SURVEILLANCE OF TUBERCULOSIS

IN NORTHERN IRELAND

2004

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Summary

In 2004 as part of the enhanced surveillance of tuberculosis notification scheme, CDSC (NI) received 94 notifications of tuberculosis. Eight cases were subsequently identified as infection with a mycobacterium other than tuberculosis complex (MOTT) and three cases were subsequently diagnosed as having a condition other than tuberculosis. (A further two cases were denotified for other reasons.) Sixty-two cases were culture confirmed as *M. tuberculosis* infection and a further three cases were culture confirmed as *M. bovis* infection. In addition to the culture confirmed cases; four cases were positive by histological examination of lymph nodes, lung tissue or other tissue. The outstanding twelve cases remain notified on the basis of clinical and other laboratory diagnosis, giving a total of eighty-one notified cases of tuberculosis identified through this programme in 2004. The annual notification rate of tuberculosis was estimated at 4.7 cases per 100,000 population.

Sixty-four of the 81 notified cases had pulmonary disease and 17 had non-pulmonary disease. Of the 64 pulmonary tuberculosis cases: 27 were both sputum smear and culture positive and a further 27 (respiratory samples or gastric washings) were culture positive only. Eight patients with pulmonary disease died. Tuberculosis was the cause of death in three cases (two of which were initially diagnosed at postmortem) and was cited as a contributing factor in two of the five remaining cases.

Eleven of the 17 non-pulmonary tuberculosis cases were confirmed by culture (ten *M. tuberculosis* and one *M. bovis*). The sites of disease reported in these cases were: lymph nodes (6), miliary (4), pleura (1), genitourinary (2), gastrointestinal (2) and joint/bone (2).

Outcome data has been provided for 77 of the 81 cases. Details of initial treatment were recorded for 60 cases, of which 56 received a combination of rifampicin, isoniazid and pyrazinamide (with or without ethambutol). Continuation therapy was recorded for 55 cases, of which 53 received a combination of rifampicin and isoniazid, with or without an additional drug.

Antimicrobial sensitivity testing results were available for all but one of the 62 *M. tuberculosis* isolates. Two isolates (both pulmonary tuberculosis) were found resistant to both isoniazid and rifampicin (multi-drug resistant; MDR-TB) and a further two isolates were found resistant to pyrazinamide The three *M. bovis* isolates were also subjected to antimicrobial sensitivity testing and, as expected, each was found resistant to pyrazinamide.

1. Introduction

Clinicians in Northern Ireland, in line with those in the rest of the United Kingdom, are required to notify all cases of tuberculosis to the Director of Public Health of the Health and Social Services Board (HSSB) of residence. Enhanced surveillance of tuberculosis was established in Northern Ireland in 1992, with the introduction of two customised data collection forms.

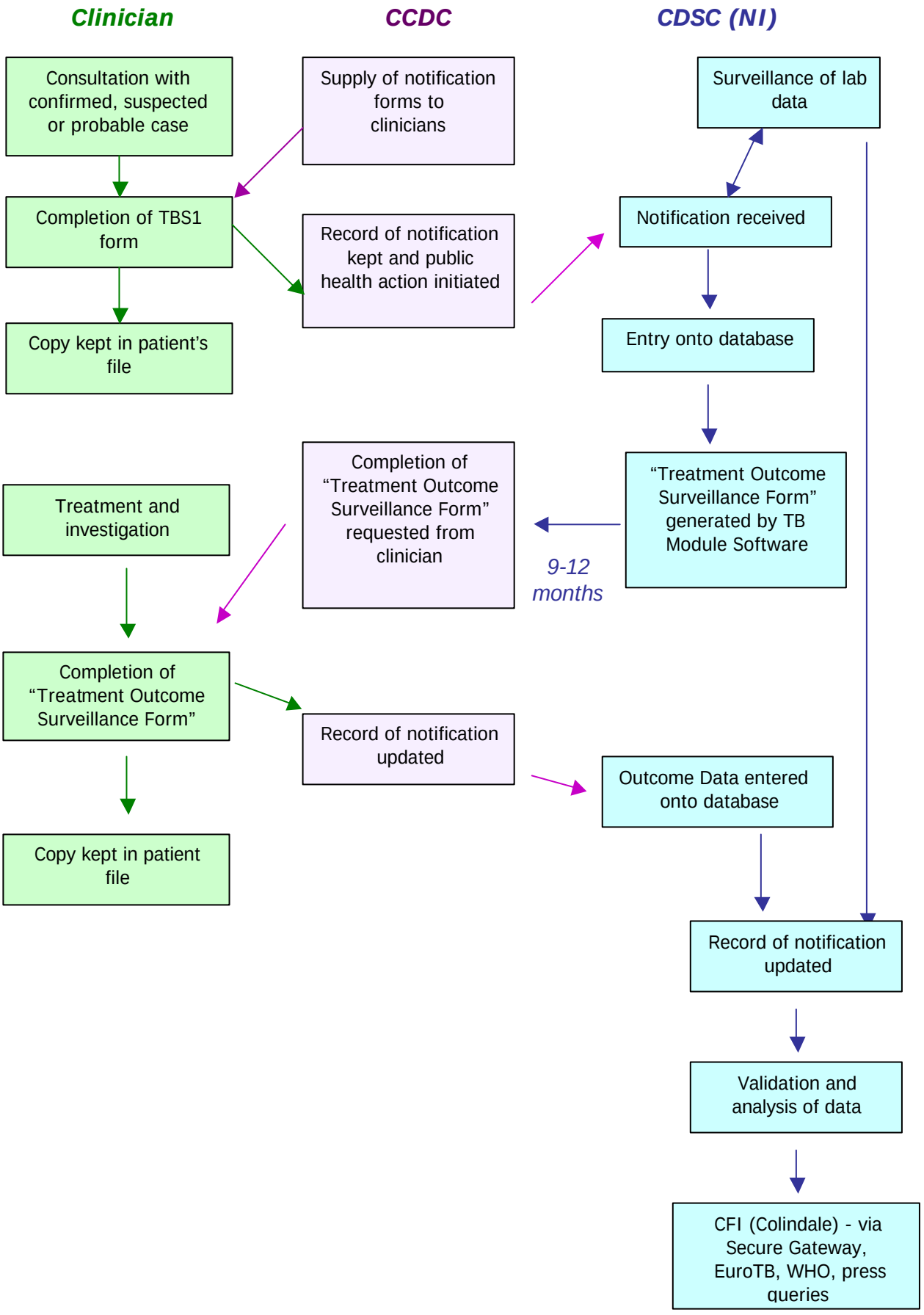
The notification form, TBS1, is used to collect clinical, demographic and microbiological information. The collection of outcome data, for all cases notified after 1 January 2001, was introduced in England and Wales at the beginning of 2002. In order to facilitate the export and central collation of data for England, Wales and Northern Ireland, outcome data is now collected across all three regions of the UK on a standardised 'Tuberculosis Treatment Outcome Surveillance Form'. This form, which replaces the TBS2 form, has been customised for local use and continues to collect details of drug treatment and outcome - together with any additional clinical and/or microbiological information not available at the time of initial notification.

