Identifying newborns who need to be vaccinated

The need for BCG in a newborn should be ascertained before delivery. Finland has a well-functioning system of public maternity clinics with almost universal attendance by pregnant mothers. A questionnaire to be used by midwives at maternity clinics is currently being tested with the guidance of the National Public Health Institute (Kansanterveyslaitos, KTL). When the questionnaire has been evaluated, training will take place to prepare for its implementation in all maternity clinics.

Training and education

As childhood TB is very rare in Finland [9], physicians' ability to suspect and diagnose it has declined. Very few paediatricians have ever seen a child with miliary TB or tuberculous meningitis. During the last 10 years, there has been only one case of paediatric tuberculous meningitis in Finland detected in an immigrant child [17]. With universal BCG, the risk of an infected child developing serious disease has been small. The medical community must be alerted to the real risk of TB in exposed unvaccinated children and the need for vigorous contact tracing.

Implementation of the new programme

The Ministry of Social Affairs and Health (Sosiaali-ja terveysministeriö) and KTL have agreed that KTL will take the lead in the preparation for the change to the targeted BCG programme. New official recommendations are being prepared but are not yet available.

A committee organised by the Finnish Lung Health Association (Filha ry), cooperating with the KTL and supported by the Ministry for Social Affairs and Health, has been preparing a new tuberculosis control programme for Finland. Several parts of the guideline have already been published in the national medical journal Suomen Lääkärilehti and are also available online [18]. The guidelines will be completed in 2006. While enhancing awareness and knowledge of TB the guidelines will support the preparation for the change to the new BCG programme.

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Original Articles

Euroroundup

Tuberculosis outcome monitoring – is it time to update European recommendations?

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We discuss tuberculosis treatment outcome monitoring and the adherence of countries in the WHO European Region to modifications introduced in 2001 to enhance inter-country comparability.
Outcomes for definite pulmonary tuberculosis cases were compared for cases reported in 2001 and 2000. Reporting was considered complete if 98% or more of cases originally notified had outcome reported. In both years, maximal period of observation was 12 months from start of treatment. In 2000, countries reported outcome as 'cured', 'completed', 'died', 'failed', 'defaulted', 'transferred' and 'other, not evaluated' for cohorts of new and retreated cases. In 2001, following changes, countries were also requested to monitor cases with unknown treatment history and two outcome categories were added – 'still on treatment' and 'unknown'.
Of 42 countries reporting outcomes in 2001, 74% (31) had

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nationwide, complete data, up from 50% (19/38) in 2000. Twelve of 21 countries that reported on observation period complied with that recommended. 'Defaulted' and 'transferred' were applied interchangeably with 'unknown'. Among new cases, 'still on treatment' was used by 15/31 countries (range: 1%-15%). 'Failed' was rarely recorded in western European countries (<1%).
European tuberculosis outcome monitoring should include all definite pulmonary cases, applying the standard period of observation and revised categories, and preferably reported using individual data.

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Key words: definitions, Europe, treatment outcome, tuberculosis surveillance

Introduction

In 1991 the World Health Assembly established targets for the detection and treatment of infectious tuberculosis cases, following the worldwide resurgence of tuberculosis [1]. Efforts by the World Health Organization (WHO) to monitor the progress of countries towards achieving these targets have necessitated the standardisation of surveillance definitions across countries [2,3]. A number of issues surfaced in the application of these definitions in national programmes, limiting the comparability of data between different countries and over time, and prompting modifications [4,5].

In the countries of the WHO European Region [6] (henceforth referred to as Europe), the key document on treatment outcome monitoring was published in 1998 by WHO and the International Union Against Tuberculosis and Lung Disease with a working group representing 37 European countries [7]. EuroTB, a network of national tuberculosis surveillance institutions in Europe, has been working with WHO since 2000 to improve completeness of reporting and standardisation of national treatment outcome monitoring data in Europe. Each year, EuroTB and WHO jointly collect data on tuberculosis cases notified in the previous calendar year, as well as outcome reports for cases notified the year before the last. Revisions to the definitions and parameters of cohort analysis were discussed between EuroTB and WHO and piloted during the annual collection of tuberculosis notification data for 2001 in an effort to improve inter-country comparability. We identify unsolved issues in outcome monitoring in Europe and recommend an update to its methodology based on the results of this analysis.

