Introduction

Tuberculosis (TB) is an infectious disease caused by the bacteria *Mycobacterium Tuberculosis*, which is spread by airborne droplets. The risk of infection depends upon duration of exposure, the intensity of the exposure, and the immune status of the person exposed.

The immune system clears the bacteria immediately in more than 80% of people exposed.[1] In a small proportion of people who have been infected, the bacteria are walled off and remain dormant but viable. This is called latent TB. It is estimated that 5-10% of those with latent TB will develop active TB during their lifetime.

The most infectious form of TB is pulmonary TB, particularly smear positive cases where TB bacilli can be seen on direct examination of the sputum. Left untreated, it is estimated that each person with active TB will infect on average between 10 and 15 people each year.[2]

Epidemiology of TB

Global TB

TB is a disease of poverty affecting young adults in their most productive years and is an increasing world-wide problem. More than two billion – one third of the world's total population – are infected with TB bacteria.

The World Health Organization (WHO) has estimated that globally, there were 9.4 million new cases of TB in 2009, including 1.1 million cases among people infected with HIV.[3] Most of the new TB cases in 2009 occurred in south-east Asia, African and western Pacific regions.

It is estimated that in 2009, 3.3% of all new TB cases had multi-drug resistant TB (MDRTB). HIV infection is the most important factor contributing to the increased incidence of TB since 1990. In 2009, an estimated 11%-13% of new cases of TB were HIV positive.[3] Globally, 1.7 million people died from TB in

2009, including 380,000 women. The vast majority of TB related deaths are in the developing world.

TB in the UK

There were 9,040 cases of TB in the UK in 2009 – the highest number in the UK for nearly 30 years, giving an overall rate of 15 cases per 100,000 population in the UK.[4] Most of the cases occurred in England (92%), followed by Scotland with 5%, Wales with 2% and Northern Ireland 1%. The rate of TB was highest in London which had 38% of all UK cases.

The number of new drug resistant TB cases has nearly doubled in the past 10 years – from 206 cases in 2000 to 389 cases in 2009. Most of the cases were young adults aged 15-44 year (60%) and non-UK born (73%).

The rates of TB in the non-UK born are 20 fold higher (around 86 per 100,000) than those born in the UK (around 4 per 100,000). The majority of non-UK born cases were diagnosed two or more years after arrival in the UK. Approximately 1 in 10 cases had at least one social risk factor (homelessness, drug or alcohol misuse or imprisonment), with a quarter reporting more than one risk factor.[4]

TB in Northern Ireland

There were 69 cases of TB reported in Northern Ireland in 2007, giving a rate of 3.9 per 100 000 population.[5] TB rates in Northern Ireland are approximately three times lower than for England and Wales, and significantly lower than in the Republic of Ireland. The distribution of TB cases across the former Health and Social Care Board areas in 2007 was as follows:

Eastern 29 cases
Southern 18 cases
Northern 11 cases
Western 11 cases

TB surveillance information in 2010 indicates an increasing proportion of cases occurring in the Southern Trust area – 34% of all TB cases in 2010, compared with 26% in 2007.

In Northern Ireland the highest proportion of cases occurred in the 25–34 year age group for men, and 35–44 year age group for women. The highest age-specific rate for both male and female patients was in those aged over 75 years. Of the TB notifications in Northern Ireland in 2007, 65% were pulmonary TB; of these 93% were confirmed by culture and 55% were sputum smear positive at the time of diagnosis.

Since 2004, there have been 10 cases of drug resistant TB in Northern Ireland. Most of the cases appear to have acquired the infection outside of Northern Ireland but there is also evidence of transmission of drug resistant TB within the community here.

While the incidence rates of TB in Northern Ireland remain substantially lower than those reported from the rest of the UK and the Republic of Ireland, the apparent transmission of drug resistant TB underlines the need for vigilance and prompt action when required. There were three pulmonary cases of MDRTB in 2007.[5] There were two cases of drug resistant TB reported in Northern Ireland between 2008 and 2010.

The proportion of TB cases in Northern Ireland who were born outside the UK or Ireland has continued to increase in recent years. An estimated 53% of total cases notified in 2007 were born outside of the UK or Ireland compared with 38% of cases in 2006. The ages of TB cases born outside the UK or Ireland are significantly lower than those born within UK or Ireland.

The PHA receives notification from port health about new entrants intending to come to Northern Ireland via Heathrow and Gatwick airports. In 2010, the PHA received reports of 298 people through this system. This arrangement does not include people travelling from other EU countries. The highest proportions of new entrants were from India (32%), China (24%), Nigeria (7%)

and Philippines (6%).

