



Pulmonary Tuberculosis Diagnosed at a Fourth Presentation in a Patient with Limited Language Access: A Narrative Review of Where Diagnostic Delay Accrues

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Abstract

A patient who attends four times before tuberculosis is diagnosed invites an obvious explanation: the system failed to listen. The published data support a more uncomfortable and more useful account, in which the two halves of the delay behave in opposite directions depending on who the patient is.

Objectives: *To review the published evidence on diagnostic delay in pulmonary tuberculosis in low-incidence settings: how the delay divides between patient and health system, how that division differs between migrant and native-born populations, and what role language and access play.*

Material and Methods: *Narrative review of multicentre cross-sectional studies, regional cohorts, qualitative systematic reviews and society correspondence indexed in PubMed and the major infectious disease, respiratory and public health journals. No new patient data were generated; every estimate quoted is one published by the original investigators.*

Results: *In a retrospective multicentre study of 669 patients across 10 Italian hospitals, migrants had a substantially longer patient-related delay than native-born patients (median 90 against 10 days) but a substantially shorter health-system delay (5 against 40 days), producing a longer total delay overall (96 against 65 days), all $p < 0.0001$. A separate Italian multicentre study of 137 patients reported a median total delay of 66 days, of which 31 was health-system and 14.5 patient-related, with first contact through a general practitioner independently associated with health-system delay exceeding ten weeks.*

Conclusion: *Total delay is the wrong single number to work with, because its components have different causes and different remedies. Language and access barriers act principally before the patient reaches care, while diagnostic suspicion acts after, and interventions aimed at one will not touch the other.*

Abbreviations: HDD – Health system-related Diagnostic Delay, IQR – Interquartile Range, OR – Odds Ratio, PDD – Patient-related Diagnostic Delay, TB – Tuberculosis, TDD – Total Diagnostic Delay.

Keywords: Pulmonary Tuberculosis; Diagnostic Delay; Migrant Health; Language Access; Health System Delay

Introduction

Tuberculosis remains a substantial public health problem in low-incidence European countries, where incidence in Italy has been estimated at around 6.1 per 100,000 with up to half of cases occurring in migrants [1,2]. Delay in diagnosis matters twice: it worsens the individual outcome and it extends the period of transmission [3,4].

Diagnostic delay is conventionally divided into a patient-related component, from symptom onset to first presentation, and a health-system component, from first presentation to diagnosis [5,6]. That division is not merely descriptive. The two intervals have different determinants and respond to entirely different interventions.

Migrant populations are consistently reported to experience worse tuberculosis outcomes and greater barriers to care, with language among the barriers most often cited [7,8,9,22,23]. Screening at entry identifies a proportion but does not address disease arising later [10,24,25]. This review examines what the quantitative data show about where the time is actually lost.

Material and Methods

Search strategy: PubMed and the archives of the major infectious disease, respiratory and public health journals were searched for studies of diagnostic delay in tuberculosis. Search terms combined tuberculosis with diagnostic delay, patient delay, health system delay, migrant, interpreter and language barrier. Reference lists of systematic reviews [7,10] were screened by hand for primary sources.

Eligibility: Studies were included if they quantified diagnostic delay in defined populations, identified determinants of delay, or characterised the experiences of migrants accessing tuberculosis services. Qualitative studies are cited for mechanism rather than magnitude and are identified as such.

Data extraction and handling: Design, setting, sample size, the definition of each delay interval and the reported estimate were extracted as published. Whether an interval is patient-related or health-system is reported alongside every figure, because studies differ in where they place the boundary and because the central finding of this review depends on keeping the two apart. No pooling or re-analysis was performed. Figures 1 to 4 and Tables 1 and 2 reproduce published values only. This is a narrative synthesis and was not registered as a systematic review.

Results

The multicentre comparison: A retrospective, multicentre, cross-sectional study collected tuberculosis cases from 10 Italian hospitals between 2018 and 2023, including 669 patients of whom 390 were migrants and 279 native-born (Figure 2) [11]. It reported each delay component separately, which is what makes it useful.

