Health Protection Surveillance Centre

Report on the Epidemiology of Tuberculosis in Ireland 2004

Epidemiology of Tuberculosis in Ireland 2004

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Introduction

The World Health Organization (WHO) has estimated that globally, there were 8.9 million new cases of tuberculosis (TB) in 2004, of which 3.9 million were smear positive. Approximately 2 million TB deaths occurred in 2004.[1]

In 2004, 414,163 cases of TB were notified by 51 countries of the WHO European region to EuroTB.[2] The overall notification rate was 47.0 cases per 100,000 population with very diverse epidemiological situations evident across the region. Figure 1 displays a map of TB notifications rates in the WHO European region.

The lowest rate in the region occurred in Western Europe (EU countries plus Andorra, Iceland, Israel, Monaco, Norway, San Marino and Switzerland) at 12.6/100,000. The overall notification rate in 2004 was 26% lower than in 1997. Rates were lower than 10 per 100,000 in 16 countries and higher than 20 per 100,000 in the Baltic States – Lithuania (73), Latvia (69) and Estonia (44), as well as Portugal (37), Poland (25) and Hungary (24). In the EU and Western Europe, 66% of cases were nationals of the country of report, 29% were of foreign origin, reaching 40% or more in 16 countries. Multi-drug resistance remained more frequent in the Baltic States with a mean of 19% (country range: 18 to 20%) compared to 2% (0 to 5%) in the other countries.

The eight Balkan countries in Central Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, F.Y.R. of Macedonia, Romania, Serbia and Montenegro, and Turkey) reported 62,609 cases of TB in 2004, corresponding to an overall notification rate of 50.7/100,000. The notification rate was much higher in Romania (146 per 100,000) than in other countries (range 19 to 61 per 100,000). Drug resistance data from all countries (not available for Turkey) indicated low levels of drug resistance except in Bulgaria and Romania (combined MDR: 5 to 6%).

In 2004, 291,288 cases were reported from Eastern Europe (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Rep. of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan), of which 52% were from the Russian Federation. The Russian Federation is the only European country which features in the WHO list of 22 high TB-burden countries in the world. The overall notification rate in Eastern Europe was 104.7/100,000 and increased by 41% between 1997 and 2004. Data on drug resistance in recent years suggest high levels of MDR in most countries in this region.

In Ireland, national epidemiological data on TB have been collated by the Health Protection Surveillance Centre (HPSC) since 1998. From January 2000, this information has included enhanced surveillance data items based on the minimum dataset reported to EuroTB. The resulting National Tuberculosis Surveillance System (NTBSS) was set up following consultation with the eight health boards and the National TB Advisory Committee. The National TB Advisory Committee was reconvened in October 2004.

This report presents an epidemiological review of all TB cases notified in 2004. Data for 2004 have been validated and updated to include information relating to treatment outcome. Provisional data for 2005 are presented in Appendix 1.

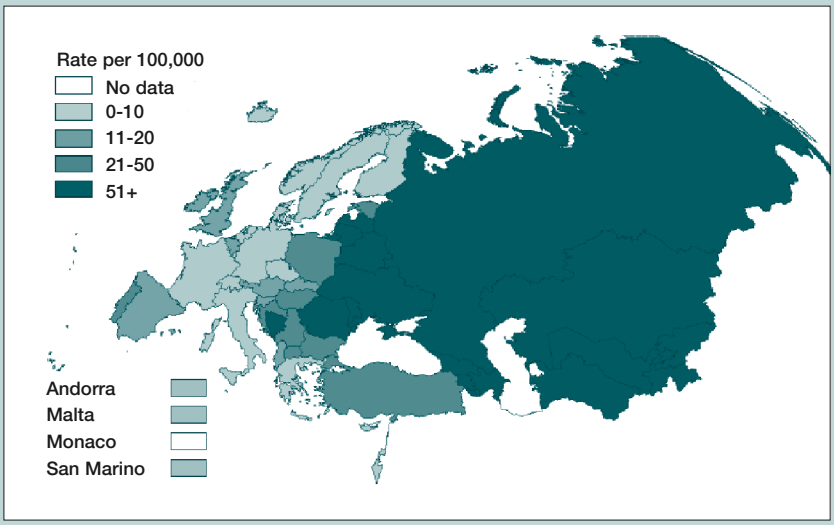

Figure 1: Tuberculosis notification rates per 100,000 population, WHO European region, 2004

Case Definitions

The case definitions used for the analyses described in this report were those recommended by the National TB Working Party (1996).[3]

A notified case of TB referred to clinically active disease due to infection with organisms of the *Mycobacterium tuberculosis* complex (*M. tuberculosis, M. bovis, M. africanum, M. microti, M. canetti*). Active disease was presumed if the patient was commenced on a full curative course of anti-tuberculosis chemotherapy. Persons placed on chemoprophylaxis for preventive treatment or infected by *Mycobacterium* other than *M. tuberculosis* complex were not included as cases.

A definite case of tuberculosis was a case with culture-confirmed disease due to *M. tuberculosis* complex.

An other than definite case met both of the following conditions: (1) it was the clinician's judgement that the patient's clinical and/or radiological signs and/or symptoms were compatible with tuberculosis *and* (2) the physician took the decision to treat the patient with a full course of anti-tuberculosis therapy.

Pulmonary TB was defined as a laboratory-confirmed case - either a positive smear, histology or culture - with or without radiological abnormalities consistent with active pulmonary TB *or* a case where the physician took the decision that the patient's clinical symptoms and/or radiological signs were compatible with pulmonary TB. The WHO defines pulmonary TB, for the purpose of analysis, as any case that has a pulmonary disease component.

Extra-pulmonary TB was defined as a patient with a smear, culture, or histology specimen, from an extra-pulmonary site that was positive for *M. tuberculosis* complex *or* a case with clinical signs of active extra-pulmonary disease in conjunction with a decision taken by the attending physician to treat the patient with a full curative course of anti-tuberculosis chemotherapy.

Pulmonary and extra-pulmonary TB was a case of tuberculosis that met the previous two definitions.

Smear positive case was defined as a patient with at least two sputum specimens positive for acid-fast bacilli by microscopy; *or* a patient with at least one sputum specimen positive for acid-fast bacilli and radiographic abnormalities consistent with active tuberculosis; *or* a patient with at least one sputum specimen positive for acid-fast bacilli, which is culture positive for *M. tuberculosis*.

A recurrent case was defined as a patient with a documented history of TB prior to their 2004 notification.

Multi-drug resistance (MDR) was defined as resistance to at least isoniazid and rifampicin with or without resistance to ethambutol and streptomycin.

Extensively Drug Resistant TB (XDR-TB)[6] is defined as a TB strain resistant to at least isoniazid and rifampicin (MDR) that is also resistant to any fluoroquinolone, and to at least one of three injectable second-line anti-TB drugs used in TB treatment (capreomycin, kanamycin and amikacin).

Methods

Data collection

An enhanced TB notification form was completed by public health doctors for each case of TB notified in 2004. These forms summarise all available clinical, microbiological, histological and epidemiological data. Forms were then collated in the regional departments of public health, where data were entered onto an Epi2000 database (NTBSS). Each HSE area provided finalised 2004 data with outcome information to HPSC in early to mid 2006. Data were validated with each area and national data were collated. Provisional 2005 data were obtained from each area in August 2006.

Data analysis

National TB data from 1992 to 1997 were provided by the Department of Health and Children (DoHC). National TB data from 1998 onwards were obtained from the NTBSS system.

Rates for 1991, 1992 and 1993 are based on the 1991 population census; rates for 1994, 1995, 1996, 1997, 1998 and 1999 are based on the 1996 population census and rates for 2000, 2001, 2002, 2003, 2004 and 2005 are based on the 2002 population census. For the calculation of rates in the indigenous and foreign born population, population data were taken from table 29A, volume 4 of the 2002 census, 'persons usually resident in each province and county, and present in the state on census night, classified by country of birth'. The indigenous population was defined as those persons who were born in Ireland.[4]

Direct methods of standardisation were used to allow comparison of rates between geographical areas using the 2002 Irish population as the standard population. In order to compare rates between groups of interest, 95% confidence intervals were used.

