

# **Report on the Epidemiology of Tuberculosis in the Eastern Region 1999**

**Department of Public Health,  
Eastern Regional Health Authority  
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**Dr Mary Cronin  
Specialist in Public Health  
Medicine  
Eastern Regional Health Authority**

**Dr. Mary O'Meara  
Area Medical Officer  
Community Care Area 8  
Northern Area Health  
Board**

**Dr Deidre Sommers  
Area Medical Officer  
Community Care Area 5  
South Western Area  
Health Board**

On behalf of the TB Advisory committee: Dr Pauline Morris, Dr Rosemary Hamill, Dr Martin Galy, Dr Mary O'Mahoney, Dr Peter Nolan, Dr Mary Scully, Dr Rosarie Quinlan, Dr Grainne Egan, Dr Sylvia Eakins, Dr Rosalea Watters (Chair).

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## **Introduction**

This document presents the epidemiological data for cases of tuberculosis (TB) notified for Dublin, Wicklow and Kildare in 1999. Sources of notification used in this report included, hospital physicians, general practitioners, and the regional laboratory surveillance system. Notification forms were completed by public health doctors at community care area level and collated in the Department of Public Health.

## **Materials and methods**

### **Case definitions**

A notified case of TB refers to clinically active disease due to infection with organisms of the Mycobacterium Tuberculosis complex (M. Tuberculosis, M Bovis and M Africanum). Active disease was presumed if the patient was commenced on a full curative course of antituberculosis chemotherapy.

Persons placed on chemoprophylaxis for preventative treatment or infected by mycobacterium other than the M tuberculosis complex were not included as cases.

Pulmonary TB was defined as a laboratory confirmed case (positive smear, histology, or culture) with or without radiological abnormalities consistent with active pulmonary TB.

Presumed pulmonary TB was defined as a case treated for TB by the physician without laboratory confirmation.

Pulmonary TB was further divided into smear positive and smear negative cases based on direct microscopic examination of spontaneously produced or induced sputum. Cases which were positive on microscopy of bronchoalveolar or gastric lavage were considered laboratory confirmed but sputum smear negative

Extrapulmonary TB was defined as a patient with a smear, culture or histology specimen from an extra pulmonary site positive for M tuberculosis complex, or with clinical signs of active extrapulmonary disease and the attending physician treating the patient with a full curative course of antituberculosis chemotherapy.

Primary TB was defined as a patient with negative smear, culture or histology specimen but with radiological signs of hilar lymphadenopathy on chest X-ray, positive skin test or clinical evidence leading the physician to treat with a curative course of antituberculosis chemotherapy.

### **Data Analysis**

Population data were taken from the 1991 and 1996 Census of Population from the Eastern Health Board area. Data were analysed using Epi-Info software, version 6.04.

The  $\chi^2$  test was used to compare proportions in groups and 95% confidence intervals were used to compare rates between groups of interest. The  $\chi^2$  for trend was used to assess rates over time. A three year moving average was calculated by applying the formula  $(a+2b+c)/4$  to each of three successive points a, b, and c in the series and using the result as the smoothed value of b.

## Results

### Demography.

One hundred and eighty cases were notified as been treated for TB in 1999. The notification rate was 13.8/100,000 population, which was higher than in 1998, when 154 cases were notified (11.7 per 100,000). The increase in the 3 year moving average, evident each year since 1997 has continued.

Table 1: Notified cases of tuberculosis Eastern Health Board 1990-1999

Year	Number*	Number per 100,000	3 year moving average
1990	191	15.3	
1991	183	14.7	190
1992	202	16.2	183
1993	144	11.6	162
1994	159	12.8	153
1995	150	12.0	143
1996	113	8.7	126
1997	129	9.9	131
1998**	154	11.9	154
1999	180	13.9	

\* $\chi^2$  ( linear trend ) = 26.4 p=0.00000004

\*\* 2 cases, which were included in the *Report on the Epidemiology of Tuberculosis in the Eastern Health Board Region in 1998*<sup>1</sup> were subsequently denotified. There were two other cases notified in 1998 which were received too late for inclusion in the analysis presented in the *Report on the Epidemiology of Tuberculosis in the Eastern Health Board Region in 1998*. The total number of notifications for 1998 therefore, remains at 154.