Once a case has been notified and the TBS1 details entered onto a secure database at CDSC (NI), 'Tuberculosis Treatment Outcome Surveillance Forms', are generated automatically. These forms are then forwarded, approximately 9 months after initial notification, to the appropriate CCDC for completion by the patients' clinician.

All forms are subsequently forwarded to the Northern Ireland Communicable Disease Surveillance Centre CDSC (NI) where the information is entered onto a secure database, validated (using laboratory reports and anti-microbial resistance information), updated and analysed. The information is then used for inclusion in national and European and WHO reports, as well as for disease surveillance at a local level. A summary of the process is shown on the following page.

If *M. bovis* infection is identified in a notified patient, an additional questionnaire (available to download at http://www.cdscni.org.uk/forms/) is forwarded to the CCDC in the patient's Board of residence and, once completed, is returned to the Centre for Infections at Colindale. This questionnaire collects data on: case background information, travel history, unpasturised milk/milk product consumption and occupational details (including animal contact).

This report presents the epidemiological data for tuberculosis cases reported in Northern Ireland (NI) from 1st January 2004 to 31st December 2004. As the data collection process can only be completed 12 months after the initial notification, an annual epidemiological report does not normally become available until 18 months after the end of the reporting period.


Clinician
CCDC
CDSC (NI)
Consultation with confirmed, suspected or probable case
Supply of notification forms to clinicians
Surveillance of lab data
Completion of TBS1 form
Record of notification kept and public health action initiated
Notification received
Copy kept in patient's file
Entry onto database
Completion of "Treatment Outcome Surveillance Form" requested from clinician
"Treatment Outcome Surveillance Form" generated by TB Module Software
Treatment and investigation
9-12 months
Completion of "Treatment Outcome Surveillance Form"
Record of notification updated
Outcome Data entered onto database
Copy kept in patient file
Record of notification updated
Validation and analysis of data
CFI (Colindale) - via Secure Gateway, EuroTB, WHO, press queries

2. Methods

2.1. Sources of information

The sources from which information used in the surveillance programme is taken include enhanced surveillance notification forms, the NI laboratory reporting system, information provided by the UK Mycobacterial Resistance Network (MYCOBNET) and death certifications.

All laboratories report a comprehensive list of clinically significant microbiological data to CDSC (NI), including isolates of *Mycobacterium* species. The Northern Ireland Mycobacterial Reference Laboratory, based at the Northern Ireland Public Health Laboratory at Belfast City Hospital, has also been participating in a national system for the surveillance of drug resistance in *Mycobacterium tuberculosis* complex organisms. This scheme, called MYCOBNET, provides information about drug resistant organisms in cases were the organism has been microbiologically confirmed.

2.2. Definitions

Case definitions are based on the recommendations developed by the working group of the World Health Organisation (WHO) and the European Region of the International Union Against Tuberculosis and Lung Disease (IUATLD).

"culture confirmed" case is defined as one in which the diagnosis has been confirmed by culture of *Mycobacterium tuberculosis, M. bovis or M. africanum* .

"other than culture confirmed case" *. In the absence of culture confirmation, such a case needs to meet the following criteria: "A clinician's judgement that the patient's clinical and/or radiological signs and/or symptoms are compatible with tuberculosis *and* a clinician's decision to treat the patient with a full course of anti-tuberculosis treatment".

*** Applicable to all cases notified after August 2003**

Both types of cases should be notified through this surveillance system. Any case which subsequently does not fulfil one of the above case definitions is marked as denotified but remains in the dataset. This would include those with a diagnosis other than tuberculosis.

Multi-drug resistance (MDR) is defined as resistance to at least isoniazid and rifampicin, with or without resistance to other drugs.

2.3. Data analysis

Data are entered onto and analysed using custom designed Microsoft Access-based software called HPA Regional Module for Enhanced TB Surveillance (2004; version 3.0). The 2004 and 2005 mid-year population estimates (Registrar General Northern Ireland, NISRA) were used for calculating rates.

3. Results

3.1. Notifications

A total of 94 cases were notified through the surveillance scheme during 2004. Of these 94 notifications; eight cases were laboratory confirmed as an infection with a mycobacterium other than tuberculosis (MOTT), three cases were subsequently diagnosed as having an illness other than tuberculosis and two further cases were denotified for other reasons. These 13 patients, diagnosed with another condition or an infection with MOTT, were de-notified but remained recorded in the dataset. They were excluded from the main analysis and analysed separately. This gave a total of 81 cases of tuberculosis notified during the course of 2004, of which 65 (80 %) were culture confirmed. Sixty-two of the isolates were identified as *M. tuberculosis* and three as *M. bovis*. Sixteen cases were notified on the basis of clinical or non-culture diagnosis and response to anti-tuberculous therapy. Of these 16 cases; four were positive by histological examination of lymph nodes, lung tissue or joint tissue. Nine of the remaining 12 cases were notified with pulmonary tuberculosis and three of these were close contacts of other known culture positive pulmonary tuberculosis patients.

Of the 81 tuberculosis cases; 64 (79 %) had pulmonary disease and 17 (21 %) had non-pulmonary disease. Follow-up information (either Treatment Outcome Form or death certificate) was provided for 77 (95 %) cases (Table 1).

Table 1: Enhanced TB surveillance notification forms submitted in Northern Ireland, 2004

TBS1	Follow-up	TBS1/follow-up (%)
81	77	95

3.2 Tuberculosis cases

The annual notification rate of tuberculosis for Northern Ireland in 2004, based on 81 notifications, was estimated at 4.7 cases per 100 000 population – indicating that the incidence of tuberculosis within Northern Ireland is continuing to increase; in 2000 the rate was 3.0 per 100 000 population and, by 2002, this rate had increased to 3.9 per 100 000 population. Preliminary analysis of 2005 notification data indicates a provisional rate of 4.4 per 100 000 population.

Table 2: Tuberculosis cases in Northern Ireland, 2004

Confirmed	Non-culture confirmed*	Total	Rate per 100 000
65	16	81	4.7

* A number of notified individuals, although never culture confirmed, were known contacts of others who already had culture confirmed tuberculosis. A further number of non-culture confirmed cases displayed clinical symptoms such as lung X-ray changes, heaf conversion or were diagnosed at post-mortem.