Three-year moving averages were calculated by applying the formula (a+2b+c)/4 to each three successive points a, b and c (each letter representing a year) in the series. They are useful for smoothing irregularities in trend data and make it easier to discern long-term trends that otherwise might be obscured by short-term fluctuations.

Results: TB cases in Ireland, 2004

Overall cases and rates

There were 432 cases of TB notified in 2004. This represents a rate of 11.0/100,000 population. A summary of the 2004 data is shown in table 1.

Table 1: Summary of the epidemiology of TB in Ireland, 2004

Parameter	Number
Total number of cases	432
Crude notification rate per 100,000	11.0
Cases in indigenous population*	290
Cases in foreign-born persons*	129
Culture positive cases	279
Smear positive pulmonary cases	136
Multi-drug resistant cases	2
Mono-resistant to isoniazid	12
Deaths attributable to TB	5
Outcomes reported in cases	364
TB meningitis cases	6

**Country of birth not available for 13 cases*

The number of TB cases notified for each of the years from 1991-2004 is shown in table 2. Crude incidence rates from 1991 to 2004 with three-year moving averages are also shown in table 2.

Table 2: Notified cases of TB in Ireland 1991-2004 with crude rates per 100,000 population and 3-year moving averages 1992-2003

Year	Number of cases	Crude rate per 100,000 population	3-year moving average
1991	640	18.2	
1992	604	17.1	612
1993	598	17.0	581
1994	524	14.5	526
1995	458	12.6	469
1996	434	12.0	436
1997	416	11.5	423
1998	424	11.7	433
1999	469	12.9	439
2000	395	10.1	410
2001	381	9.7	391
2002	408	10.4	401
2003	407	10.4	414
2004	432	11.0	

Crude incidence rates by HSE area

The total number of TB cases in each HSE area is shown in table 3 with crude incidence rates and 95% confidence intervals included. The highest crude rate was reported in HSE East at 13.5/100,000 population. The next highest rates were reported in HSE Midwest (13.0), HSE South (12.6) and HSE West (11.6). HSE Midlands had the lowest rate at 4.0/100,000 population. The rates in HSE Midlands and HSE Northeast were significantly lower than the national rate.

The crude incidence rates seen in each HSE area from 1992 to 2004 are shown in table 4 while the 3-year moving average TB notification rates for each HSE area from 1992 to 2003 are shown in table 5.

Table 3: Notified TB cases by HSE area, 2004

HSE Area	Cases	Crude Rate per 100,000	95% CI for rate
HSE E	189	13.5	11.6-15.4
HSE M	9	4.0	1.4-6.6
HSE MW	44	13.0	9.1-16.8
HSE NE	23	6.7	3.9-9.4
HSE NW	16	7.2	3.7-10.8
HSE SE	34	8.0	5.3-10.7
HSE S	73	12.6	9.7-15.5
HSE W	44	11.6	8.2-15.0
Ireland	**432**	**11.0**	**10.0-12.1**

Table 4: Crude TB incidence rates per 100,000 population by HSE area, 1992-2004

Year	HSE E	HSE M	HSE MW	HSE NE	HSE NW	HSE SE	HSE S	HSE W	Total
1992	16.1	18.7	20.9	10.0	15.9	12.3	21.4	22.2	17.1
1993	11.9	10.8	16.1	10.0	37.5	16.7	23.9	23.0	17.0
1994	12.9	14.6	17.3	11.4	9.0	11.0	17.4	22.7	14.5
1995	11.9	8.8	15.1	8.5	11.4	9.5	20.5	11.1	12.6
1996	8.7	8.3	17.7	12.1	7.1	6.9	22.5	13.1	12.0
1997	9.9	9.2	12.6	9.1	10.4	12.8	16.5	11.1	11.5
1998	11.7	4.9	14.8	9.5	9.0	8.9	14.3	15.3	11.7
1999	13.9	7.3	17.0	8.2	9.0	7.9	13.7	19.9	12.9
2000	10.2	7.1	13.8	6.1	4.1	9.7	13.8	10.0	10.1
2001	12.3	3.1	7.1	11.0	5.9	4.7	12.4	8.9	9.7
2002	11.6	8.4	9.4	7.0	5.4	11.6	13.3	8.7	10.4
2003	11.9	5.3	12.4	7.5	4.1	8.3	16.0	6.0	10.4
2004	13.5	4.0	13.0	6.7	7.2	8.0	12.6	11.6	11.0

Table 5: 3-year moving average TB notification rate per 100,000 population by HSE area, 1992-2003

Year	HSE E	HSE M	HSE MW	HSE NE	HSE NW	HSE SE	HSE S	HSE W	Total
1992	14.7	16.1	20.3	10.1	20.2	12.6	21.7	26.0	17.3
1993	13.2	13.7	17.6	10.4	24.9	14.2	21.6	22.7	16.4
1994	12.4	12.2	16.5	10.3	16.7	12.0	19.8	19.9	14.6
1995	11.3	10.1	16.3	10.1	9.7	9.2	20.2	14.5	12.9
1996	9.8	8.6	15.8	10.5	9.0	9.0	20.5	12.1	12.0
1997	10.1	7.9	14.4	10.0	9.2	10.3	17.4	12.6	11.7
1998	11.8	6.6	14.8	9.1	9.4	9.6	14.7	15.4	11.9
1999	12.4	6.6	15.7	8.0	7.8	8.6	13.9	16.3	11.9
2000	11.7	6.2	12.9	7.8	5.8	8.0	13.4	12.2	10.7
2001	11.6	5.4	9.3	8.8	5.3	7.7	13.0	9.1	10.0
2002	11.8	6.3	9.6	8.1	5.2	9.0	13.7	8.1	10.2
2003	12.2	5.8	11.8	7.2	5.2	9.0	14.5	8.1	10.6

Age and sex distribution

There were 257 (59.5%) cases of TB notified in males in 2004 and 175 (40.5%) in females, giving a male to female ratio of 1.5:1. Table 6 gives the breakdown of notified TB cases by sex and HSE area.

In 2004, the mean age of cases was 44.0 years (range 2 years to 95 years). Age was not reported for one case. One hundred and twenty two cases (28.2%) were aged between 25 and 34 years and 93 cases (21.5%) were aged 65 years and over. Table 7 describes the age-specific rates for males and females in 2004. Rates in males were higher than females in all age groups. Figure 2 shows the cases by age and sex and the male and female age-specific rates in Ireland for 2004.

