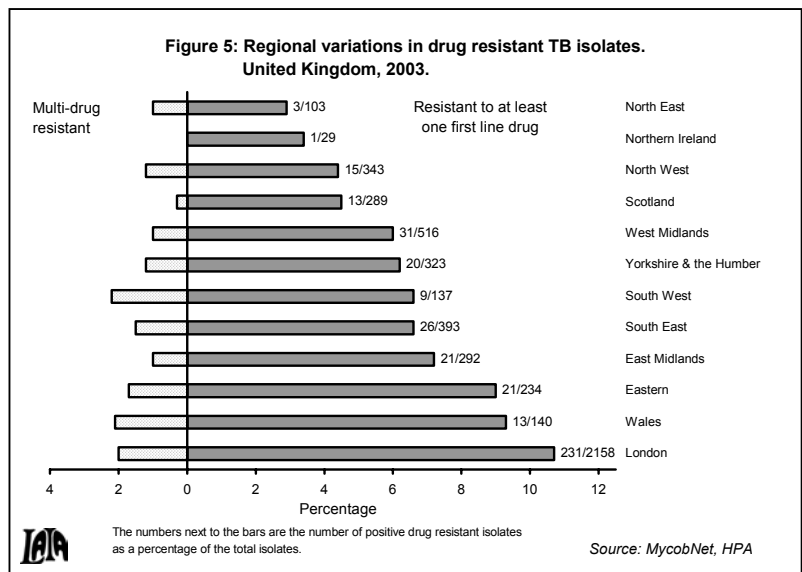


The report on TB in London published by the Communicable Disease Surveillance Centre (CDSC) in 2002 lists some possible reasons for this increase in London:

- Changing patterns of immigration – four out of five people with TB in London, where country of birth is known, are born outside the UK.
- Increased opportunities for international travel – exposure to TB in high incidence countries.
- Homelessness – a strong risk factor for TB, along with alcohol and other substance misuse.
- HIV – about 10% of London's TB cases are likely to be co-infected with HIV.
- An ageing population – older age increases the opportunities for reactivation for those exposed earlier in life

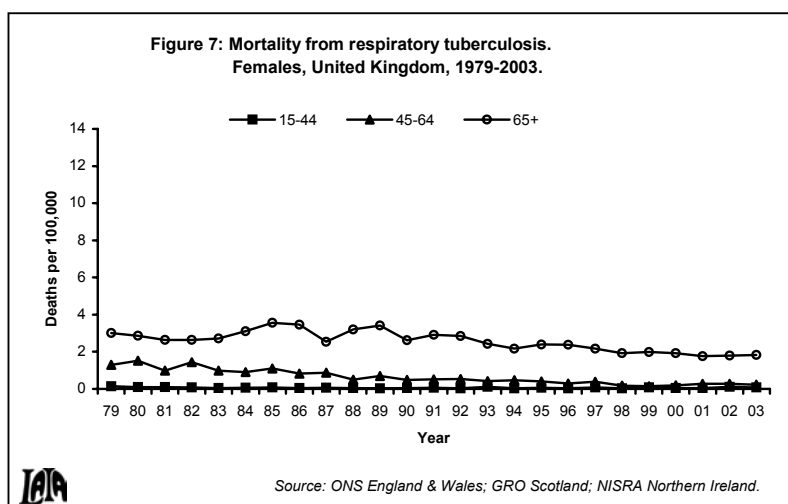
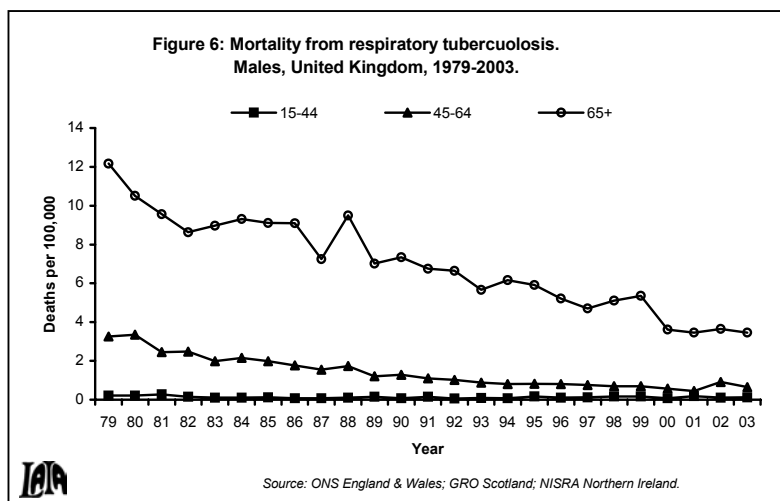
**Drug resistant tuberculosis**