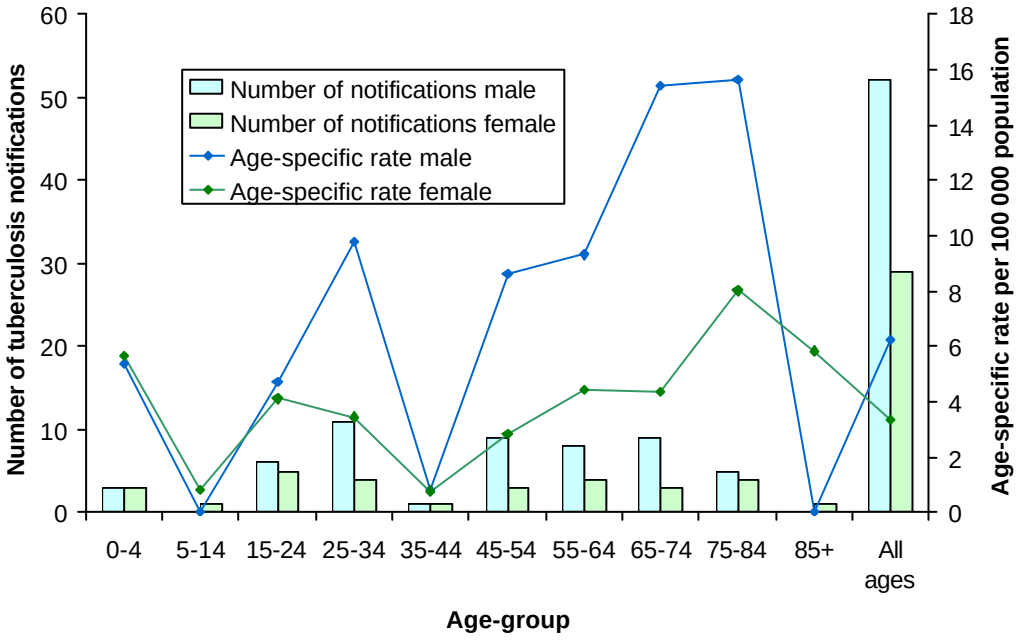
Of the 81 tuberculosis cases, 52 were male and 29 were female, giving a sex ratio M/F of 1.8 (a slight increase in the ratio of 1.7 recorded in 2003). The ages ranged from four months to 90 years with a median of 51 years and a mean of 46 years. The age-sex distribution is shown in Figure 1. The highest proportion of cases for men was recorded in the 25-34 age-group and, for women, in the 15-24 age-group. (This has changed substantially from that observed in 2003, when the highest proportion of cases were in the 65-74 age-group for men and the 75-84 age-group for women.) Seven children under the age of 15 years were notified with tuberculosis during 2004, of which four were household contacts of known tuberculosis cases. All seven children were of white ethnic group, all were born in the UK or Republic of Ireland (RoI) and six were notified with pulmonary tuberculosis (four of which were culture confirmed).

During 2004, the highest age-specific rate for both male and female patients occurred in those aged 75-84 years. Overall, the age-specific rate for men was higher than that for women, except in those under 15 years of age or over 85 years of age at the time of notification. (Table 3 and Figure 1).

Table 3: Rates of notification of tuberculosis cases per 100 000 population in Northern Ireland by age and sex, 2004

Age-group	Male	Female	Total
0-4	5.3	5.7	5.5
5-14	0.0	0.8	0.4
15-24	4.7	4.1	4.4
25-34	9.8	3.4	6.6
35-44	0.8	0.8	0.8
45-54	8.6	2.8	5.7
55-64	9.3	4.4	6.8
65-74	15.4	4.3	9.4
75-84	15.6	8.0	11.0
85+	0.0	5.8	4.2
All ages	**6.2**	**3.3**	**4.7**

Figure 1: Notified cases of tuberculosis by age and sex, and age-specific rates per 100 000 population, Northern Ireland, 2004



In 2004, the country of birth was recorded for all but one of the 81 notified cases. Fifty-five were known to have been born in the United Kingdom or RoI and 25 were known to have been born elsewhere. Of these 25 cases; 11 were born in East Timor, and the remainder were born in each of the following countries: Brazil, China, Hong Kong, India, Morocco, Nepal, Philippines, Portugal, South Africa, Thailand & Zimbabwe. In the ten years between 1992 (when enhanced surveillance of tuberculosis commenced in Northern Ireland) and 2002, an average of 10 % of all notified individuals were known to have been born outside the UK or RoI. This proportion increased to more than 20 % in 2003 and, in 2004, has increased further - to 31 %. Provisional analysis of 2005 data indicates that, of all cases which remain notified to date, approximately one-quarter were born outside the UK or RoI.

Information regarding previous tuberculosis infection was recorded for 75 of the 81 cases notified during 2004. Ten individuals were reported to have a previous history of tuberculosis and three received their first diagnosis of tuberculosis during the 1940's and 1950's – when all were children or young adults – but only one individual is recorded as having been treated with at least one month of chemotherapy at the time of original diagnosis. A further five individuals were diagnosed with tuberculosis between four and twenty years prior to their notification in 2004 (two were born outside the UK or RoI) and, of these, only two are recorded as having received chemotherapy. Detailed information on the year of initial diagnosis, or treatment received, was not recorded for the remaining two cases.

3.3. Pulmonary tuberculosis cases

Of the 81 tuberculosis cases notified, 64 (79 %) were diagnosed with pulmonary tuberculosis and 54 (84 %) of these 64 cases were confirmed by culture (52 *M. tuberculosis* and two *M. bovis*). Three other cases were found to be culture negative. However, all three exhibited chest X-ray changes and other clinical symptoms and all completed a full course of chemotherapy. Culture was not carried out on a further seven individuals notified with pulmonary tuberculosis; two of these were young children and four were close contacts of other known culture positive pulmonary cases. All six of these individuals showed chest X-ray changes and/or other clinical symptoms and all but one (who was lost to follow up) completed a full course of chemotherapy. The remaining case of pulmonary tuberculosis was first seen at post mortem and was diagnosed by histological examination.