Notification of TB was lowest in the fourth quarter of 1999.

Table 2: Number of Notifications of TB in each quarter, 1999

1999	No Cases Notified	Percentage
January-March	47	26.1%
April - June	40	22.2%
July- September	54	30.0%
October- December	39	21.7%

Crude rates per 100,000 in each community care area fluctuate each year as is seen in Table 3. In 1999, the highest crude rate was seen in Community Care Area 7 (25.1 per 100,000), followed by Community Care Areas 9 and 6. CCA 7, which covers the north inner city area, is an area of poverty, unemployment and illicit drug use.

**Table 3: Crude rate per 100,000 for notified cases of TB by Community Care Area (CCA), Eastern Health Board 1990-1999**

Year	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990
CCA 1	8.7	6.3	11.0	2.4	12.7	7.2	7.2	8.8	6.4	8.1
2	11.8	11.6	5.4	10.1	8.4	16.0	13.5	19.4	13.5	15.7
3	14.6	9.7	17.2	10.1	22.4	21.3	10.1	12.4	18.0	23.1
4	15.4	11.9	5.6	11.7	6.2	8.9	9.0	15.2	19.3	15.5
5	13.2	16	8.0	17.0	22.7	27.4	16.1	11.4	14.2	13.6
6	19.1	18.4	14.1	8.1	13.9	12.5	17.6	22.8	22.7	15.3
7	25.1	22.8	15.2	13.0	13.8	13.8	19.9	16.5	24.2	20.0
8	10.1	9.3	7.8	7.4	8.5	11.1	10.1	22.8	6.9	14.4
9	20.4*	8.1	8.9	7.3	10.6	5.7	7.3	18.8	17.1	23.2
10	7.2	5.7	9.7	5.1	7.2	9.3	5.1	6.2	7.2	7.4

\* There were 7 cases of tuberculosis notified among an extended family group of refugees in Kildare who had been housed together in temporary accommodation, which facilitated the screening process, chemotherapy and follow up. There were a total of 25 cases of tuberculosis notified for Kildare in 1999, 13 (52%) of these cases were born in Ireland.

**Table 4: No of cases of TB notified for each Community Care Area (CCA), Eastern Health Board in 1999**

CCA	No cases (%)
1	11 (6.1%)
2	14 (7.8%)
3	13 (7.2%)
4	22 (12.2%)
5	14 (7.8%)
6	26 (14.4%)
7	29 (16.1%)
8	19 (10.6%)
9	25 (13.9%)
10	7 (3.9%)
<b>Total</b>	<b>180 (100.0%)</b>

Seventy one (39.4%) cases were female and one hundred and nine (60.6%) cases were male. Notification rates increased with age and were higher in men than in women. Rates in males over 25 years old were consistently higher than rates in females.

**Table 5: Age and sex specific rates (per 100,000) for notified cases of TB (n=180)**

Agegroup	Female		Male	
	No cases	Rate per 100,000	No Cases	Rate per 100,000
0-4	4	9.2	7	14.9
5-14	1	4.1	2	1.9
15-24	10	8.3	8	6.7
25-34	14	12.7	18	17.7
35-44	7	7.5	19	21.8
45-54	8	10.8	20	28.2
55-64	9	17.1	15	30.9
65+	18	23.7	20	40.6

One hundred and fifty six people lived at home, fourteen in institutions and one in hostel accommodation. Five of the fourteen people living in institutions were in long stay hospital or nursing home accommodation, while nine were living in special refugee accommodation. One person was in prison, while seven of the eight people living in "other" accommodation were non-nationals living in rented accommodation.

### Risk categories

#### **Age**

As shown in Table 5, thirty-eight of the patients (21.1%) were 65 years of age or older.

#### **Employment status**

Sixty people (33.3%) were employed, 43 (23.9%) were unemployed and 41 (22.8%) had retired. Among those under 65 years old, 43 patients (30.3%) were unemployed, compared to 35% in 1998.

#### **Ethnicity**

One hundred and thirty six cases were born in Ireland and forty four (24.4%) were of foreign nationality, reflecting a significant increase in notifications in non-nationals on 1998 figures (twenty four or 15.6% cases notified in non-nationals).