Methods

Classification of outcomes and cohorts

For the collection of data on tuberculosis cases notified in 2000, all 51 European countries were requested to classify their outcomes using the six standard categories ('cured', 'completed', 'died', 'failed', 'defaulted' and 'transferred') [TABLE 1] [7]. The first outcome observed within 12 months from start of treatment or diagnosis would be considered definitive. If treatment lasted beyond 12 months for any reason, a case would be classified as 'other, not evaluated'. Cases lost to follow up were to be classified as 'defaulted' (unless fulfilling the conditions for 'transferred'), and cases diagnosed post mortem were to be classified as 'died'. Those found to have been wrongly diagnosed as tuberculosis or notified more than once in the same calendar year, as well as those notified from areas not participating in outcome monitoring, were to be excluded from the cohort. Monitoring was limited to new and retreated cohorts of definite pulmonary cases that were culture positive, or smear positive if culture was not available. Data were to be submitted in aggregate form on paper or electronically.

Changes were introduced, beginning with the cohorts of cases reported to European surveillance for the year 2001. Countries were to report outcomes on all the definite cases that had been notified to EuroTB for 2001, including those with unknown previous treatment history. Two additional outcome categories were introduced: 'still on treatment' (at 12 months) and 'unknown' [TABLE 1]. The 'still on treatment' category had already been contemplated in the European recommendations as a way of dealing with previously treated cases failing a full re-treatment course [7]. Instructions on data submission and definitions were developed in English and Russian [8]. Countries were requested to report outcomes in individual format where possible. Participants were invited to give feedback on compatibility between national and recommended definitions.

TABLE 1

Tuberculosis treatment outcome categories, 2000 and 2001

Cured	Treatment completion and: • culture becoming negative on samples taken at the end of treatment and on at least one previous occasion or • sputum microscopy becoming negative for acid-fast bacilli at the end of treatment and on at least one previous occasion
Completed	Treatment completion, not meeting the criteria to be classified as cure or treatment failure
Died*	Death before starting treatment or during treatment, irrespective of cause
Failed	Culture or sputum microscopy remaining positive or becoming positive again at 5 months or later during treatment
Defaulted†	Treatment interrupted for 2 consecutive months or more
Transferred	Patient referral to another clinical unit for treatment and information on outcome not available / not obtained
Still on treatment§	Patient still on treatment at 12 months and who did not meet any other outcome during treatment. It includes patients with: • treatment prolonged because of side effects / complications, initial regimen planned for > 12 months • initial treatment changed due to polyresistance (ie resistance to at least two first line drugs) on the isolate taken at the start of treatment • information on the reasons for being still on treatment not available
Unknown§	Information on outcome not available

* Includes cases diagnosed post mortem
† Includes cases not starting treatment following diagnosis
§ Categories introduced from 2001
Adapted from [7]

Other definitions

For the purpose of this article, a new case is defined as a patient with no history of curative, combination antituberculosis treatment or one who has had such treatment for less than four weeks. A retreated case is a patient who had at least one treatment episode lasting four weeks or more before the current notification but not in the same calendar year; a relapse is a retreated case, previously declared cured, and notified again with definite tuberculosis. Multidrug resistance (MDR) refers to resistance to at least isoniazid and rifampicin. 'Success' refers to the sum of 'cured' and 'completed'. Countries are grouped in three geographic areas: EU & West (countries of the European Union post-May 2004, plus Andorra, Iceland, Israel, Norway and San Marino), East (countries of the former Soviet Union excluding the Baltic states) and Centre (other countries in the Balkans and Turkey).

Analysis

Outcomes are expressed as the percentage of cases in the respective outcome category divided by all cases included in the cohort. The most recent cohorts reported were used for both numerator and denominator. Data used are those received up to 28 February 2005. For 2000 cohorts, cases classified under 'other, not evaluated' were retained in the denominator. Unless stated otherwise, the median of outcomes is used for inter-country comparison. Arithmetic means are used where statistical significance is tested on cases pooled from different countries (P value limit for significance = 0.001). Smear positive cohorts are used for both years in countries where culture positive cohorts were not available.

Completeness of cohorts is calculated as the percentage of definite cases included in outcome monitoring cohorts divided by the number of definite cases previously notified [TABLE 2]. It could exceed 100% if outcome reports included additional cases identified subsequent to initial notification. This commonly occurs after reclassification of cases based on belated retrieval of culture results. Outcome results are discussed for new, definite cases from nationwide cohorts reported in 2001 with 98% completeness or more [TABLE 3]. As completeness tended to be lower in 2000, changes in outcome coding between 2000 and 2001 are discussed solely for countries with >90% completeness in 2000 and reporting more than 10 cases [TABLE 3, countries in bold].