The intended Trust areas of arrival for the new entrants were as follows: 168 to Belfast Trust area, 54 to Northern Trust area, 31 to South Eastern Trust area, 23 to Western Trust area and 14 to Southern Trust area. Intended area of arrival was not known for eight new entrants.

From TB perspective, these countries have higher incidence of TB than Northern Ireland and people from these countries will require additional health services in relation to TB prevention and control. The annual incidence of TB in China is 96 per 100,000 population, 295 per 100,000 population in Nigeria, 168 per 100,000 population in India and 280 per 100,000 in the Philippines.[3]

It has been estimated by the Northern Ireland Statistics and Research Agency that between mid-2008 and mid-2009, 12,700 people came to live in Northern Ireland from outside the United Kingdom.[6] Birth registration data show that the proportion of children born in Northern Ireland whose mother was born outside the United Kingdom and Ireland has risen three fold over the last eight years.

In 2001, 3% of babies had foreign born mothers (700 babies out of 22,000) while in the first six months of 2010 this rose to 10% (1,300 babies out of 12,700).[6] In 2009, there were estimated to be 39,000 people of A8 central and eastern European background living in Northern Ireland. The A8 countries are Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. The percentage of residents with A8 background is highest in Dungannon (8%), Craigavon (4%) and Newry and Mourne (4%).[6]

Some A8 countries have higher incidence of TB. The annual incidence of TB in the A8 countries is as follows: Czech Republic (8.8 per 100,000), Estonia (33 per 100,000), Hungary (18 per 100,000), Latvia (45 per 100,000), Lithuania (71 per 100,000), Poland (25 per 100,000), Slovakia (13 per 100,000) and Slovenia (12 per 100,000).[3]

TB in Republic of Ireland

There were 465 case of TB reported in the Republic of Ireland in 2006, corresponding to a rate of 11 per 100,000 population.[7] The incidence of TB was higher in males than females: 60.2% of cases were male. Since 1998, the number of foreign born cases has tripled. In 2006, the incidence of TB among the indigenous population was 8.3 per 100,000 compared with 26.3 among foreign born. Most (83.2%) of the foreign born cases reported in the Republic of Ireland were aged between 15 and 44 years.

Evidence, challenges and opportunities

Stop TB Strategy

Efforts to control TB globally are led by the World Health Organization as part of the *Stop TB Strategy,* with the aim to dramatically reduce the burden of TB by 2015.[8] While the focus of this strategy is on countries with much higher TB incidence than here, many of the key components and objectives of the strategy are also applicable to Northern Ireland, including:

- achieve universal access to high quality care for all people with TB;
- support development of new tools and enable their timely and effective use;
- secure political commitment with adequate sustained financing;
- protect vulnerable populations from TB, TB/HIV and multidrug resistant TB;
- empower people with TB, and communities through partnership.

The *Stop TB Strategy* has identified advocacy, social mobilisation and community participation as components of an effective approach to prevent and control TB. The strategy also recommends promotion of the Patients' Charter for Tuberculosis Care.[9]

The Patients' Charter

The Patients' Charter was developed to encourage empowerment and positive partnership between TB patients and health care providers to achieve

a better outcome.[9] It identifies rights and responsibilities of patients with TB. Patients' rights include care, dignity, information, choice, confidence, justice, organisation and security. Patient's responsibilities are identified as sharing information, following treatment, contributing to community health and showing solidarity.

Berlin Declaration

In 2007, 49 European Governments signed the *Berlin Declaration* to prioritise TB control across the region, noting with concern that TB has re-emerged as an increasing threat to health security in the WHO European Region.[10]

The following priorities were identified in the *Berlin Declaration*:

- universal access to the *Stop TB Strategy;*
- civil society and affected communities should be considered essential partners in and integrated into TB control;
- prioritised, sustained and targeted local, national and international funding;
- TB control should be given high priority in national development plans
- better use should be made of currently available effective tools;
- TB should be integrated into HIV treatment and care programmes;
- special efforts should be made to ensure that highly vulnerable documented and undocumented migrant and other populations have access to culture-sensitive services providing quality care for TB;
- greater partnership and coordination across health, penitentiary and social services should be promoted.

European Framework Action Plan

At European level, a *Framework Action Plan* was developed by the European Centre for Disease Prevention and Control (ECDC) in 2008.[11] The ECDC framework identified eight key areas for strategy development:

- TB control commitment, TB awareness and capacity of health systems
- surveillance
- laboratory services
- prompt and quality TB care for all
- MDR- and XDRTB
- TB/HIV co-infection
- new tools for TB control
- build partnership and collaboration with countries

NICE guidance

The current operational approach to TB in Northern Ireland is based on the guidance produced by National Collaborating Centre for Chronic Conditions in 2006. The NICE guidance provides specific recommendations in relation to clinical management, prevention and control based on systematic review of available evidence. The key components of TB prevention, treatment and control have been identified as:

- diagnosing and treating latent TB infection;
- diagnosing and treating active TB;
- screening contacts of cases and people from high incidence countries;
- identification and management of drug resistant TB;
- provision of BCG vaccination for people in at-risk groups;
- maintenance of high quality surveillance arrangements.