**Table 6: Country of Origin of TB cases in non -nationals**

Country Of Origin	Number cases
Angola	2
Bangladesh	1
China	1
United Kingdom	5
Ethiopia	1
India	1
Ivory Coast	1
Japan	1
Kosova	11
Malaysia	1
Moldovia	1
New Zealand	1
Nigeria	4
Pakistan	3
Philippines	1
Romania	2
Slovakia	1
Somalia	1
Sri Lanka	1
Sudan	1
Vietnam	1
Zaire	2

Thirty five (n=35) of these patients came from "high-risk" countries as defined by W.H.O. (incidence of TB  $\geq$  40/100,000 population)<sup>2</sup>

Over the last three years the numbers of cases of TB in non-nationals has increased more than threefold. As previously noted, seven of the cases from Kosova, were part of the same extended family group

**Table 7: Cases of TB in indigenous population and in non-nationals, EHB, 1996-1999**

Year	Indigenous Irish		Non Nationals	
	Number	Percentage of total cases	Number	Percentage of total cases
1996	103	91.2	10	8.8
1997	117	90.7	12	9.3
1998	130	84.5	24	15.5
1999	136	75.5	44	24.4

The non-national population did not differ from the Irish in sex, sputum status, culture results, history of TB in the past or whether the diagnosis was pulmonary or extrapulmonary. However, overall they were younger ( $p=0.0001$ ), the diagnosis was more likely to be one of Primary TB ( $p=0.04$ ) and they were more likely to have a history of contact with TB ( $p=0.02$ )

#### **HIV infection**

Six patients had HIV associated TB. All had pulmonary disease, one having pulmonary and extra-pulmonary disease. Mycobacterium tuberculosis was isolated in all six cases. Five of the six were sputum positive on direct examination, the sixth was culture positive. In all cases the organism was fully sensitive to standard TB chemotherapy

#### **Prior History of TB**

There was an increase in the proportion of patients with a history of TB in the past, notified in 1999 ( $n=23$ , 14.2%) when compared to 1998 ( $n=16$ , 10.4%), although this increase is not statistically significant. One patient who was notified in 1999, had a history of TB within the previous two years. This was a man who had a problem with alcohol addiction and was living in a hostel.

#### **TB Contact**

Forty-six patients (25.5%) had a history of contact with TB previously, twenty three of these were recorded as having had contact within the previous 2 years. Ten cases were identified through contact tracing.

#### **Diagnosis**

One hundred and thirty five cases were diagnosed with pulmonary or combined pulmonary and extra-pulmonary TB, of whom 92 (68.1%) were laboratory confirmed (tables 8 and 9). Pulmonary TB alone was diagnosed in 124 cases, of whom 83 (66.9%) were laboratory confirmed. There were eleven cases of combined pulmonary and extra-pulmonary TB, of whom 8 were laboratory confirmed.

**Table 8: Classification of cases of TB notified to the Eastern Health Board in 1999**

Diagnosis	No. Cases
Pulmonary TB	124 (68.9%)
Pulmonary + Extrapulmonary	11 (6.1%)
Extrapulmonary	36 (20.0%)
Primary	9 (5.0%)
Total	180 (100%)

**Table 9: Sputum smear and culture status for notified pulmonary TB cases and notified extrapulmonary cases associated with pulmonary disease (in brackets) Eastern Health Board 1999.**

Pulmonary TB	Sputum smear		Total
	Positive	Negative	
Culture +	44 (6)	39 (3)	83 (9)
Culture -	0 (0)	35 (2)	35 (2)
Not done	0 (0)	6 (0)	6 (0)
<b>Total</b>	<b>44 (6)</b>	<b>80 (5)</b>	<b>124 (11)</b>

Extra-pulmonary TB alone was notified in 36 cases. The sites involved were as shown in table 9.