Results

Completeness of cohorts

Whereas 38 of 51 countries submitted outcome data for definite pulmonary cases notified in 2000, the number of countries increased to 42 in 2001. Ten countries did not report outcome information in 2000 or 2001 (Belarus, Croatia, Finland, France, Greece, Luxembourg, Monaco, Spain, Switzerland, Ukraine). In 2000, 19/38 reporting countries had nationwide cohorts with at least 98% completeness, increasing to 31/42 in 2001 [TABLE 2]. The total number of cases included in complete cohorts increased from 25 735 in 2000 to 57 692 in 2001. In 2001, seven countries reported outcome for cases with unknown treatment history, which represented between 1% and 26% of cases reported (1206 cases in total). The number of countries reporting nationwide, complete cohorts increased in all geographic areas. Eleven countries, all from the EU & West, sent individual outcome data.

Compatibility of period of observation and outcome categories

Romania and 20 countries from the EU & West submitted feedback on their coding experience in 2001. Twelve countries (57%) stated that they applied a 12 month maximal observation period, while in the others this was longer (three countries) or not defined. Fourteen countries (67%) reported no incompatibilities between outcome categories proposed and those in national use. Three countries (14%) noted differences with one category while four countries differed in more than one category. 'Cured' was not always differentiated from 'completed' (four countries), 'failed' was sometimes defined differently, or was not available as a category (three countries), and 'defaulted' was sometimes applied in a different way (three countries). A number of countries could distinguish between death from tuberculosis or from other causes. One country reported that an outcome could be changed within the 12-month period if, for example, a defaulter resumed treatment after an interruption.

Classification of outcomes in 2001 and changes from 2000

Among nationwide, complete cohorts of new cases in 2001 [TABLE 3], 'success' ranged from 54% to 100% (median: 76%). 'Died' was more frequent in the EU & West compared with the Centre and East (means: 9% versus 4%, P<10-6). In general, the number of 'unknown' was inversely proportional to the total of 'defaulted' and 'transferred'. In 20 countries that reported fewer than 2% of cases as 'unknown', cases overall were classified more often as 'transferred' or 'defaulted' than in the 12 countries with a higher proportion of 'unknown' (means: 8% versus 5%; P<10-6). 'Failed' was rarely reported in the EU & West (<1%) in contrast to the Centre (3%) and East (8%). Conversely, 'still on treatment' was more commonly reported in the EU & West (1%; country range: 0%-15%) than in the Centre and East (0%; 0%-9%).

In 2001, 15 of 31 countries reporting outcomes had cases classified as 'still on treatment' (1%-15%) and 15 as 'unknown' (1-30%), with higher proportions in both categories amongst retreated cases (data not shown). Three types of shifts in outcome coding could be discerned in 2001 cohorts when compared to 2000 [TABLE 3]

a) 'other, not evaluated' shifted to 'still on treatment' in Estonia, Latvia and Portugal;

b) 'other, not evaluated' shifted to 'unknown' in Austria, and possibly in Sweden where this shift was accompanied by an increase in 'still on treatment' and a drop in 'success';

c) 'defaulted' shifted to 'unknown' in Ireland.

Discussion

Changes to the outcome monitoring methodology introduced in 2001 were meant to enhance inter-country comparability and ensure that all definite pulmonary cases would be monitored and assigned an outcome. Cases with unknown previous treatment history, or who were still on treatment at 12 months, would be retained in the calculation of cohort completeness. Ensuring completeness would reduce the likelihood of selection bias when reporting outcomes. In countries reporting nationwide outcome data, cases notified in areas or units not participating in monitoring would be classified as 'unknown' and kept in the denominator for the calculation of outcome percentages. Reducing the proportion of 'unknown' would then become an intermediate goal to improve coverage.