Table 6: TB cases by HSE area and sex, 2004

HSE Area	Males	Females	Male:female ratio
HSE E	111	78	1.4
HSE M	6	3	2.0
HSE MW	26	18	1.4
HSE NE	10	13	0.8
HSE NW	10	6	1.7
HSE SE	22	12	1.8
HSE S	47	26	1.8
HSE W	25	19	1.3
Ireland	**257**	**175**	**1.5**

Table 7: Age-specific TB rates per 100,000 population for males and females, 2004

Age Group (years)	Male	Female	Total
0-14	1.4	1.0	1.2
15-24	11.1	7.9	9.5
25-34	21.7	17.8	19.8
35-44	12.5	8.1	10.3
45-54	12.4	5.0	8.7
55-64	16.3	9.2	12.8
65+	28.0	16.6	21.6
Total	**13.2**	**8.9**	**11.0**

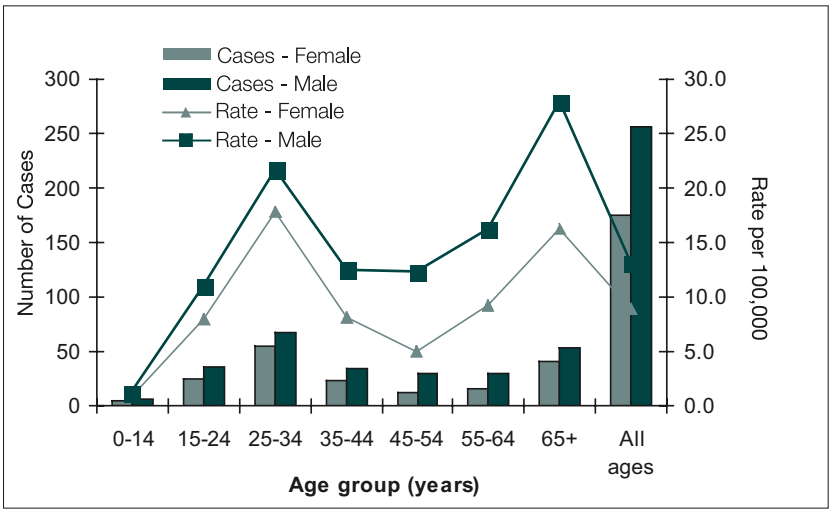

*Figure 2: Cases of TB by age and sex, and age-specific rates per 100,000 population, 2004**

**Age was not reported in one case*

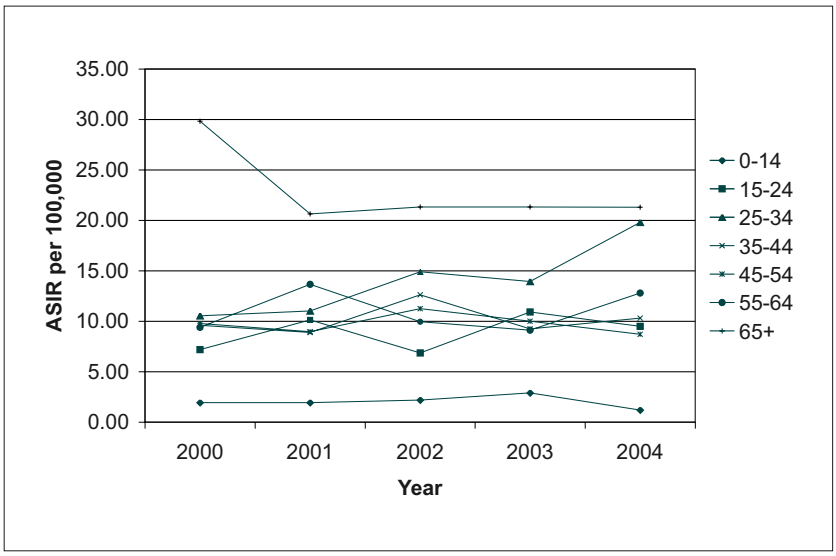

Figure 3: Age-specific rates of TB by year, 2000-2004

Age-standardised TB incidence rates by HSE area, county and CCA

Age-standardised TB incidence rates for each HSE area are presented in figures 4 and 5 (figure 4 includes 95% confidence intervals).

The highest age-standardised TB incidence rates were seen in HSE East at 13.3/100,000 population, followed by HSE Midwest (13.0) and HSE South (12.6). HSE Midlands reported the lowest age-standardised rates at 4.1/100,000 population which was significantly lower than the national age-standardised incidence rate (10.3/100,000 population).

Age-standardised incidence rates for each county are shown in table 8 and figure 6 (95% confidence intervals are included in table 8). Dublin had a significantly higher rate (15.0) than the national figure (11.0). Counties with significantly lower incidence rates than the national rate were Wicklow (2.9), Laois (1.7) and Wexford (1.6). No cases were notified from Cavan.

Crude incidence rates for each community care area (CCA) are shown in table 9. Three-year moving averages for the crude incidence rates are presented in table 10. In 2004, the highest crude rates per

Table 8: Age-standardised TB incidence rates per 100,000 population by county with 95% confidence intervals, 2004

County	ASIR per 100,000	95% CI
Roscommon	21.6	9.0-34.1
Dublin	15.0	12.7-17.2
Waterford	14.9	7.4-22.5
Limerick	14.3	8.7-20.0
Cork	13.5	10.0-16.9
Monaghan	11.5	2.2-20.7
Clare	11.5	5.0-18.0
Carlow	11.0	1.4-20.6
Galway	11.0	6.5-15.5
Tipperary North‡	10.8	2.7-18.8
Kerry	10.6	5.0-16.1
Louth	9.1	3.2-15.1
Kildare	8.1	3.2-13.0
Kilkenny	7.8	1.5-14.0
Mayo	7.7	2.6-12.8
Tipperary South‡	7.2	1.4-13.0
Sligo	6.8	0.1-13.4
Donegal	6.6	2.5-10.8
Meath	6.1	1.9-10.3
Leitrim	6.0	0.0-14.4
Westmeath	5.7	0.1-11.3
Offaly	4.9	0.0-10.5
Wicklow	2.9	0.0-6.1
Laois	1.7	0.0-5.0
Wexford	1.6	0.0-3.9
Cavan	-	-
Ireland	**11.0**	**10.0-12.1**

‡ The overall rate for Tipperary was 8.8 per 100,000 population

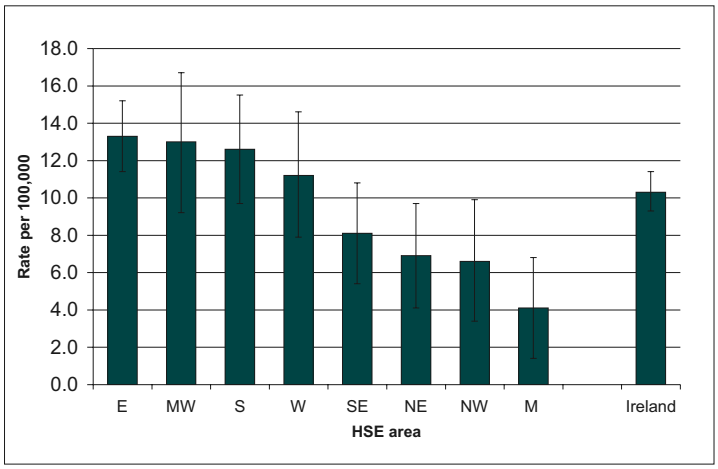

*Figure 4: Age-standardised TB incidence rates per 100,000 population by HSE area with 95% confidence intervals, 2004**

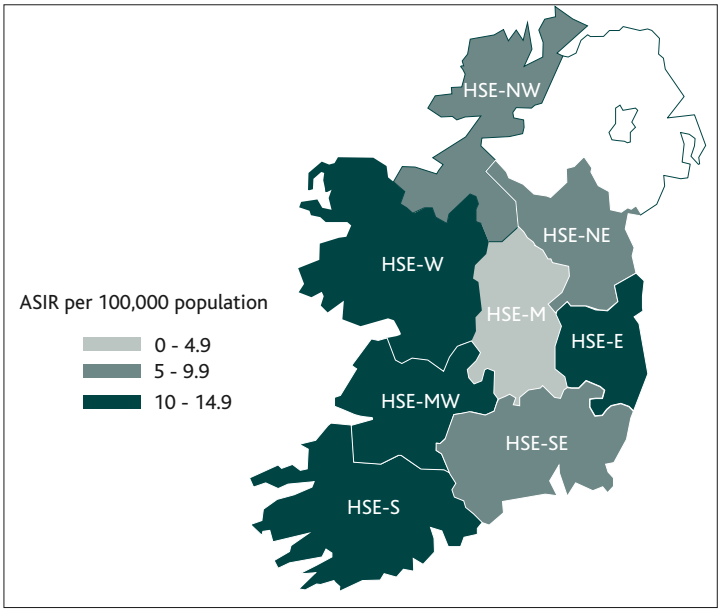

Figure 5: Age-standardised TB incidence rates per 100,000 population by HSE area, 2004

100,000 population were in CCA7 (26.1), CCA3 (23.8) and CCA5 (21.5) in HSE East and Roscommon (22.3) in HSE West. The highest 3-year moving average rates between 2001 and 2004 were in CCAs 3, 5, 6 and 7 in HSE East, Waterford in HSE Southeast, and North and South Lee in HSE South.