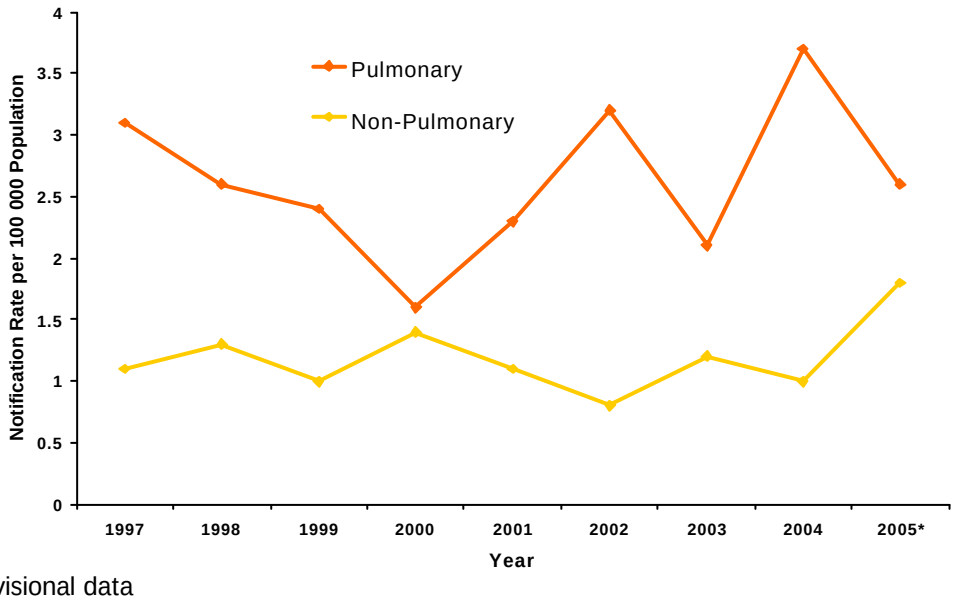
Twenty-seven (42 %) of the 64 pulmonary tuberculosis cases notified during 2004 were found to be sputum smear positive at the time of notification and all were, subsequently, confirmed by culture (26 *M. tuberculosis* and one *M. bovis*). This is similar to 2003, when 16 (44 %) of the 36 pulmonary tuberculosis cases notified were found to be sputum smear positive and all except one were culture confirmed.

Twenty-one pulmonary tuberculosis cases in 2004 were sputum smear negative at the time of notification but 17 were, subsequently, confirmed by culture (16 *M. tuberculosis* and one *M. bovis*). Sputum smear testing was not carried out in the remaining 16 pulmonary tuberculosis cases. However, suitable alternative samples (bronchcoscopy or gastric washings) were obtained from nine of these 16 patients; six were found to be smear positive and all nine were, subsequently, found culture positive. Of the remaining seven patients on whom no smear testing was carried out; one was found to be sputum culture positive for *M. tuberculosis*, one (diagnosed at post mortem) was positive by histological examination of lung tissue and the remaining five displayed chest X-ray and/or clinical symptoms and/or were close contacts of other, known, culture positive pulmonary tuberculosis cases.

Forty-five of the 64 pulmonary tuberculosis cases notified during 2004 successfully completed a full course of anti-tuberculous treatment and details of drugs administered were provided on Treatment Outcome forms. An additional five patients are recorded as having completed a full course of anti-tuberculous treatment - although details of drugs administered were not provided. Treatment Outcome forms were not completed for a further two patients. Four patients refused to comply with treatment or were lost to follow up and a further eight patients were diagnosed at post mortem or died soon after treatment commenced. Tuberculosis was cited as the primary cause of death in three of these eight patients (two of whom were diagnosed at post mortem) and as a contributing factor in the death of two further patients.

The annual notification rate for pulmonary tuberculosis in Northern Ireland during 2004 was 3.7 cases per 100 000 population (Table 4) – a substantial rise on rate of 2.1 cases per 100 000 population recorded in 2003. Provisional data indicates that the rate of pulmonary tuberculosis will have fallen again in 2005 – to approximately 2.6 cases per 100 000 population (Figure 2).

Figure 2: Rates of pulmonary and non-pulmonary tuberculosis per 100 000 population, Northern Ireland, by year



***** provisional data

Table 4: Pulmonary tuberculosis notifications in Northern Ireland, 2004

Confirmed	Non-culture confirmed	Total	Rate per 100 000
54	10	64	3.7

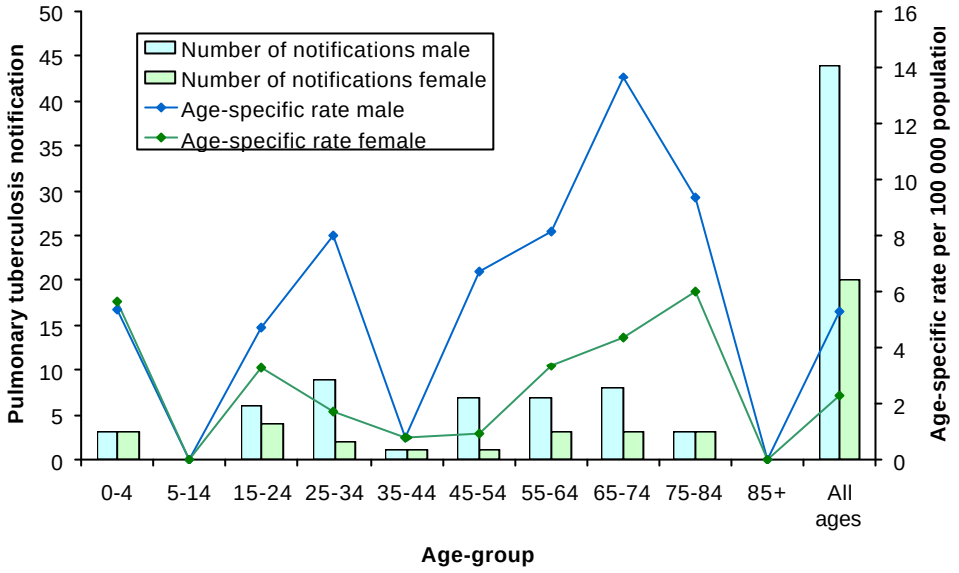
Of the 64 pulmonary tuberculosis cases notified during 2004, 44 were male and 20 were female. The age of those affected ranged from four months to 81 years with a median of 50 years and a mean of 45 years (in contrast to a mean of 51 years in 2003, 56 years in 2002, 58 years in 2001 and 61 years in 2000). The incidence of pulmonary tuberculosis was spread over a wide age range for both men and women during 2004. However, almost half of all pulmonary cases occurred in those under 45 years of age (Figure 3).

The age-sex distribution shows that, as in previous years, the highest age-specific rates for pulmonary tuberculosis continue to be recorded in older age-groups. During 2004, the highest age-specific rates occurred in the 65-74 age-group for men and the 75-84 age-group for women (Table 5 and Figure 3).