Service framework

In 2009, a *Service Framework for Respiratory Health and Wellbeing* was issued by the DHSSPS, which included a range of TB-related targets addressing: screening and vaccination, infection control, individualised treatment plans and management by specialised services .[12] The specific TB-related targets in the framework are detailed in Appendix 1.

There is also specific guidance issued by DHSSPS in 2009 for occupational health screening of health care workers before they have clinical contact with

patients to ensure they are free from TB disease, with immunisation where appropriate.[13]

A regional TB group was established in 2010 to develop an action plan for TB in Northern Ireland. The group includes representatives from the PHA, Trusts, primary care and the Patient Client Council. Membership of the group and terms of reference are detailed in Appendices 2 and 3. The action plan has been developed by the group to take forward the TB-related activities between 2011 and 2013.

The challenges faced implementing this action plan will include:

- securing adequate resources;
- providing appropriate health and social care to people from countries with higher incidence of TB;
- responding to the threat from increasing global problem of drug resistant TB;
- ensuring that TB services include appropriate provision of HIV testing;
- identifying barriers to TB-related services among disadvantaged and vulnerable groups;[14]
- ensuring that TB services are of high quality to protect health of individuals and the community.

The action plan also offers significant opportunities to improve arrangements for prevention, treatment and control of TB through coordination of activities. New laboratory techniques are likely to improve timeliness of diagnosis and identification drug sensitivity for new cases.

There is also an opportunity to develop an integrated approach to TB, involving the PHA, Trusts and Primary Care along with voluntary and other related organisations. In the *Director of Public Health Annual Report 2010*, three key measures were identified:[15]

- early identification a, diagnosis and treatment of new cases of TB are the most important measures for prevention and control.

- all suspected cases of TB should be referred for urgent assessment by the designated TB physicians within each Trust.

- TB is a notifiable disease and clinicians are required to report all confirmed or suspected cases to the PHA duty room to enable appropriate public health measures.

Systematic monitoring of through a process of TB Cohort Review will be used to develop and maintain an effective response.[16]

References

1. Tuberculosis, Clinical diagnosis and management of Tuberculosis, and measures for its prevention and control.(Guidelines for NHS by NICE, 2006).

2. Tuberculosis. Fact Sheet No.14. World Health Organisation November 2010.

3. Global TB Control 2010. World Health Organisation, 2010.

4. TB in the UK. Report on TB surveillance in the UK 2010. Health protection Agency, 2010.

5. Epidemiology of TB in Northern Ireland. Annual Surveillance report 2007. Public Health Agency 2010.

6. Migration Statistics for Northern Ireland (2009). Northern Ireland Statistics & Research Agency, 2010.

7. Guidelines on the Prevention and Control of TB in Ireland 2010. Health Protection Surveillance Centre (Dublin), 2010.

8. Tuberculosis (TB). The Stop Strategy. Vision, goal, objectives and targets. The Stop Strategy One-page summary. World Health Organisation 2006

9. The Patient's Charter for Tuberculosis Care. Patient's rights and responsibilities. World Care Council, 2006

10. The Berlin Declaration on Tuberculosis. All against Tuberculosis, WHO Ministerial Forum. World Health Organisation, 2007

11. Framework Action Plan to Fight Tuberculosis in the European Union. European Centre for Disease Prevention and Control. Stockholm 2008

12. Service Framework for Respiratory Health and Wellbeing. DHSSPS, 2009 (AMCC2302). (Appendix 1)

13. Health clearance for TB (TB), Hepatitis B, Hepatitis C and HIV: New Healthcare Workers with Direct Clinical Contact with Patients. DHSSPS, HSS(MD) 22/2009

14. Addressing Poverty in TB Control. Options for National TB Control Programmes. World Health Organisation, 2005

15. Director of Public Health Annual Report 2010. Public Health Agency, Belfast 2011

16. Understanding the TB Cohort Review Process. An Instruction Guide. CDC, 2006.

17. Control of Tuberculosis in Northern Ireland – updated guidance. HSS(MD)10/2006. DHSSPS, 2006.

18. Immunisation against infectious disease. Department of Health. London, 2006 and updates from www.dh.gov.uk/greenbook

.

.