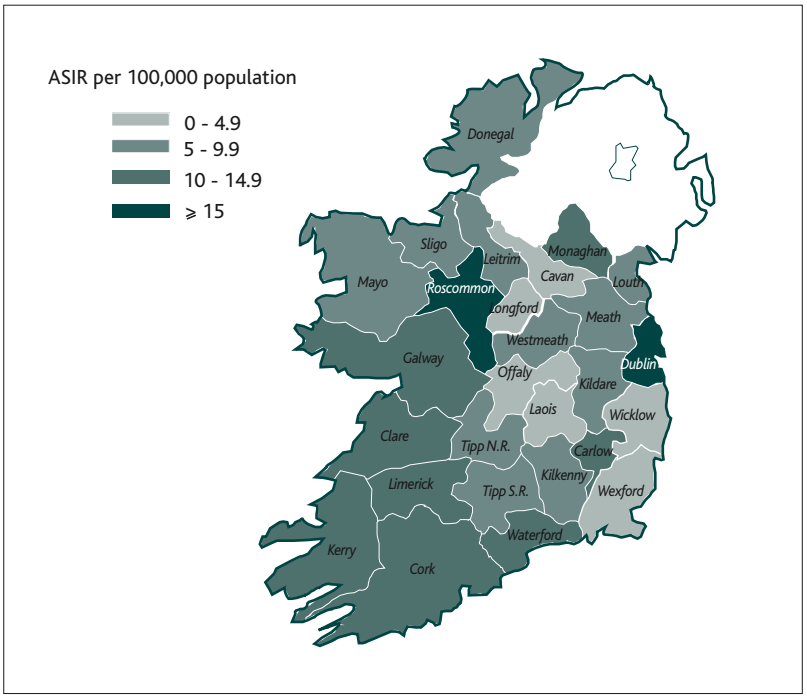

Figure 6: Age-standardised TB incidence rates per 100,000 population by county, 2004

Table 9: Crude incidence rate per 100,000 by community care area (CCA)[1], 2000 to 2004

HSE area	CCA	Rate per 100,000 population				
		2000	2001	2002	2003	2004
HSE E	**Total**	**10.2**	**12.3**	**11.6**	**11.9**	**13.5**
	1	5.4	2.3	4.7	4.7	9.3
	2	13.3	5.7	7.6	7.6	11.4
	3	7.7	26.1	21.5	23.0	23.8
	4	6.9	8.2	7.5	10.3	8.2
	5	11.9	10.3	18.3	19.1	21.5
	6	16.8	18.7	23.0	17.4	14.9
	7	18.8	27.8	18.8	21.2	26.1
	8	10.8	11.8	5.4	4.9	12.3
	9	5.0	5.0	7.8	8.4	6.2
	10	5.0	8.0	1.0	5.0	3.0
HSE M	**Total**	**7.1**	**3.1**	**8.4**	**5.3**	**4.0**
	Longford/Westmeath	8.7	6.8	7.8	7.8	4.9
	Laois/Offaly	5.7	0.0	9.0	3.3	3.3
HSE MW	**Total**	**13.8**	**7.1**	**9.4**	**12.4**	**13.0**
	Clare	11.6	5.8	9.7	6.8	11.6
	Limerick[2]	na	na	na	na	na
	Tipperary Nth/East Limerick[2]	na	na	na	na	na
HSE NE	**Total**	**6.1**	**11.0**	**7.0**	**7.5**	**6.7**
	Cavan/Monaghan	3.1	16.7	6.3	10.4	5.2
	Louth/Sth Monaghan	11.4	8.8	10.5	9.6	8.8
	Meath	3.7	9.0	4.5	3.7	6.0
HSE NW	**Total**	**4.1**	**5.9**	**5.4**	**4.1**	**7.2**
	Donegal	2.9	3.6	4.4	2.9	7.3
	Sligo/Leitrim	5.9	9.4	7.0	5.9	7.0
HSE SE	**Total**	**9.7**	**4.7**	**11.6**	**8.3**	**8.0**
	Carlow/Kilkenny	13.5	8.1	8.1	9.0	8.1
	Tipperary Sth	10.7	2.4	4.7	9.5	8.3
	Waterford	12.6	7.2	23.3	11.7	14.4
	Wexford	2.6	0.9	8.6	3.4	1.7
HSE S	**Total**	**13.8**	**12.4**	**13.3**	**16.0**	**12.6**
	Kerry	8.3	6.8	10.6	12.1	10.6
	North Cork	21.8	9.5	15.0	10.9	13.6
	North Lee	16.7	21.8	18.6	22.4	16.0
	South Lee	10.7	10.7	12.5	19.7	11.9
	West Cork	13.8	7.9	3.9	2.0	7.9
HSE W	**Total**	**10.0**	**8.9**	**8.7**	**6.0**	**11.6**
	Galway	10.5	10.0	5.7	5.3	11.0
	Mayo	8.5	4.3	10.2	8.5	7.7
	Roscommon	11.2	14.9	16.7	3.7	22.3
Total		**10.7**	**10.4**	**11.1**	**11.1**	**11.7**

[1]In some areas, CCA does not always correspond to county
[2]Rates cannot be calculated for these CCAs as the population in the CCAs is not known

Table 10: 3-year moving average TB notification rate per 100,000 population by CCA[3], 2001 to 2003

HSE area	CCA	3-year moving average		
		2001	2002	2003
HSE E	**Total**	**11.6**	**11.8**	**12.2**
	1	3.7	4.1	5.8
	2	8.1	7.1	8.6
	3	20.3	23.0	22.8
	4	7.7	8.4	9.1
	5	12.7	16.5	19.5
	6	19.3	20.6	18.2
	7	23.3	21.6	21.9
	8	9.9	6.9	6.9
	9	5.7	7.3	7.7
	10	5.5	3.8	3.5
HSE M	**Total**	**5.4**	**6.3**	**5.8**
	Longford/Westmeath	7.5	7.5	7.0
	Laois/Offaly	3.7	5.3	4.7
HSE MW	**Total**	**9.3**	**9.6**	**11.8**
	Clare	8.2	8.0	8.7
	Limerick[4]	na	na	na
	Tipperary Nth/East Limerick[4]	na	na	na
HSE NE	**Total**	**8.8**	**8.1**	**7.2**
	Cavan/Monaghan	10.7	9.9	8.1
	Louth/Sth Monaghan	9.9	9.9	9.6
	Meath	6.5	5.4	4.5
HSE NW	**Total**	**5.3**	**5.2**	**5.2**
	Donegal	3.6	3.8	4.4
	Sligo/Leitrim	7.9	7.3	6.5
HSE SE	**Total**	**7.7**	**9.0**	**9.0**
	Carlow/Kilkenny	9.4	8.3	8.5
	Tipperary Sth	5.0	5.3	8.0
	Waterford	12.6	16.4	15.3
	Wexford	3.2	5.4	4.3
HSE S	**Total**	**13.0**	**13.7**	**14.5**
	Kerry	8.1	10.0	11.3
	North Cork	13.9	12.6	12.6
	North Lee	19.7	20.3	19.9
	South Lee	11.2	13.9	16.0
	West Cork	8.4	4.4	3.9
HSE W	**Total**	**9.1**	**8.1**	**8.1**
	Galway	9.1	6.7	6.8
	Mayo	6.8	8.3	8.7
	Roscommon	14.4	13.0	11.6
Total		**10.6**	**10.9**	**11.2**

[3] In some areas, CCA does not always correspond to county
[4] Rates cannot be calculated for these CCAs as the population in the CCAs is not known

Geographic origin

Of the 432 patients diagnosed with TB in 2004, 290 (67.1%) were born in Ireland, 129 (29.9%) were born outside Ireland and for the remaining 13 cases, the country of birth was unknown. The crude TB rate in the indigenous population was 8.4/100,000 while the crude rate in the foreign-born population was 32.3/100,000.