Table 5: Rates of notification of pulmonary tuberculosis in Northern Ireland per 100 000 population by age and sex, 2004

Age-Group	Male	Female	Total
0-4	5.3	5.7	5.5
5-14	0.0	0.0	0.0
15-24	4.7	3.3	4.0
25-34	8.0	1.7	4.8
35-44	0.8	0.8	0.8
45-54	6.7	0.9	3.8
55-64	8.1	3.3	5.7
65-74	13.7	4.3	8.6
75-84	9.4	6.0	7.3
85+	0.0	0.0	0.0
Total	5.3	2.3	3.7

Figure 3: Notified cases of pulmonary tuberculosis by age and sex, and age-specific rates per 100 000 population, Northern Ireland, 2004



3.4. Non-pulmonary tuberculosis cases

Seventeen notifications of non-pulmonary tuberculosis were received during 2004. Eleven of these cases (65 %) were culture confirmed: ten with *M. tuberculosis* infection and one with *M. bovis* infection.

The major sites of disease were:

- Lymph nodes: 6
- Miliary tuberculosis: 4
- Pleura: 1
- Genitourinary: 2
- Gastrointestinal: 2
- Joint/bone: 2

Two patients with non-pulmonary disease are known to have died. Tuberculosis was the cause of death in one patient (miliary TB and TB meningitis) and was unrelated to the death of the other.

The annual notification rate for non-pulmonary tuberculosis in 2004 was 1.0 cases per 100 000 population (Table 6). This is largely unchanged from the figure recorded in 2003, when the rate was 1.2 per 100 000 population.

Table 6: Non-pulmonary tuberculosis notifications in Northern Ireland, 2004

Confirmed	Non-culture confirmed	Total	Rate per 100 000
11	6	17	1.0

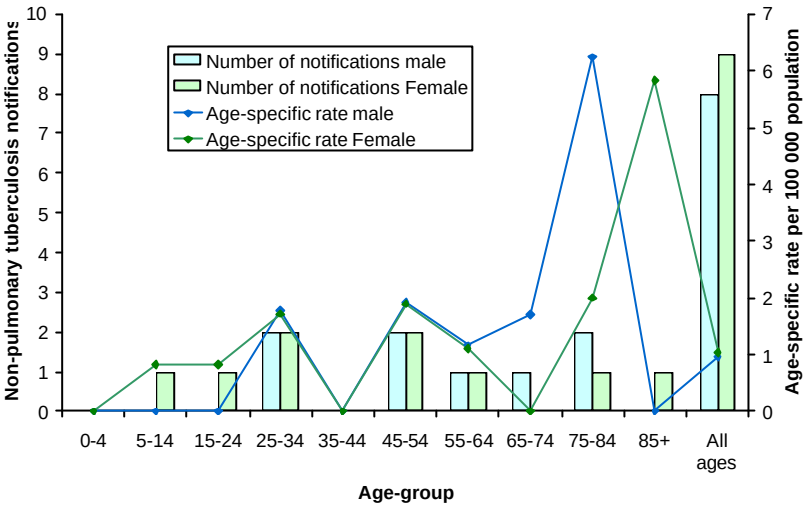
Of the 17 non-pulmonary tuberculosis cases notified during 2004, eight were male and nine were female. The ages ranged from eight years to 90 years with a median of 51 years and a mean of 50 years. In 2004, the highest proportion of cases overall was found in the 25-34 and the 45-54 age-groups age-group (Figure 4). Six of the eight patients in these two age-groups were born outside the UK or RoI.

The highest age-specific rate for non-pulmonary tuberculosis occurred in men aged 75-84 years and in women aged 85+ years. The highest age-specific rate overall also occurred in the 85+ age-group (Table 7 and Figure 4).

Table 7: Rates of notification of non-pulmonary tuberculosis in Northern Ireland per 100 000 population by age and sex, 2004

Age-Group	Male	Female	Total
0-4	0.0	0.0	0.0
5-14	0.0	0.8	0.4
15-24	0.0	0.8	0.4
25-34	1.8	1.7	1.7
35-44	0.0	0.0	0.0
45-54	1.9	1.9	1.9
55-64	1.2	1.1	1.1
65-74	1.7	0.0	0.8
75-84	6.2	2.0	3.7
85+	0.0	5.8	4.2
Total	1.0	1.0	1.0

Figure 4: Notified cases of non-pulmonary tuberculosis by age and sex, and age-specific rates per 100 000 population, Northern Ireland, 2004



3.5. Anti-tuberculous treatment

Initial therapy

Initial therapy was recorded for 60 (74 %) of the 81 tuberculosis patients notified in 2004. As in previous years, the most commonly reported treatment regimen was a combination of rifampicin, isoniazid and pyrazinamide – with or without ethambutol (Table 8).

Table 8: Initial therapies employed for the treatment of tuberculosis in Northern Ireland, 2004

Initial Therapy *	Number of cases
Rifampicin/Isoniazid/Pyrazinamide/Ethambutol	40
Rifampicin/Isoniazid/Pyrazinamide	16
Rifampicin/Isoniazid/Ethambutol	1
Rifampicin/Isoniazid	1
Other **	2

* No details of drug therapy were recorded for 21 individuals notified with tuberculosis during 2004. Of these: ten were diagnosed at post mortem or died before their initial phase of therapy was complete, one left Northern Ireland shortly after initial notification, Treatment Outcome forms were not returned for four patients and drug details were not completed on Treatment Outcome forms for a further six patients.

** One patient was diagnosed initially with MDR-TB. The second patient was isoniazid resistant initially but, despite appropriate chemotherapy, also developed rifampicin resistance. Each patient therefore received prolonged treatment with 5 drug regime (pyrazinamide, ethambutol, ofloxacin, azithromycin, and cycloserine)

Continuation therapy

In 2004, continuation therapy was recorded for 55 (68 %) of tuberculosis cases. In all but three of these 55 cases, the treatment regimen was a combination of rifampicin and isoniazid (Table 9).

Table 9: Continuation therapies employed for the treatment of tuberculosis in Northern Ireland, 2004

Continuation therapy *	Number of cases
Rifampicin/Isoniazid	52
Rifampicin/Isoniazid/Pyrazinamide	1
Other (as described for Table 8)	2

* No details of continuation drug therapy were recorded for five individuals notified with tuberculosis during 2004: two patients who completed the initial phase of drug therapy left Northern Ireland and were lost to follow up, two patients failed to attend further appointments after completing the initial phase of chemotherapy and were lost to follow up and one patient refused to complete treatment because of severe side effects.

Adverse drug reactions were recorded in three cases during 2004 (5 % of cases for which initial therapy details were recorded). A rash caused by pyrazinamide was recorded for one case, significant hepatotoxicity was recorded in a second and severe nausea was recorded in a third.