**Table 10: Extrapulmonary disease sites (includes cases with combined pulmonary and extrapulmonary disease)**

Site	Number Cases
Pleural	12
Lymph-Extrathoracic	9
Lymph intrathoracic	1
Bone	4
Meningeal	3
Genitourinary	7
Disseminated	3
Peritoneal	1
Skin	1
Eyes	2
Vocal cords	1
Synovial fluid	1
Nose	1
Duodenum	1

**Table 11: Histology and culture status of extrapulmonary cases of TB Eastern Health Board 1999**

Extrapulmonary TB	Culture		Total
	Positive	Negative	
Histology +	16	3	19
Histology -	2	15	17
	18	18	36

*Histology- means histology negative or not done*

*Culture negative means culture negative or not done*

Three cases of TB meningitis were notified. One case was an 18 year old, Irish national, a female who had pulmonary disease, in addition to tuberculous meningitis and tuberculosis of her eyes. She had received neonatal BCG. Another case was an 8 year old child who had not received BCG. The third case was a 29 year old patient from Zaire, who had not had BCG.

Primary TB was diagnosed in 9 patients. This is a fourfold increase on the number of primary cases notified in 1998. Four of these cases were born in Ireland and 5 were non-nationals, 3 from Kosova and 2 from England. All 9 cases were under 5 years of age. Four of the children had a history of BCG with a BCG scar recorded.

**Table 12: Diagnosis for notified cases of TB, Eastern Health Board 1991-1998**

Year	1999	1998	1997	1996	1995	1994	1993	1992
Pulmonary TB only (lab confirmed)	83	79	66	66	76	83	68	95
Presumed Pulmonary TB	41	32	31	16	39	45	45	61
Extrapulmonary TB only	36	29	25	22	24	21	20	31
Pulmonary + extrapulmonary TB (Pulmonary disease lab confirmed)	11 9	12 4	6 5	6 N/A	7 N/A	7 N/A	10 N/A	5 N/A
Primary TB	9	2	1	3	4	3	1	10

#### **Drug Resistance.**

Two cases of tuberculosis had an organism resistant to one or more antibiotics. Both cases occurred in non-nationals. These patients came from Nigeria and the Ivory Coast, respectively. Both patients were diagnosed with pulmonary disease. The isolate from one patient was isoniazid resistant and the isolate from the second patient was resistant to rifampicin, INAH, pyrazinamide and streptomycin. The patient, who was resistant to INAH only, took his own discharge from hospital and is believed to have returned directly to Nigeria.

#### **Deaths**

Eight patients died following the diagnosis of TB. TB was considered to be the cause of death in two cases.

#### **Hospitalisation**

One hundred and thirty four patients (74.4%) were admitted to hospital, either for diagnosis or treatment of their tuberculosis.

#### **Notification Source**

The main source of notification was the attending physician. Other sources included general practitioners, laboratory surveillance and public health.

**Table 13: Notification Source of TB cases Eastern Health Board 1999**

Notification Source	No Cases	Percentage
Clinician	151	83.9%
General Practitioner	6	3.3%
Laboratory Surveillance	2	1.1%
Public Health	16	8.9%
Other	5	2.8%

Notifications from the Laboratory Surveillance System reflect a failure of the Tuberculosis Notification System, as the responsibility for notification rests with the clinician.

#### **Delay in Notification**

Data on the date of diagnosis was available in relation to 179 patients.

**Table 14: Delay in Notification of TB cases in the Eastern Health Board, 1999**

Days to notification	Number
0-6	112
7-13	28
14-20	14
21-26	5
27-34	4
35-41	5
42-48	1
49-55	2
56-62	1
63-69	1
70 +	6

The 1996 Working Party Document on Tuberculosis<sup>3</sup> recommends that cases of tuberculosis should be notified within three working days following diagnosis and that contact tracing should commence within seven working days following notification. In relation to 8 cases of sputum positive TB, there was a delay in notification of greater than one week. In 4 of these cases, the delay was greater than 14 days (15, 17, 25 and 81 days respectively).

#### **Contact tracing**

Contact tracing constitutes a large workload for medical and public health nursing staff who work in the community care areas. While data on the number of contacts screened is not systematically collected, anecdotal evidence is that, because of the increasing likelihood that patients are in paid employment, the workload generated by the need to carry out screening of contacts in the workplace is increasing. In one Community Care Area, following a notification of a case of sputum positive pulmonary disease in a large factory with a workforce of over 2000 people, 87 people were initially assessed and 22 required chest x-rays following tuberculin testing. The screening was interrupted when an atypical mycobacterium was identified on culture of the patient's sputum. In another factory in the same Community Care Area, 30 contacts were screened following notification of a case of TB in the workplace. No new cases were identified and one individual was placed on chemoprophylaxis.