Figure 7 shows TB cases by geographic origin from 1998 to 2004. Table 11 shows the breakdown of TB cases by HSE area and geographic origin.

Cases born outside Ireland originated from at least 38 countries. Table 12 shows the breakdown of these cases by country of birth and corresponding continent (as specified by EuroTB).[2] The exact country of birth was unknown for 14 of the cases born outside Ireland.

Figure 8 shows the age distribution of cases notified in 2004 by geographic origin. The majority (93.0%) of cases born outside Ireland were aged between 15 and 44 years with a median age of 29.6 years. The median age of those born in Ireland was 50.3 years with 46.4% of the cases aged greater than 55 years.

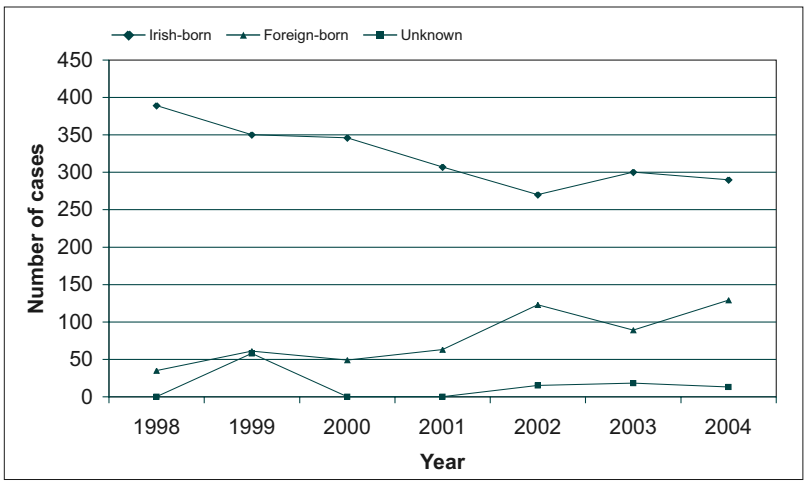

Figure 7: TB cases by geographic origin, 1998 to 2004

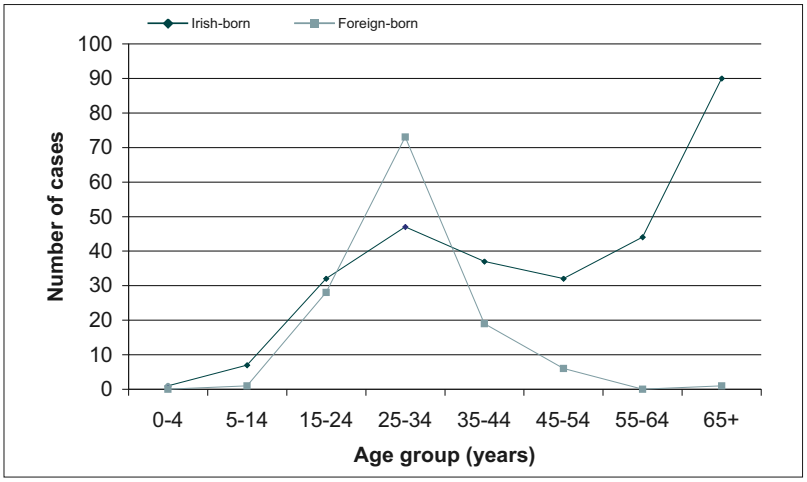

Figure 8: TB cases by age group and geographic origin, 2004

Table 11: Cases of TB by HSE area and geographic origin, 2004

HSE area	Irish-born	Foreign-born	Unknown	Total
HSE E	115	74	-	189
HSE M	5	4	-	9
HSE MW	36	8	-	44
HSE NE	16	4	3	23
HSE NW	15	1	-	16
HSE SE	24	10	-	34
HSE S	53	19	1	73
HSE W	26	9	9	44
Ireland	**290**	**129**	**13**	**432**

Table 12: Countries of origin of foreign-born patients with TB, 2004

Continent	Total	Country	Cases
Europe	**22**	Denmark	1
		France	2
		Germany	1
		Greece	1
		Lithuania	1
		Poland	1
		Portugal	1
		Republic of Moldova	1
		Romania	5
		Serbia and Montenegro	2
		Ukraine	1
		United Kingdom	5
Africa	**47**	Angola	2
		Congo	4
		Egypt	1
		Eritrea	1
		Lesotho	1
		Nigeria	17
		Rwanda	1
		Sierra Leone	2
		Somalia	7
		South Africa	4
		Sudan	2
		Uganda	1
		Zimbabwe	3
		Unknown	1
Asia	**49**	Bangladesh	6
		China	5
		India	17
		Korea	1
		Mongolia	1
		Nepal	2
		Pakistan	7
		Philippines	1
		Sri Lanka	1
		Thailand	2
		Vietnam	1
		Unknown	5
America	**3**	USA	1
		Jamaica	1
		Unknown	1
Unknown	**8**		
Total	**129**		

Site of disease

Of the 432 cases notified in 2004, 274 (63.4%) were pulmonary, 121 (28.0%) were extrapulmonary and 36 (8.3%) were pulmonary and extrapulmonary. For one case (0.2%), the site was unspecified. TB cases by site of disease and HSE area are shown in table 13.

*Table 13: TB cases by site of disease and HSE area, 2004***

HSE Area	Pulmonary		Extrapulmonary		Pulmonary & extrapulmonary	
	Number	%	Number	%	Number	%
HSE E	123	65.1	49	25.9	17	9.0
HSE M	6	66.7	2	22.2	1	11.1
HSE MW	28	63.6	13	29.5	3	6.8
HSE NE	18	78.3	4	17.4	0	-
HSE NW	6	37.5	5	31.3	5	31.3
HSE SE	25	73.5	5	14.7	4	11.8
HSE S	38	52.1	30	41.1	5	6.8
HSE W	30	68.2	13	29.5	1	2.3
Ireland	**274**	**63.4**	**121**	**28.0**	**36**	**8.3**

***Site of disease was unspecified in one case*

Pulmonary TB cases

The WHO defines pulmonary TB, for the purpose of analysis, as any case that has a pulmonary disease component. There were 310 cases reported in 2004 with a pulmonary disease component (71.8% of all cases reported). Sputum smear and culture results for these cases are shown in table 14. Sputum microscopy results were available for 259 (83.5%) of the 310 cases. This is comparable to the figures from 2003 (82.9%) and 2002 (82.6%). Of the 310 pulmonary cases, 140 (45.2%) were sputum positive for AFB by microscopy and 225 (72.6%) were culture positive.

The proportion of pulmonary cases (with or without an extrapulmonary component) was higher in persons born in Ireland (75.5%) compared to those born abroad (63.6%).

Pulmonary smear positive cases

In Ireland in 2003, 136 (43.9%) of the 310 cases with a pulmonary disease component were smear positive.

Table 14: Sputum smear and culture status for pulmonary TB cases, 2004

Culture result	Sputum smear positive	Sputum smear negative	Sputum smear not done	Sputum smear unknown	Total
Culture positive	133	68	20	4	225
Culture negative	1	39	5	3	48
Culture not done	-	-	10	-	10
Culture unknown	6	12	4	5	27
Total	**140**	**119**	**39**	**12**	**310**

Extrapulmonary TB cases

Extrapulmonary TB was diagnosed in 121 (28.0%) cases of whom 53 (47.6%) were culture confirmed. Forty (33.1%) of the 121 cases were histology positive, 20 of which were also culture positive and 20 of which were laboratory confirmed by histology only.