The increase in the proportion of countries submitting nationwide cohorts from 37% to 60%, which more than doubled the size of complete cohorts, is an important achievement in European tuberculosis surveillance. However, sustaining or improving upon this achievement in future is not assured, especially in certain Eastern countries where reporting systems are not yet stable. The definition of a retreated case is not harmonised, particularly in countries of the former Soviet Union, and has at times changed in the interim [9]. This precludes conclusive discussion of outcomes among retreated cases. For many countries, the compatibility between recommended and national outcome monitoring parameters is not known. In countries providing information, the period of observation was not standardised, and this limits inter-country comparison, since chances of success may vary with the duration of evaluation. Another possible source of bias when comparing national programmes is the absence of a lower time limit for defining treatment completion, which may therefore be expected to vary substantially if drug regimens are not standardised. Likewise, 'success' may improve if outcome is changed after the case first satisfies the definition of another outcome category (eg, reclassification of defaulters). There is evidence that 'defaulted', 'transferred' and 'unknown' tend to be used interchangeably, thus reducing the possibility of meaningful comparison of these categories at European level. Having a sub-category of 'died' for cases dying directly from tuberculosis rather than a concurrent cause could be useful in programme monitoring [7] but this would require a harmonised definition of which cases to include.

The shift observed from 'other, not evaluated' to the 'still on treatment' category was anticipated, since the former category was reserved for cases on prolonged treatment. In Portugal, where drug resistance is low, this shift has largely been caused by the continued use of long term chemotherapy regimens for non-MDR tuberculosis (A Fonseca Antunes, personal communication, 11 May 2005).

TABLE 2

Size and completeness of treatment outcome cohorts, definite pulmonary tuberculosis cases*, Europe, 2000 and 2001

Geographic area	Tuberculosis notifications, 2000			Tuberculosis notifications, 2001		
Country	Total notified (A)	Total with outcomes (B)	Completeness† (B/A, %)	Total notified (C)	Total with outcomes (D)	Completeness† (D/C, %)
EU & West						
Andorra	5	7	>100%	3	3	100%
Austria	666	621	93%	590	590‡	100%
Belgium	758	660	87%	739	724	98%
Cyprus	-	-	-	26	26	100%
Czech Republic	815	720	88%	729	729‡	100%
Denmark	313	129	41%	254	213	84%
Estonia	516	516 r	100%	557	557‡	100%
Germany	-	1155	-	3943	3943‡	100%
Hungary	896	961	107%	917	917‡	100%
Iceland	7	7	100%	7	7‡	100%
Ireland	182	186	>100%	122	181	>100%
Israel	248	346	>100%	249	313	>100%
Italy	-	338 s	-	1212	315 s	26%
Latvia	1278	1278	100%	1275	1335	>100%
Lithuania	1490	1490 r	100%	1698	1698	100%
Malta	9	9	100%	10	10‡	100%
Netherlands	591	584	99%	627	627‡	100%
Norway	111	111	100%	156	156‡	100%
Poland	-	270 s	-	3699	3636	98%
Portugal	2042	2104	>100%	2097	2241	>100%
San Marino	1	1	100%	0	0	-
Slovakia	528	528	100%	517	517‡	100%
Slovenia	285	285	100%	273	273‡	100%
Sweden	128	121	95%	111	113	>100%
United Kingdom	-	-	-	2477	1874	76%
Centre						
Albania	-	-	-	191	191	100%
Bosnia & Herzegovina	1508	1294	86%	1618	1551	96%
Bulgaria	-	-	-	-	429 s	-
Macedonia	183	168	92%	190	190	100%
Romania	13 431	15 042	>100%	13 536	14 863	>100%
Serbia & Montenegro	-	280 s	-	372	372 s	100%
Turkey	4315	3461	80%	4444	4359	98%
East						
Armenia	686	501 s	73%	330	330 s,r	100%
Azerbaijan	964	964 r	100%	1689	1689	100%
Georgia	1451	1277	88%	1691	1691	100%
Kazakhstan	12 926	11 682 r	90%	12 095	11 794 r	98%
Kyrgyzstan	1726	1511 r	88%	1774	1754 r	99%
Moldova, Rep of	651	651 n	100%	1250	1109 r	89%
Russian Federation	-	5310 s	-	4933	4912 s,r	100%
Tajikistan	434	665 n	>100%	781	768 r	98%
Turkmenistan	-	1512	-	1797	1797	100%
Uzbekistan	-	1794 s	-	854	854 s,n	100%

n = new cases only; r = retreated cases only include relapses; s = selected areas (non-nationwide)

* Pulmonary culture positive cases, except for countries underlined (smear positive)

† Values >100% indicate complete cohorts with additional reporting of outcome on cases included in monitoring after the initial notification. 2001 cohorts also include cases with unknown treatment history if present

‡ Individual outcome data

In Estonia, however, 'still on treatment' cases were mostly MDR (data not shown), and a similar explanation would be likely for Latvia, another Baltic state with a high MDR burden [10]. In Lithuania, the proportion of 'still on treatment' in 2001 was more modest than in neighbouring Baltic states despite similar MDR levels [11]. This shift was not observed in other former Soviet countries probably because MDR cases were mostly classified as 'failed' both in 2000 and 2001. Such differences may represent variability in patient access to drug-susceptibility testing and appropriate chemotherapy.

