

Annual Prevalence and Treatment Estimates for Nontuberculous Mycobacterial Pulmonary Disease in Europe: A NTM-NET Collaborative Study

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Introduction

The prevalence of nontuberculous mycobacterial pulmonary disease (NTMPD) has been increasing in Europe, but, comprehensive analyses and reliable estimates on treatment practices are lacking. We developed methods to assess annual prevalence, and used nationally representative chart audits to evaluate treatment practices in 5 European countries (EU5): United Kingdom (UK), France, Germany, Italy, and Spain.

Methods

- i. **Prevalence estimation¹:** NTMPD patients diagnosed annually was estimated by a 2-round Delphi method independently by 6 experts, that included anonymous feed-back of the 1st round groups estimates. The panel was asked:
 1. To estimate the annual NTMPD prevalence rate for each of the five countries and the most likely annual prevalence range;
 2. To provide comments/rationale for each estimate.
- ii. **Patient data extraction:** A representative sample of physicians extracted treatment information from records of NTMPD patients with a confirmed diagnosis of *Mycobacterium avium* complex (MAC) or *M. abscessus* pulmonary disease.
 - Phase 1: Survey to determine distribution of physicians that diagnose and treat NTMPD patients by specialty (11 questions)
 - Phase 2: Questionnaire related to treatment of NTMPD patients (33 questions with several subquestions)

Number of Physicians by Stage of Study	
Contacted Physicians	2970
Phase 1 Physician Participants	2585 (87%)
Total without Qualified Patients	1828
Qualified Phase 2 Physicians	757
Phase 2 Physician Participants	446 (59%)

Country	Number of patients included in phase 2
France	206
Germany	211
Italy	210
Spain	230
UK	155

Results

COUNTRY OR REGION	Annual NTMPD Prevalence ¹ (Pop/100,000)	Standard Deviation of Prevalence Estimates (Pop/100,000)	Standard Deviation of Estimated Totals (# of patients)
France	6.0	1.7	± 1,093
Germany	6.5	1.2	± 992
Italy	6.1	1.2	± 731
Spain	5.9	1.1	± 515
United Kingdom	6.5	1.9	± 1,200
EU5	6.2		± 4,530

Table 1: Consensus estimates of annual NTMPD prevalence rate using a 2-round Delphi methodology (¹see Methods).

	Annual NTMPD prevalence by region (Pop/100,000)	Estimated number of NTMPD patients		Annual NTMPD prevalence by region (Pop/100,000)	Estimated number of NTMPD patients
FRANCE			SPAIN		
Parisian	13,6	1609 (42%)	Madrid	8,4	531 (19%)
Northwest	7,6	963 (25%)	South	6,5	776 (28%)
Southeast	4,1	638 (16%)	East	6,5	869 (32%)
Northeast	3,7	534 (14%)	Central	5,3	299 (11%)
Southwest	1,3	112 (3%)	North	3,3	289 (10 %)
Total	6,0 ¹	3856	Total	5,9 ¹	2764
GERMANY			UK		
East	8,2	1656 (31%)	England	7,0	3674 (89,6%)
West	7,1	1976 (37%)	Scotland	6,7	350 (8,5%)
North	6,3	597 (11%)	N. Ireland	2,9	51 (1,3%)
South	3,9	1143 (21%)	Wales	0,9	28 (0,7%)
Total	6,5 ¹	5372	Total	6,5 ¹	4103
ITALY			ITALY		
Central	10,4	1221 (33%)	South	7,3	1489 (40%)
North	3,8	1003 (27%)	Total	6,1 ¹	3713

Table 2: Regional differences in the estimated annual NTMPD prevalence rate and of the number of NTMPD patients in France, Spain, UK, Germany, and Italy (¹see Methods).

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Figure 1: Diagnosing physicians, NTM-species and severity of NTMPD at first presentation. MAC is the predominant species reported.

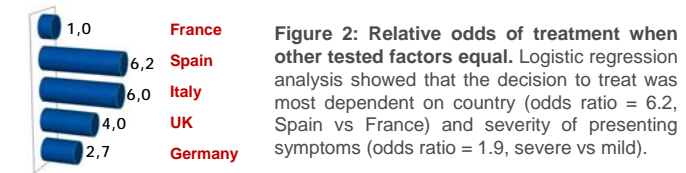


Figure 2: Relative odds of treatment when other tested factors equal. Logistic regression analysis showed that the decision to treat was most dependent on country (odds ratio = 6.2, Spain vs France) and severity of presenting symptoms (odds ratio = 1.9, severe vs mild).

Conclusion

Annual prevalence of NTMPD is estimated to be uniform on a per capita basis in EU5, but heterogeneous within different regions.

- Reliable epidemiological data are missing.
- A surveillance system is urgently needed not only to confirm these data, but to monitor treatment outcome and to plan prospective treatment trials.

2/3 of NTMPD patients already have moderate or severe NTMPD at diagnosis. The percentage of patients treated varies widely by country and severity.

- NTMPD patients need to be diagnosed early in the course of the disease. Physicians need to be better educated about risk factors and screening indications.

Critical gaps in appropriate treatment practices need to be addressed in the future; it may be advisable to refer NTMPD patients to specialized physicians, who preferably are able to include these in prospective clinical trials.