One hundred and fifty seven (36.3%) of the cases reported in 2004 had an extrapulmonary disease component. The extrapulmonary sites reported are shown in table 15. The most frequent sites of extrapulmonary disease reported were pleura (26.1%) and extrathoracic lymph nodes (21.0%). There were six cases of TB meningitis.

Table 15: Extrapulmonary disease sites in notified cases, 2004

Site	Number	Percentage
Pleural	41	26.1
Lymph - extrathoracic	33	21.0
Other	30	19.1
Disseminated	10	6.4
Genitourinary	9	5.7
Lymph - intrathoracic	8	5.1
Meningeal	6	3.8
Bone/joint other than spine	6	3.8
Spinal	5	3.2
Peritoneal	5	3.2
Site not specified	4	2.5
Total	**157**	**100.0**

TB meningitis

There were six cases of TB meningitis reported in 2004 giving an incidence rate of 0.15/100,000 population (1.5/million population). A profile of these cases is provided in table 16. Of the six cases, two were culture confirmed. All cases were greater than 25 years old.

Between 1998 and 2004, a total of 41 cases of TB meningitis have been reported, six in 1998, seven in 1999, six in 2000, two in 2001, six in 2002, eight in 2003 and six in 2004. The cumulative incidence rates of TB meningitis in each HSE area and in Ireland for 1998-2004 are shown in table 17.

Table 16: TB meningitis cases in Ireland, 2004

HSE Area	Age group (years)	History of BCG	Culture Status
HSE E	25-34	No	Negative
HSE E	35-44	Unknown	Unknown
HSE NE	35-44	Unknown	Negative
HSE NE	45-54	Unknown	Positive
HSE S	35-44	Yes	Negative
HSE MW	35-44	Unknown	Positive
Total	**6 cases**		

Table 17: Cumulative incidence rate of TB meningitis in Ireland, 1998-2004

HSE Area	Cases 1998 to 2004	Cumulative incidence rate per 100,000	95% CI
HSE E	16	1.1	0.6-1.7
HSE M	0	-	-
HSE MW	2	0.6	0.0-1.4
HSE NE	6	1.7	0.4-3.1
HSE NW	2	0.9	0.0-2.2
HSE SE	1	0.2	0.0-0.7
HSE S	11	1.9	0.8-3.0
HSE W	3	0.8	0.0-1.7
Ireland	**41**	**1.0**	**0.7-1.4**

Note: Calculations based on 2002 census figures

Bacteriological results

Of the 432 cases notified in 2004, 311 (72.0%) were laboratory confirmed (by culture, microscopy, or histology) and 121 cases were not laboratory confirmed.

Culture
In countries where laboratories capable of identification of *M. tuberculosis* complex are routinely available,a definite case of TB has been defined as a case with culture confirmed disease due to *M. tuberculosis* complex. In 2004, 279 (64.6%) of all TB cases notified were culture positive. This is very similar to the proportion reported in 2003 (64.4%) and is an increase on the percentage reported in 2002 (61.0%) and 2001 (58.8%).

Table 18 shows the breakdown of laboratory-confirmed and culture-confirmed cases by site of disease.

Table 19 shows a breakdown by culture status and HSE area of TB cases notified in 2004.

Table 18: Laboratory-confirmed and culture-confirmed cases of TB by site of disease, 2004

Site of disease	Total	Culture-confirmed	% Culture-confirmed	Laboratory-confirmed	% Laboratory-confirmed
Pulmonary	274	199	72.6	206	75.2
Pulm and extrapulm	36	26	72.2	31	86.1
Extrapulmonary	121	53	43.8	73	60.3
Unknown	1	1	100.0	1	100.0
Total	**432**	**279**	**64.6**	**311**	**72.0**

Table 19: Culture status of TB cases by HSE area, 2004

HSE Area	Culture positive	Culture negative	Culture not done	Culture unknown	Total
HSE E	142	26	8	13	189
HSE M	6	2	-	1	9
HSE MW	23	19	1	1	44
HSE NE	12	5	-	6	23
HSE NW	6	7	2	1	16
HSE SE	22	8	4	0	34
HSE S	47	14	8	4	73
HSE W	21	1	2	20	44
Ireland	**279**	**82**	**25**	**46**	**432**

Species

Among the 279 culture-confirmed cases, information on species was reported for 273 (97.8%) of the cases. Of the 279 culture-confirmed cases, 268 (96.1%) were *M. tuberculosis* and five (1.8%) were *M. bovis.* No cases of *M. africanum* were reported in 2004.

Antibiotic resistance

Information on the results of sensitivity testing was reported for 266 (95.3%) of the 279 culture-confirmed cases. Of the 268 *M. tuberculosis* isolates, resistance was documented in 22 cases (5.1% of total cases), including two cases of multi-drug resistant TB (MDR-TB) (representing 0.5% of total cases). One of the MDR-TB cases was resistant to isoniazid and rifampicin and the other was resistant to isoniazid, rifampicin and ethambutol. There were no cases of extensively drug resistant TB (XDR-TB) notified in 2004. Mono-resistance to isoniazid was recorded in 12 cases, mono-resistance to rifampicin in three cases, to ethambutol in one case, to pyrazinamide in one case, and to streptomycin in two cases. One further case was resistant to both isoniazid and streptomycin. Thirteen of the 22 (59.1%) drug resistant cases, including one of the MDR-TB cases, were born outside Ireland. A profile of resistant cases in 2004 is shown in table 20.

Table 20: Sensitivity results of drug resistant TB cases in Ireland, 2004

Diagnosis	Isolate	Isoniazid	Rifampicin	Pyrazinamide	Ethambutol	Streptomycin
Pulmonary	M.TB	+	+	-	+	-
Pulmonary	M.TB	+	+	-	-	-
Extrapulmonary	M.TB	+	-	-	-	+
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	+	-	-	-	-
Extrapulmonary	M.TB	+	-	-	-	-
Pulmonary	M.TB	-	+	-	-	-
Extrapulmonary	M.TB	-	+	-	-	-
Extrapulmonary	M.TB	-	+	-	-	-
Extrapulmonary	M.TB	-	-	+	-	-
Pulm + Extrapulm	M.TB	-	-	-	+	-
Pulmonary	M.TB	-	-	-	-	+
Extrapulmonary	M.TB	-	-	-	-	+

(+ indicates resistance)

Treatment outcome

Outcome was recorded for 364 (84.3%) of the 432 cases notified in 2004. Of the 364 cases, 283 completed treatment, 35 were recorded as being lost to follow up, 24 died, treatment was interrupted in 11 cases, and 11 cases were still on treatment at time of reporting. Of the 24 deaths reported, five (1.2% of total cases) were attributed to TB.

Outcome was reported for 121 of the 136 smear positive cases. Of the 121, 99 completed treatment, 12 were lost to follow up, treatment was interrupted in four cases, four died and two were still on treatment at the time of reporting. Of the four deaths among smear positive cases, one was attributed to TB.

Of the 22 drug resistant cases, 16 completed treatment while one case was still on treatment, one case was lost to follow up, treatment was interrupted in one case and treatment outcome was unknown in three cases. Of the two MDR-TB cases, one case had completed treatment and one case was still on treatment.

Details on treatment outcome for all cases and for smear positive cases only are shown in table 21.

Table 21: Treatment outcome for all cases and smear positive cases, 2004

Treatment outcome	Total cases		Smear positive cases	
	Number	%	Number	%
Completed treatment	283	65.5	99	72.8
Lost to follow up	35	8.1	12	8.8
Treatment interrupted	11	2.5	4	2.9
Still on treatment	11	2.5	2	1.5
Died (attributed to TB)	5	1.2	1	0.7
Died (not attributed to TB)	19	4.4	3	2.2
Outcome unknown	68	15.7	15	11.0
Total	**432**	**100.0**	**136**	**100.0**

Case ascertainment

Table 22 summarises the method by which cases notified in 2004 were found.