3.6. Non-tuberculosis cases

During 2004, a total of 13 cases were found not to be due to tuberculosis and were, therefore, excluded from the main analysis. Eight notified cases of pulmonary tuberculosis was found, by culture, to be due to infection with mycobacteria other than *M. tuberculosis* or *M. bovis* (two *M. avium intracellulare,* four *M. malmoense,* one *M. chelonae* and one not specified). Three further cases, also initially suspected as having

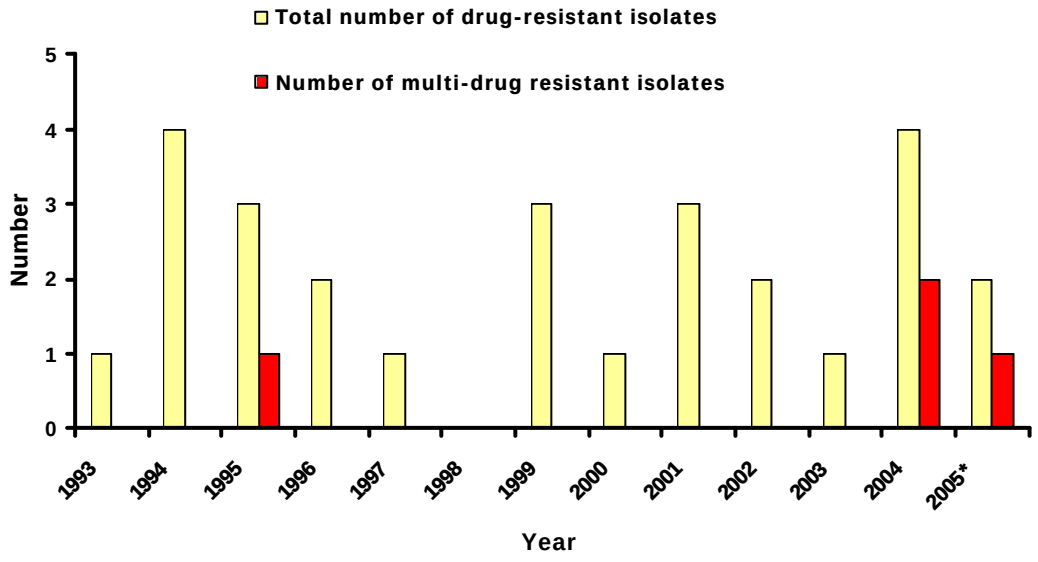
pulmonary tuberculosis, were denotified once other causes of illness had been established. The remaining two cases were removed from the dataset as they did not meet the criteria for notification.

3.7. Surveillance of mycobacterial isolates susceptibility to anti-tuberculous drugs in 2004

Sixty-two (52 pulmonary, ten non-pulmonary) *M. tuberculosis* isolates, together with three *M. bovis* isolates (two pulmonary, one non-pulmonary), were examined for susceptibility to anti-tuberculous drugs during 2004. Two *M. tuberculosis* pulmonary isolates were found to be resistant to both isoniazid & rifampicin (MDR). Both MDR-TB patients were of white ethnic origin and both were born in the UK (one had been working outside the UK for a number of years prior to diagnosis). Two further *M. tuberculosis* pulmonary isolates were found resistant to pyrazinamide only and, as expected, each of the *M. bovis* isolates was found pyrazinamide resistant.

The number of *M. tuberculosis* drug resistant isolates during 2004 is higher than that recorded during each of the last nine years (Figure 5). In addition, the first cases of MDR-TB in Northern Ireland since 1995 were seen in 2004. To date, susceptibility testing results are known for 45 *M. tuberculosis* isolates cultured during 2005. Two have been found to be drug resistant; one to isoniazid only and one to both isoniazid & rifampicin (MDR).

Figure 5: Incidence of drug resistance in isolates of *M. tuberculosis* Northern Ireland, 1995-2005*



* provisional data

4. Discussion

4.1. Enhanced surveillance of tuberculosis in England, Wales and Northern Ireland

Notification rates for tuberculosis in a number of Western European countries, including England and Wales, have been increasing since the late 1980's. In both 1998 and 1999, the Enhanced Surveillance of Tuberculosis notification rate for England and Wales was 11.0 per 100 000 population. Over the next four years it rose steadily, reaching a notification rate of 12.8 per 100 000 population by 2003. A further increase, to 13.4 per 100 000 population, has been recorded for 2004 [1] (Figure 6).

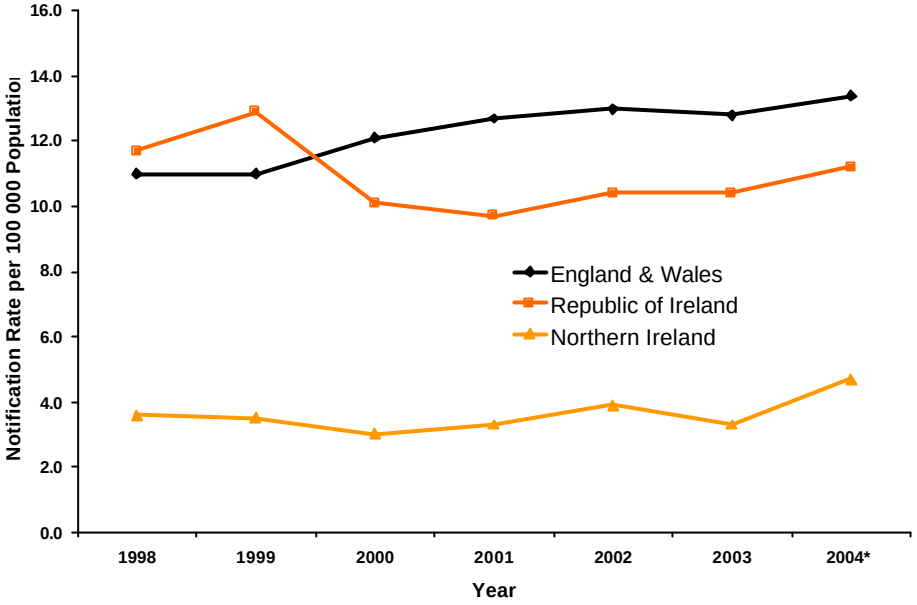
The notification rate in Northern Ireland still remains at approximately one third of that recorded for the UK as a whole. In 2003, the notification rate for Northern Ireland was 3.3 per 100 000 population and, for the UK overall (England, Wales & Northern Ireland), the rate was 12.5 per 100 000 population [2]. The corresponding figures for 2004 are: Northern Ireland rate of 4.7 versus overall UK rate of 13.1 [3].