A large workload also results from the need to screen contacts of patients in hospitals and long stay institutions. For example, in one Community Care Area, two cases, one a patient with laryngeal tuberculosis who had been in an acute hospital ward for 10 days prior to diagnosis and the other, a patient

in respite care in a health board nursing home for two weeks prior to the diagnosis of smear positive pulmonary tuberculosis, resulted in 63 and 72 contacts, respectively, being screened. These investigations resulted in the identification of one new case in the nursing home, following 6 months of follow-up. In another Community Care Area, following notification of a case of sputum positive pulmonary TB in a long stay unit of a health board hospital, 77 staff and 20 patients were screened. No new cases of TB were identified.

### Discussion

TB surveillance involves the systematic collection, collation, analysis and dissemination of information on the epidemiology of TB to all relevant professionals in the region. Close co-operation between clinicians, microbiologists and public health doctors is essential so that accurate and reliable data is collected and that an accurate picture of the epidemiology of TB is described. TB surveillance also provides invaluable information for planning services for the prevention treatment and control of TB.

The yearly rise in the number of cases of TB notified continued in 1999. There was a slight decrease in the number of laboratory confirmed cases notified during the year, when compared with the 1998 figure (with 68.1% of all pulmonary TB cases were laboratory confirmed). This is slightly lower figure than the percentage reported in 1998 (71.2%).

Risk factors for disease remain unchanged when compared to 1998 and include age over 65, being male, being unemployed and having a history of previous TB or TB contact.

As in 1998, one quarter of the cases notified in 1999 had a history of contact with TB previously. In 1998, 25.6% (n=10) and in 1999, 50% (n=23) of these cases, were recorded as having had contact within the previous 2 years. In 1998, only one of these 10 cases (10%) was found by contact tracing. However, in 1999, the number of cases found through contact tracing increased to 10 of the 23 (43.5%) cases recorded as having had contact with tuberculosis within the previous 2 years.

As in 1998, HIV associated TB has not proven to be as problematic as originally anticipated in the 1980's.

There has been a marked increase in cases arising in non-nationals, reflecting the changing ethnic composition of the population of the region. It is worth pointing out that 11 of the cases involved "programme" refugees from Kosova. Seven of these cases were part of the same extended family group. This has inflated the figures for non-nationals in respect of 1999. At present voluntary screening is offered to asylum seekers from high-incidence countries but not all avail of the service currently. There may be many barriers to partaking in screening including language difficulties, low priority given to health issues and a perception that ill health may reflect negatively on decisions being made regarding asylum applications.

There were two cases of drug resistant TB notified in 1999 (3 cases in 1998), one of which was resistant to INAH only. However, with the increasing number of cases from countries with endemic multi-drug-resistant TB, there is a need for continuing vigilance in relation to the issue of drug resistant TB in this country.

There was one case of TB meningitis in a child in 1998 and one case reported in an 8 year old child in 1999. The W.H.O. criteria for discontinuing routine BCG vaccination state that a rate of TB meningitis in children under age 5 be less than one case per 10 million general population over the previous 5 years. One case in this age group in the eastern region gives a rate above W.H.O. recommendations for discontinuing BCG vaccination.

The 1996 Working Party Document on Tuberculosis<sup>3</sup> recommends that cases of tuberculosis should be notified within three working days following diagnosis and that contact tracing should commence within seven working days following notification. In 1999, 8 sputum positive cases (16.0%) were not notified within one week of diagnosis (15.1% of sputum positive cases in 1998).

**References:**

<sup>1</sup> Report on the Epidemiology of Tuberculosis in the Eastern Health Board Region in 1998. Department of Public Health, Eastern Health Board, July 1999

<sup>2</sup> Global Tuberculosis Control. WHO Report 1999

<sup>3</sup> Report of the Working Party on Tuberculosis. Department of Health, September 1996