Where access to laboratory testing is good, MDR cases are commonly identified ahead of the fifth month of treatment and embarked on long term medication, making it more likely that they are classified as 'still on treatment' at 12 months rather than 'failed'. In much of western Europe, 'failed' is rarely used, because the follow-up bacteriological information required to define this category is often not captured by surveillance systems. In the new definitions for outcome monitoring in MDR cases, 'failed' is reserved for cases who are bacteriologically positive at a much later stage in the course of their second line treatment [12]. Until such time as second line treatment becomes widely available in all European countries, the category 'failed' will have to be retained. As more countries develop the capacity to rapidly diagnose drug resistance and to change over to second line regimens, the 'still on treatment' option will have a wider utility, and the 'failed' category will become less important.

Table 3

Tuberculosis treatment outcomes, new definite pulmonary cases, Europe, 2000 and 2001*

Geographic area	Total number		Success %		Died %		Failed %		Defaulted %		Transferred %		Other / not evaluated %		Still on treatment %		Unknown %	
Country	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001†	2000†	2001†	2000†	2001
EU & West																		
Andorra	7	2	86	100	0	0	0	0	14	0	0	0	0	-	-	0	-	0
Austria	**607**	**545**	**71**	**76**	**12**	**9**	**0**	**0**	**6**	**6**	**0**	**0**	**12**	**-**	**-**	**0**	**-**	**8**
Belgium	577	534	65	63	12	9	1	0	18	1	2	2	3	-	-	1	-	24
Cyprus	-	25	-	92	-	0	-	0	-	0	-	8	-	-	-	0	-	0
Czech Republic	645	704	69	69	18	5	1	0	2	1	2	0	8	-	-	0	-	24
Estonia	**401**	**351**	**73**	**68**	**8**	**9**	**1**	**2**	**6**	**11**	**0**	**0**	**12**	**-**	**-**	**10**	**-**	**0**
Germany	1003	2589	77	66	16	12	0	0	2	2	4	0	0	-	-	5	-	15
Hungary	**778**	**732**	**61**	**54**	**14**	**10**	**3**	**10**	**12**	**7**	**6**	**3**	**4**	**-**	**-**	**15**	**-**	**1**
Iceland	6	7	83	86	17	0	0	0	0	14	0	0	0	-	-	0	-	0
Ireland	**160**	**129**	**53**	**59**	**10**	**7**	**0**	**1**	**37**	**3**	**0**	**0**	**0**	**-**	**-**	**0**	**-**	**30**
Israel	**320**	**288**	**78**	**79**	**11**	**9**	**1**	**1**	**3**	**6**	**7**	**3**	**1**	**-**	**-**	**0**	**-**	**3**
Latvia	**957**	**1004**	**76**	**77**	**9**	**7**	**2**	**1**	**6**	**7**	**0**	**0**	**6**	**-**	**-**	**9**	**-**	**0**
Lithuania	**1067**	**1142**	**76**	**74**	**7**	**10**	**3**	**2**	**12**	**11**	**1**	**0**	**1**	**-**	**-**	**2**	**-**	**0**
Malta	8	9	100	89	0	11	0	0	0	0	0	0	0	-	-	0	-	0
Netherlands	**543**	**601**	**87**	**86**	**6**	**4**	**0**	**0**	**5**	**7**	**1**	**0**	**0**	**-**	**-**	**2**	**-**	**0**
Norway	**105**	**145**	**78**	**86**	**10**	**6**	**3**	**0**	**1**	**3**	**9**	**6**	**0**	**-**	**-**	**1**	**-**	**0**
Poland	214	3155	72	76	11	6	6	1	6	6	5	1	0	-	-	0	-	11
Portugal	**1893**	**2024**	**82**	**80**	**5**	**5**	**0**	**0**	**4**	**5**	**2**	**3**	**6**	**-**	**-**	**6**	**-**	**0**
Slovakia	**421**	**413**	**83**	**86**	**14**	**11**	**1**	**0**	**2**	**1**	**0**	**0**	**1**	**-**	**-**	**1**	**-**	**0**
Slovenia	**247**	**250**	**84**	**79**	**10**	**14**	**0**	**0**	**3**	**4**	**3**	**1**	**0**	**-**	**-**	**2**	**-**	**0**
Sweden	**112**	**106**	**79**	**62**	**11**	**12**	**0**	**1**	**2**	**3**	**0**	**3**	**8**	**-**	**-**	**7**	**-**	**12**
Centre																		
Albania	-	177	-	81	-	5	-	3	-	3	-	0	-	-	-	0	-	8
Macedonia	**152**	**164**	**86**	**89**	**4**	**0**	**2**	**2**	**7**	**8**	**1**	**0**	**0**	**-**	**-**	**0**	**-**	**1**
Romania	**12 071**	**10 960**	**77**	**71**	**4**	**4**	**8**	**6**	**8**	**6**	**0**	**1**	**4**	**-**	**-**	**1**	**-**	**11**
Turkey	3461	4359	73	72	3	2	0	0	6	5	6	5	12	-	-	9	-	7
East																		
Azerbaijan	**890**	**1421**	**90**	**77**	**1**	**4**	**2**	**8**	**3**	**7**	**4**	**2**	**0**	**-**	**-**	**0**	**-**	**1**
Georgia	807	1014	63	67	3	2	9	7	25	14	0	8	0	-	-	0	-	1
Kazakhstan	**8781**	**8894**	**79**	**78**	**5**	**5**	**10**	**12**	**3**	**4**	**3**	**2**	**0**	**-**	**-**	**0**	**-**	**0**
Kyrgyzstan	1233	1458	82	81	3	5	4	6	5	6	6	2	0	-	-	0	-	0
Tajikistan	665	670	77	72	15	14	8	12	0	0	0	2	0	-	-	0	-	0
Turkmenistan	1017	1243	81	64	9	9	6	12	3	14	1	0	0	-	-	1	-	0