This difference in rates between Northern Ireland and England and Wales continues to be due largely to the high numbers of notifications in the London Region. The 2004 rate for London was 42.0 per 100 000 population and this accounted for 44 % of all cases reported across England, Wales & Northern Ireland [3]. In contrast, Northern Ireland accounted for just over 1 % of all cases notified through the Enhanced Surveillance scheme during 2004. As stated in the HPA Tuberculosis Update of March 2006 [3] "The continuing increase in notification rates across the UK is largely confined to specific subgroups of the population in major cities. The increase reflects a combination of factors, including migration from high incidence countries, homelessness, HIV co-infection and, potentially, improvements in case reporting following the introduction of Enhanced Tuberculosis Surveillance"

Notification rates in the Republic of Ireland, although markedly higher than those in Northern Ireland, have not changed substantially during the time that epidemiological data on tuberculosis have been collated by the Health Protection Surveillance Centre, Dublin (Figure 6). In 1999, the annual notification rate was 12.9 cases per 100 000 population. This rate decreased to 10.1 per 100 000 population in 2000 and to 9.7 per 100 000 population in 2001. Since then, the Republic of Ireland rate has been increasing again: in both 2002 and 2003, the rate was 10.4 per 100 000 population and the provisional rate for 2004 is 11.2 per 100 000 population [4].

Figure 6: Rate of Tuberculosis per 100 000 population in England & Wales,

Republic of Ireland and Northern Ireland 1998- 2004*



* 2004 data for the Republic of Ireland [4] are provisional

Enhanced Surveillance of Tuberculosis commenced in Northern Ireland in 1992. Although the notification rate reached its lowest value during 2000, a reversal of this trend commenced in 2001 and continued to 2004 (Table 10). Provisional analysis of 2005 Northern Ireland data indicates that the rate of notification has fallen slightly once again.

Table 10: Number of tuberculosis notifications and rates per 100 000 population, Northern Ireland, 1992-2005

4.2. Incidence of tuberculosis in Northern Ireland by age

Year	Number of cases	Rate
1992	71	4.4
1993	77	4.7
1994	87	5.3
1995	84	5.1
1996	78	4.7
1997	70	4.2
1998	66	3.9
1999	57	3.4
2000	51	3.0
2001	55	3.3
2002	67	3.9
2003	57	3.3
2004	81	4.7
2005 (provisional)	76	4.4

For many years, tuberculosis in Northern Ireland has been a disease confined largely to older age groups. In 2000, 53 % of tuberculosis notifications were in those aged 65+. However, since then, the proportion of those that are 65+ years of age at the time of notification has been falling; by 2002, the figure was 42 % and, by 2004, it was 27 %. Provisional data for 2005 indicates that, again, only 27 % of cases were aged 65+ at the time of notification.

Analysis of data collected between 2000 and 2004 indicates that both the mean and median ages of those notified in Northern Ireland with tuberculosis have been falling with time (Table 11a). Although the number and proportion of cases imported into Northern Ireland has been increasing steadily since 2000 (Table 11b), this does not account wholly for the overall decrease in age at the time of notification. Table 11c shows that, for those known to have been born in the UK or Ireland, the average age at the time of notification fell by 7 years between 2000 and 2003, and by a further 6 years between 2003 and 2004. However, this downward trend across all age groups within the indigenous population appears to have slowed for the time being – as evidenced by provisional data for 2005 (Table 11c). In contrast, both the mean and median ages of those known to have been born outside the UK or RoI continue to fall (Table 11b).

Table 11a: Mean and median ages of all tuberculosis cases notified, Northern Ireland, 2000-2005

Year	All Countries of birth			
	Total number of cases notified	Age range	Mean age	Median age
2000	51	2-99	61.0	68.0
2001	55	3-92	55.0	58.0
2002	67	2-94	53.8	56.0
2003	57	1-89	52.8	53.0
2004	81	0-90	45.8	51.0
2005 (provisional)	76	0-87	48.4	48.0

Table 11b: Mean and median ages of tuberculosis cases known *not* to be

born in UK or Ireland, Northern Ireland 2000-2005

Year	Total number of cases notified	Known *not* to be born in UK/Ireland				
		Number of cases	Percentage of total cases	Age range	Mean age	Median age
2000	51	4	7.8%	32-43	39.0	41.0
2001	55	7	12.7%	27-85	41.7	34.0
2002	67	9	13.4%	24-49	37.6	38.0
2003	57	12	21.1%	21-44	34.1	35.0
2004	81	25	30.9%	19-73	34.1	28.0
2005 (provisional)	76	19	25.0%	13-65	30.9	27.0

Table 11c: Mean and median ages of tuberculosis cases known to be born in UK or Ireland, Northern Ireland 2000-2005

Year	Total number of cases notified	Known to be born in UK/Ireland				
		Number of cases	Percentage of total cases	Age range	Mean age	Median age
2000	51	43	84.3%	2-99	64.6	70.0
2001	55	36	65.5%	3-85	57.8	64.0
2002	67	58	86.6%	2-94	56.4	62.0
2003	57	45	78.9%	1-89	57.8	66.0
2004	81	55	67.9%	0-90	51.6	56.0
2005 (provisional)	76	56	73.7%	0-87	54.6	57.5

4.3. Tuberculosis in Northern Ireland by place of birth

Although the proportion of cases in Northern Ireland known to have been born outside the UK remains very much lower than in England & Wales, it has been increasing steadily since 2000 (Table 11b) and, in 2004, represented almost one third of all cases notified. Provisional data for 2005 indicates that the proportion of cases known to have been born outside the UK or RoI has decreased slightly, to 25 %. However, to date, some 37 % of those notified in Northern Ireland during 2006 were born outside the UK or RoI.

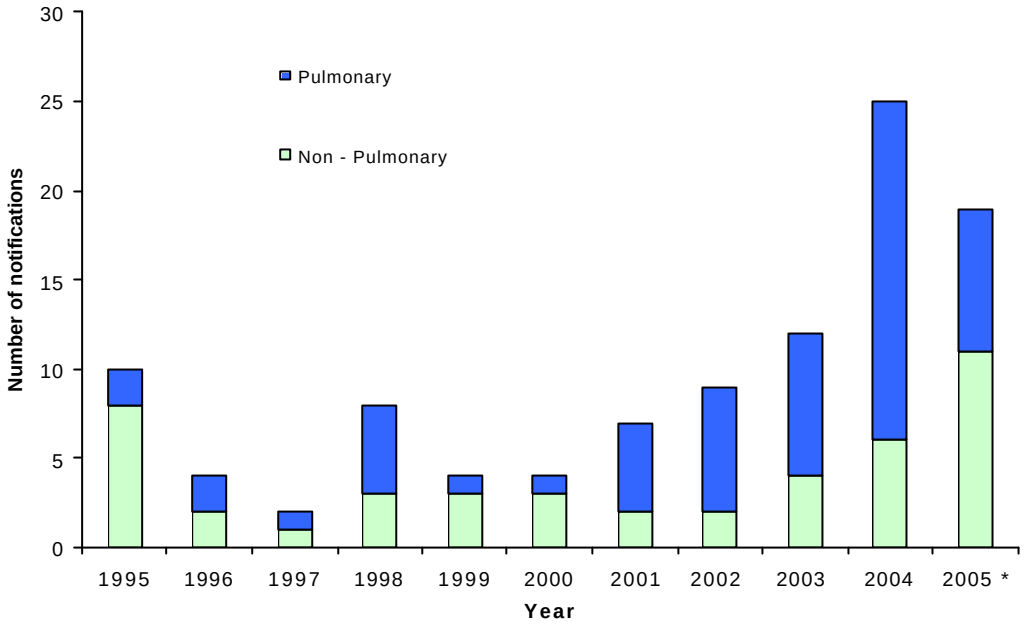
In Northern Ireland during 2004, 25 cases (31 % of all cases) occurred in individuals born abroad (Table 11b). Nineteen of the 25 cases were notified with pulmonary disease (Figure 7) and, of these, nine were both sputum smear and culture positive for *M. tuberculosis*. A further five cases were smear negative and, of these, four were found culture positive for *M. tuberculosis* and one was found culture positive for both *M. bovis* and *M. avium*. The remaining five cases were treated on the basis of their clinical symptoms and their history of close contact with other, known, culture positive pulmonary tuberculosis cases.