Table 22: Method of case finding, 2004

Case found by	Total	Percentage
Presenting as case	331	76.6
Contact tracing	28	6.5
Immigrant screening	4	0.9
Other screening	13	3.0
Other	22	5.1
Unknown	34	7.9
Total	**432**	**100.0**

Previous history of TB

Thirty six (8.3%) of the 432 cases were reported to have a previous history of TB with previous year of diagnosis provided for 27 cases. The year of diagnosis ranged from 1920 to 2003 with 13 of the 27 cases (48%) of the cases reported to have had TB in the previous ten years.

HIV Status

Of the 432 cases, 13 were reported as being HIV positive. However, information on HIV status was not provided or was unknown for 408 of the cases notified in 2004.

Discussion

This is the seventh national report produced by HPSC on the epidemiology of TB in Ireland. The report is based on data from the enhanced national TB surveillance system (NTBSS 2000) which became operational in all HSE areas in Ireland in January 2000. The new system is based on the minimum dataset required by EuroTB (www.eurotb.org).

In 2004, 432 cases of TB were notified to HPSC giving a national crude incidence rate of 11.0/100,000 population. This rate is slightly higher than the rate in 2003 and 2002, which was 10.4/100,000. However, it remains lower than the crude incidence rates reported between 1991 and 1999, which ranged from 11.5/100,000 to 18.5/100,000. The overall notification rate in countries of the EU which reported to EuroTB was 12.8/100,000 in 2004, ranging from 3.6/100,000 in Cyprus to 73.0/100,000 in Lithuania.[2]

Differences in age-standardised TB incidence rates persist between HSE areas with HSE East having the highest rate in 2004 followed by HSE Midwest and HSE South. HSE Midlands had the lowest rate in 2004, followed by the HSE Northeast. Examining the HSE Eastern area in greater detail reveals that certain community care areas (CCAs), in particular CCAs 3, 5, 6 and 7, have consistently high rates of TB. Between 25 to 33% of the population in these CCAs belong to social class 6 and 7 (see Appendix 2 for descriptions of social class).[4] Rates greater than 20/100,000 were reported from CCAs 3, 5 ,7 (HSE East) and Roscommon (HSE West) in 2004. In the HSE Southern area, there are high rates in both North and South Lee. Roscommon had very low rates in 2003 at 3.4 per 100,000.

The highest age-specific rate in 2004 occurred among those aged 65 years and over (21.6/100,000 population). This was similar to the rate observed in this age group in 2003, 2002 and 2001. There were 10 cases in children under 15 years of age in 2004 giving a rate of 1.2/100,000. This is a decrease from the rate in 2003 (2.9) and 2002 (2.2). Between 2000 and 2004, the age-specific rate among the 25-34 year age group increased from 10.5 to 19.8 per 100,000 population. There was a notable difference in age between those born in Ireland and those born outside Ireland. In cases born in Ireland, there was a peak among those aged greater than 64 years with a median age of 50 years. In cases born outside Ireland, the peak occurred in those aged 25-34 years old with a median age of 30 years. There were 73 foreign born cases out of a total of 122 (60%) in the 25-34 year age group in 2004 compared to 40 foreign born cases out of a total of 86 (47%) in this age group in 2003. Where available, data from other countries in the EU and Western Europe show similar trends with the highest rates in nationals aged greater than 64 years and the highest rates in foreign born cases in the 25-34 year age group.[2]

Rates among males were higher than females for all age groups. The highest rate among males was among those aged 65 years and over (28.0/100,000) while the highest rate among females was among those aged 25 to 34 years old (17.8/100,000). The male to female ratio (1.5:1) reported in 2004 was comparable with the rate reported in 2003 (1.6:1).

Thirty percent of TB cases notified in 2004 were born outside Ireland. This compares to 21.9% in 2003, 30.1% in 2002 and 16.5% in 2001. In 2004, among countries in the EU and Western Europe who reported data to the EuroTB network, 29% of notifications were in foreign born patients. In the United Kingdom, France, Germany and Belgium, where crude incidence rates are similar to those reported in Ireland, the percentage of cases of foreign origin in 2004 ranged from 44 to 61%.[2] The crude rate of TB notifications in the indigenous population was 8.4/100,000 population compared to a rate of 7.7/100,000 population in 2003.

There were six cases of TB meningitis in 2004, giving a rate of 0.15/100,000 population. All cases of TB meningitis reported in 2004 were aged between 25-54 years. Between 1998 and 2004, four cases of TB meningitis were reported among 0-4 year olds. The Report of the Working Party on Tuberculosis (1996),[3] recommends that the cessation of neonatal BCG vaccination should be considered if certain criteria are met. The criteria for discontinuation of BCG vaccination and how they apply to Ireland are outlined in Appendix 3. [5]

In 2004, 279 of all cases of TB notified (64.6%) were culture positive. This is very similar to the proportion in 2003 (64.6%) and is an increase on the proportion in previous years (61.0% in 2002 and 58.8% in 2001). One hundred and thirty six pulmonary cases were smear positive.

There were 22 drug resistant cases notified in 2004, including two cases of MDR-TB. There were no cases of extensively drug resistant TB (XDR-TB) notified to HPSC in 2004. Multi-drug resistant cases and cases resistant to isoniazid represented 0.5% (2 cases) and 3.5% (15 cases) of total cases respectively. This compares to 0.3% and 2.7% respectively in 2003. In 2004, combined multi-drug resistance and mean combined isoniazid resistance were 19% and 32% respectively in the Baltic States and 2% and 8% respectively in the 15 other countries in the EU and Western Europe.

Drug resistance is an issue that needs to be kept under close surveillance especially with the emergence of XDR-TB. In September 2006, WHO expressed concern over the emergence of XDR-TB and called on countries to strengthen and implement measures to prevent the global spread of these virulent drug resistant strains of TB. In this context, WHO recommends strengthening of basic TB care and public health infrastructures to prevent the emergence of drug-resistance, increased collaboration between HIV and TB control programmes and increased investment in laboratory infrastructure to enable better detection and management of resistant cases of TB. [6]

In recent years, the quality of the data, and in particular data on treatment outcome, has improved greatly. In 2004, information on treatment outcome was provided for 84.3% of cases which is very similar to the proportion in 2003 (84.8%). This compares to 77.2% in 2002 and 59.8% in 2001. It is of critical importance to TB control in Ireland that surveillance of TB and reporting of outcome data be maintained at a high level.

The Global Plan to Stop TB 2006-2015 was launched in January 2006 and aims to reduce the global prevalence of and deaths due to TB by 50% in 2015 relative to 1990. In addition, it proposes to eliminate TB as a public health problem (<1 case per million population) by 2050. This strategy calls on countries to strengthen health systems for TB treatment and control and to address MDR-TB, TB/HIV and other challenges e.g. high risk groups and areas where TB rates are high.[7] The importance of good surveillance data cannot be underestimated in this context as it will help guide where resources should be directed in order to ensure effective control of TB in Ireland and in order to reach the elimination target by 2050.

Conclusions

There was a slight increase in TB case notifications in 2004 compared to 2003 and 2002.

A regional variation was noted in the TB notification rates ranging from 4.0/100,000 in HSE Midlands to 13.5 per 100,000 in HSE East.

Certain community care areas in HSE East (CCA 3, 5 and 7) and Roscommon in HSE West reported rates greater than 20/100,000 in 2004.

The highest age-specific rate in 2004 occurred among those aged greater than 64 years.

The age-specific rate among 25-34 years olds was 19.8/100,000 compared to 10.5/100,000 in 2000.

Rates were higher in males than females for all age groups. The highest rate among males was in those aged greater than 64 years while the highest rate among females was among those aged 25-34 years.

In 2004, 30% of cases were born outside Ireland compared to 21.9% in 2003 and 30.1% in 2002.