In 1994, MycobNet was set up to monitor TB drug resistance in the UK. The Communicable Disease Surveillance Centre (CDSC, based at HPA) collates information on drug sensitivity for all cases of tuberculosis confirmed by culture at different Reference Centres throughout the UK. In 2003, 7.3% of isolates were resistant to isoniazid and 2.0% to rifampicin, the most commonly used drugs to treat tuberculosis. Multi-drug resistant tuberculosis, where the strain is resistant to more than one drug, is also an emerging problem: 2.1% of isolates were resistant to both of these drugs in 2003. Figure 5 shows the regional variation in drug-resistant isolates in 2003. Resistance to at least one first line drug varied from 10.7% (231/2158) in London to 2.9% (3/103) in the North East. Only Northern Ireland reported no multi-drug resistant isolates in 2003



### Trends in mortality

Figures 6 and 7 show trends in the mortality rates in the UK from respiratory TB for the period 1979-2003 for males and females (see Appendix 2 for the ICD codes used). (Figures 8 and 9 present the same data on a log scale – see [www.laia.ac.uk](http://www.laia.ac.uk).) In males aged over 45, rates declined through the 1980s and 1990s and are currently around 4 per 100,000 in the 65+ age-group and 0.65 per 100,000 in the 45-64 age-group. Rates in the 15-44 age-group have remained relatively low and stable over the same period and are currently 0.12 per 100,000. Rates have always been lower in females, and have also decreased over time. Rates are currently 1.8 per 100,000 in the 65+ age-group, 0.23 per 100,000 in the 45-64 age-group and 0.01 per 100,000 in the 15-44 age-group.



### Summary

- Tuberculosis is a curable infectious disease. It most commonly affects the lungs, but it can also spread to other parts of the body.
- It is thought that one third of the world's population is currently infected with TB.
- In the UK, the total number of notifications for tuberculosis has been increasing since the early 1990s. London has seen the sharpest increases.
- Notifications differ by ethnic group: numbers have been falling in the white ethnic group, and Black Africans represent a growing proportion.
- Resistance to common first line drugs is increasing.
- Deaths attributed to tuberculosis in the UK have declined in the past twenty years.

**Appendix 1: NOIDS and ETS**

The speed of the Notifications Of Infectious Diseases system helps in detecting possible outbreaks and epidemics. Known problems with NOIDs include failure to de-notify suspected cases which turn out not to be TB, duplicate reports and failure to notify some cases. Despite these, a review of NOIDs carried out in 1993 found that the number of notified cases of TB was a fair estimate of the disease incidence in England & Wales. The greater detail of the Enhanced Tuberculosis System gives a wider clinical and epidemiological picture and also helps to provide an annual corrected analysis of reports. It is thought that in some areas NOIDs reporting has reduced, due in part to the introduction of ETS. The advantages of the ETS system are that it can exclude duplicate reports and those cases which are subsequently found not to be TB, but final numbers for a particular year are usually not available for at least 12 months. However, it is thought to provide a more accurate estimate of TB incidence than the NOIDs data.

**Appendix 2: ICD codes for deaths**

All deaths are coded to the International Coding of Diseases (ICD). In this factsheet deaths coded under ICD revisions 9 and 10 have been used. The following ICD codes were used :

Respiratory TB: ICD9 10-12 and 137 (late effects); ICD10 A15, A16 and B90.9 (late effects).

All TB: ICD9 10-18 and 137 (late effects); ICD10 A15-A19 and B90 (late effects)

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**Sources**

The data presented in this factsheet are all available in the public domain and most are available from the websites listed below or from annual reference volumes published by the same organisations.

**Notifications**

England & Wales and Northern Ireland: [Health Protection Agency \(HPA\)](#)

Scotland: [Scottish Health Statistics](#)

Northern Ireland: [Communicable Disease Surveillance Centre Northern Ireland](#)

**Mortality**

England & Wales: Office for National Statistics annual mortality reference volumes and website [National Statistics Online](#)

Scotland: Annual reports of the Registrar General for Scotland and website [The General Register Office for Scotland](#)

Northern Ireland: Annual reports of the Registrar General for Northern Ireland and website [The Northern Ireland Statistics and Research Agency \(NISRA\)](#)

Population estimates were obtained from the same websites.

**Other websites with information or data about tuberculosis**

There are many websites with information and data on tuberculosis and some are listed below. Searching on 'tuberculosis' in a search engine will bring up many others!

[British Lung Foundation](#)

[British Thoracic Society](#)

[TB alert](#)

[European TB surveillance](#)

[World Health Organisation TB information](#)

[Stop TB partnership](#)

[Division of Tuberculosis Elimination \(America\)](#)

**Acknowledgements**

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