Each of the six cases born abroad and notified with non-pulmonary disease during 2004 was found culture positive for *M. tuberculosis*.

The year of first entry into the Province was recorded for 22 of the 25 cases born abroad. Fourteen out of the 22 cases developed disease within two years of entry to the UK and, of these, six developed disease within one calendar year of entry.

Provisional data for 2005 indicates that 19 cases (25 % of all cases notified) occurred in individuals born abroad. Eight of these 19 cases were notified with pulmonary tuberculosis, of which three were both sputum smear and culture positive for *M. tuberculosis* at the time of notification. The remaining five pulmonary cases were also culture positive for *M. tuberculosis*. The year of first entry into the UK was recorded for 17 of the 19 cases known to have been born abroad. Nine developed disease within two years of entry to the UK and, of these, three developed disease within one calendar year of entry.

Figure 7: Site of disease in notified tuberculosis cases born outside UK & Ireland, Northern Ireland, 1995-2005 *



* provisional data

4.4. Tuberculosis in Healthcare Workers

In January 2003, the UK Department of Health published a draft consultation paper, seeking views on the implementation of a new health clearance policy for healthcare workers joining the NHS (England) [6]. The proposals in this publication followed recommendations (made by an expert group in 2001) to assess the potential health risks posed to patients from health care workers new to the NHS infected with serious communicable diseases such as HIV, hepatitis B, hepatitis C and tuberculosis. The Department of Health received a large number of responses to the consultation and these are being considered for incorporation into the final guidance, which will be published in 2006 for implementation.

In 2004, only one healthcare worker was notified with tuberculosis - sputum smear and culture positive pulmonary tuberculosis. (This individual first entered the UK more than five years before notification and had worked previously at a TB hospital in a country with a high incidence of disease [5])

4.5. Incidence of M. bovis infection in Northern Ireland

There are, generally, only one or two human cases of *M. bovis* infection notified in Northern Ireland each year. As outlined on Page 4 of this Report, additional information is sought on any patient with culture confirmed *M. bovis* infection - in order to help identify potential source(s) of infection. In the past, the majority of these cases have been elderly patients with a reactivation of old disease. However, *M. bovis*

infection can also occur in an individual for whom no risk factors (animal contact, consumption of unpasturised milk etc.) have been identified. Table 12 shows that, between 1999 and 2004, a total of ten culture confirmed human cases of *M. bovis* infection in Northern Ireland were notified through Enhanced Surveillance of Tuberculosis – with no cases in either 2000 or 2002.

Of some concern is the number of new cases of laboratory confirmed *M. bovis* infection during 2005. Provisional data indicates that there were a total of five - all were patients notified with pulmonary disease (one with miliary TB also) and three were sputum smear positive at the time of notification. During 2005, two elderly patients with *M. bovis* infection died a short time after the commencement of treatment. Tuberculosis was listed as the cause of death in one case and as a contributing factor in the second. To date, questionnaires have been completed and returned for four of the five patients found to have *M. bovis* infection during 2005 (Table 12).

Table 12: Number of cases of *M. bovis* infection by site of disease and known risk factors, Northern Ireland, 1999-2005 *

Year	Total *M. bovis* culture positive	Number Pulmonary (ages and risk factors identified)	Number Non-Pulmonary (ages and risk factors identified)
2005 *	**5**	**5** > 70y - no risk factors identified, except age > 70y - Extensive worldwide travel & drinking unpasturised milk > 50y < 50y - residence located on farm with known bovine TB. < 50y - no risk factors identified	**0**
2004	**3**	**2** < 50y - no risk factors identified < 50y - no risk factors identified	**1** > 50y - previous laboratory report of TB (1997)
2003	**2**	**0**	**2** > 50y - previous history of TB > 80y - no risk factors identified, except age
2002	**0**	n/a	n/a
2001	**2**	**1** > 60y - no risk factors identified	**1** > 50y - agricultural/animal worker
2000	**0**	n/a	n/a
1999	**3**	**1** > 50y - previous history of TB	**2** < 50y - family farm < 50y - family farm

* provisional data

5. Outcome Surveillance

The collection of outcome data on tuberculosis cases has been ongoing in Northern Ireland since enhanced surveillance commenced in 1992, but has only been in use across England and Wales for cases notified since January 2001. Overall, outcome information was reported on 88 % of tuberculosis cases reported in England, Wales and Northern Ireland during 2003. This represents a continuing year on year improvement in outcome reporting within the UK - the corresponding figures for 2002 and 2001 were 85 % and 79 % respectively.[3] In Northern Ireland, treatment outcome information was reported for 96 % of cases in 2001 (the highest in the UK). This figure fell, to 91 %, in 2002. However, the percentage completion of treatment outcome forms in Northern Ireland has risen once again, to 95 %, for both 2003 and 2004.

Outcome information (Treatment Outcome form or death certificate) was available for 77 of the 81 cases notified in Northern Ireland during 2004. Fifty-five patients are known to have completed their full course of treatment and details of drugs prescribed were recorded on their outcome form. In addition, one patient commenced treatment but refused to continue because of severe side effects. Outcome forms were returned for a further six patients notified during 2004 - although details of drugs administered were not provided. Ten patients were diagnosed at post mortem or died shortly after the commencement of treatment and five patients commenced treatment but were lost to follow up. One of these five patients is known to have left Northern Ireland at the time of diagnosis and the remaining four patients failed to attend appointments.

CDSC (NI) would like to acknowledge the continued significant contribution made by CCDCs, microbiologists, chest physicians, consultant colleagues and their nursing and clerical staff to tuberculosis surveillance in Northern Ireland.

6. References

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