There was a notable difference in age between those born in Ireland (median age 50.3 years) and those born outside Ireland (median age 29.6 years).

In 2004, 310 of the TB cases had a pulmonary disease component of which 225 were culture positive and 136 were smear positive.

There were six cases of TB meningitis in 2004. All cases were aged between 25 and 54 years.

Treatment outcome data were provided for 84.3% of cases, a similar proportion to 2003. Treatment was completed for 283 of the cases notified in 2004 and there were 24 deaths reported (five attributable to TB).

There were 22 drug resistant cases notified in 2004. Of the 22, 15 were resistant to isoniazid, including two MDR-TB cases. There were no cases of extensively drug resistant TB (XDR-TB) notified to HPSC in 2004.

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Appendix 1: TB Cases Notified in Ireland in 2005, Provisional Data[Ψ]

There were 461 cases of TB provisionally notified in 2005. It is important to note that these data are provisional and **may change significantly following validation**.

A summary of the data is shown in table 23.

Table 23: Provisional summary of the epidemiology of TB in Ireland, 2005

Parameter	2005
Total number of cases	461
Crude notification rate per 100,000	11.8
Cases in indigenous population	288
Cases in foreign-born persons	142
Culture positive cases	205
Smear positive pulmonary cases	132
Monoresistance to isoniazid	3
Multi-drug resistant cases	3
TB meningitis cases	8

Crude incidence rates by HSE area
The total number of TB cases in each HSE area is shown in table 24 with crude incidence rates and 95% confidence intervals included.

Table 24: Provisional TB cases in each HSE area, 2005

HSE Area	Cases	Crude rate per 100,000	95% CI for rate
HSE E	195	13.9	12.0-15.9
HSE M	16	7.l	3.6-10.6
HSE MW	58	17.1	12.7-21.5
HSE NE	14	4.1	1.9-6.2
HSE NW	15	6.8	3.3-10.2
HSE SE	37	8.7	5.9-11.5
HSE S	77	13.3	10.3-16.2
HSE W	49	12.9	9.3-16.5
Ireland	**461**	**11.8**	**10.7-12.8**

Age and sex

There were 273 cases (59.2%) of TB notified in males and 182 cases (39.5%) in females, giving a male to female ratio of 1.5:1. Sex was not reported in six cases.

The mean age of cases notified was 43.4 years (range 1 to 96 years). Age was not reported for four cases.

Geographic origin

Of the 461 cases provisionally notified in 2005, 288 were born in Ireland, 142 were born outside Ireland. Information on country of birth was not reported for 31 of the cases.

Of the 142 cases born outside Ireland, 62 were born in Asia, 31 in Africa, 29 in Europe and one in America. The country of birth was unknown for 19 of the cases born outside Ireland.

[Ψ] *2005 data as of 31st August 2006*

Site of disease

Of the 461 cases provisionally notified in 2005, pulmonary TB was diagnosed in 283 cases (61.4%), extrapulmonary TB in 126 cases (27.3%) and pulmonary and extrapulmonary TB in 36 cases (7.8%). The site of disease was unknown for 16 cases.

Of the 319 cases with a pulmonary disease component, 155 (48.6%) were culture positive and 132 (41.4%) were smear positive.

TB meningitis

There were eight cases of TB meningitis provisionally notified in 2005 giving an incidence rate of 0.2/100,000 population (2/million population). Two of the cases were aged less than 15 years, two aged 15-24 years, three aged 25-34 years and one aged greater than 64 years. Three of the cases were reported as having received BCG vaccination. Of these eight cases, four were culture negative and the culture status was not reported for the remaining four.

Culture

Of the 461 cases provisionally notified in 2005, 205 (44.5%) were culture confirmed. Of the 319 with a pulmonary component, 155 were culture positive and of the 126 extrapulmonary cases, 44 were culture positive.

Among the 205 culture positive cases, 176 were *M. tuberculosis*, three were *M. bovis*. There were no reported cases of TB as a result of infection by *M. africanum*. The species was not provided for 26 of the culture positive cases.

Antibiotic resistance

Resistance was reported in six cases out of a total of 176 *M. tuberculosis* isolates (3.4%). There were three cases of MDR-TB and three which were mono-resistant to isoniazid. Five of the six resistant cases, including two of the MDR-TB cases, were born outside Ireland.

Appendix 2: Social Class (Source: CSO)

Social class

The entire population is also classified into one of the following social class groups (introduced in 1996) which are defined on the basis of occupation

1. Professional workers
2. Managerial and technical
3. Non-manual
4. Skilled manual
5. Semi-skilled
6. Unskilled
7. All other gainfully occupied and unknown

The occupations included in each of these groups have been selected in such a way as to bring together, as far as possible, people with similar levels of occupational skill. In determining social class, no account is taken of the differences between individuals on the basis of other characteristics such as education. Accordingly, social class ranks occupations by the level of skill required on a social class scale ranging from 1 (highest) to 7 (lowest). This scale combines occupations into six groups by occupations and employment status. A residual category “All other gainfully occupied and unknown” is used where no precise allocation is possible.

Appendix 3: BCG Vaccination

The Report of the Working Party on Tuberculosis (1996),[3] based on the recommendations of the International Union against Tuberculosis and Lung Disease (IUATLD),[5] recommends that the cessation of neonatal BCG vaccination should be considered if certain criteria are met.

Criterion 1
There is a well functioning tuberculosis control programme.

Ireland: The tuberculosis control programme is currently being reviewed and it is likely that recommendations will be made for strengthening the programme.

Criterion 2
There has been a reliable reporting system over the previous five or more years, enabling the estimation of the annual incidence of active tuberculosis by age and risk groups, with particular emphasis on tuberculosis meningitis and sputum smear positive pulmonary tuberculosis.

Ireland: Yes. National data enabling a detailed epidemiological analysis for the country as a whole were first presented by HPSC in the 1998 National TB Report. The 2004 report is the seventh national TB report produced by HPSC.

Criterion 3
Due consideration has been given to the possibility of an increase in the incidence of tuberculosis resulting from the epidemiological situation of AIDS in that country.

Ireland: Yes

Criterion 4
The average annual notification rate of sputum smear positive pulmonary tuberculosis should be 5/100,000 or less during the previous three years.

Ireland: Yes. In 2004, the national rate for sputum smear positive pulmonary TB was 3.5/100,000 while in 2003 and 2002, the rates were 3.7/100,000 and 3.1/100,000 respectively.

Criterion 5
The average annual notification rate of TB meningitis in children under five years of age should be less than one case per ten million general population over the previous five years.

Ireland: No. Between 2000 and 2004, there were three cases of TB meningitis in children under five years of age, two in 2003 and one in 2002. Of the three cases, one child had received BCG vaccination and the other two had not. Two of the three cases were culture confirmed.

Criterion 6
The average annual risk of tuberculosis infection should be 0.1% or less.

Ireland: Not applicable.

When considering the importance of neonatal BCG vaccination, it is worth considering the practice in other European countries. For example, Sweden discontinued routine neonatal BCG vaccination in 1975 when they had a total notification rate of 20/100,000 population and an age-specific incidence rate for children aged 0-14 years of 0.3/100,000. While the national crude rate in Ireland is less than 20.0/100,000 population, the 2004 age-specific incidence rate for children 0-14 years was 1.2/100,000, four times the rate recorded in Sweden when they discontinued neonatal BCG vaccination. In 2003, 2002, 2001 and 2000, the age-specific incidence rate for children aged 0-14 years was 2.9/100,000, 2.2/100,000, 1.9/100,000, and 1.9/100,000 respectively. In 1999, the age-specific incidence rate for children aged 0-14 years was 4.7/100,000 population, almost sixteen times the rate recorded in Sweden.

In summary, Ireland does not yet meet all of the criteria (outlined above), for discontinuation of the national BCG vaccination programme.

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