* The two columns under Total number show total new cases in outcome cohorts by year; value in other columns are percentage outcomes. Excluding countries with incomplete (<98%) and/or non-nationwide cohorts, and San Marino (0 cases) in 2001. Countries **in bold** had >10 cases and > 90% completeness in 2000 (see Methods)

† 'Other/not evaluated' discontinued from 2001; 'still on treatment' and 'unknown' introduced in 2001

In conclusion, outcome should be reported for all definite pulmonary cases notified, regardless of treatment history. The 12-month maximum period of observation should be applied for the classification of all outcomes. Cases treated beyond 12 months and having MDR tuberculosis (identified at start or during the current treatment episode) would form the subject of continued monitoring with a longer period of observation (24-36 months).

The eight outcome categories proposed can be used for national outcome monitoring. Owing to the incomplete differentiation of 'cured' from 'completed', and to the non-uniform use of 'defaulted', 'transferred' and 'unknown' in classifying cases lost to follow up, analysis of outcome monitoring at European level and inter-country comparison should be based on five categories: 'success', 'death', 'failed', 'still on treatment' and 'others'. European countries should further standardise their parameters for tuberculosis outcome monitoring in order to enable a more meaningful comparison of programme performance between countries and over time. In the West, where tuberculosis patients are older and deaths are thus expected to be higher, it is all the more imperative to bolster patient follow up if countries are to approach the 85% success target.

The WHO and EuroTB should continue working together to harmonise monitoring methodology, promote the evaluation of control programmes and support countries to provide nationwide, complete data. In order to better understand the determinants of outcome, collection of tuberculosis notification data on an individual case basis should be promoted.

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ORIGINAL ARTICLES

Surveillance report

EPIDEMIOLOGY AND RESPONSE TO THE GROWING PROBLEM OF TUBERCULOSIS IN LONDON

D Antoine[1], H Maguire[2], A Story[1]

As in other countries with low tuberculosis incidence, tuberculosis in England and Wales tends to be concentrated in some subgroups of the population, and is mainly a problem in large cities. In 2003, almost half of all tuberculosis cases reported in England and Wales were from London, where the incidence was almost five times higher than in the rest of England and Wales. While the highest proportion of cases occur in foreign born patients, evidence from a large outbreak of drug resistant tuberculosis points to ongoing active transmission among marginalised groups including homeless people, hard drug users, and prisoners. Increasing rates of disease and levels of drug resistance, combined with a concentration of disease in hard-to-reach risk groups now present a major challenge to tuberculosis control in the city. To respond to the changing epidemiology observed in recent years, treatment and control services are being reconfigured,

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