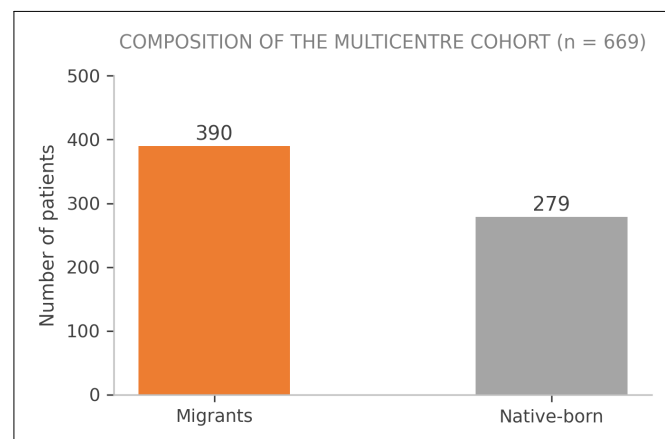


Figure 2: Composition of the multicentre Italian cohort [11]

The components move in opposite directions: Migrants had a markedly longer patient-related delay, at a median of 90 days against 10 for native-born patients, but a markedly shorter health-system delay, at 5 days against 40. The net effect was a longer total delay, 96 against 65 days, with $p < 0.0001$ for all three comparisons (Figure 1) [11]. The overall disparity is therefore real, and it is produced entirely before the patient reaches a clinician.

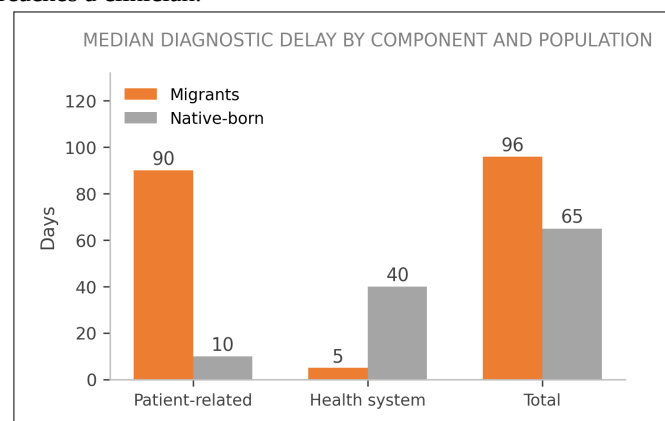


Figure 1: Median diagnostic delay by component in migrant and native-born patients [11]

What the system contributes: A separate Italian multicentre study enrolled 137 consecutive patients at seven referral centres and reported a median total delay of 66 days (IQR 31 to 146), of which the health-system component was 31 days (IQR 7.25 to 85) and the patient component 14.5 days (IQR 0 to 54) (Figure 3) [12]. In that cohort the delay attributable to health services was roughly twice that attributable to patients. Extrapulmonary disease (OR 4.3, 95% CI 1.4 to 13.8) and first contact with a general practitioner rather than a hospital (OR 5.1, 95% CI 1.8 to 14.5) were independently associated with health-system delay exceeding ten weeks [12].

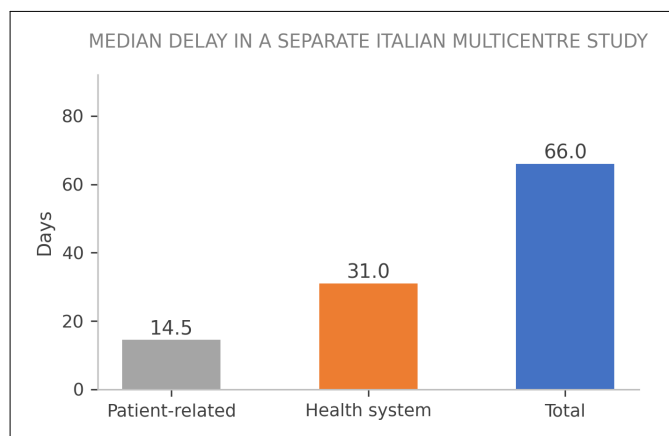


Figure 3: Median delay components in a separate Italian multicentre study [12]

A consistent pattern across cohorts: An earlier regional study in Emilia-Romagna found median patient, health-care and total delays of 7, 36 and 65 days. Recent migrants, defined as those in Italy for three years or less, had the longest patient delay at 16 days, while Italian-born patients had the longest health-care delay at 60 days (Figure 4) [13]. The same inversion appears in other settings: one cohort reported median patient delay of 13 days among migrants against 9 among local patients, with 47 per cent of migrants exceeding 14 days against 30 per cent of locals [14,15]. Patterns of emergency department use also differ between these populations [32], and completion of treatment varies with patient background [31].

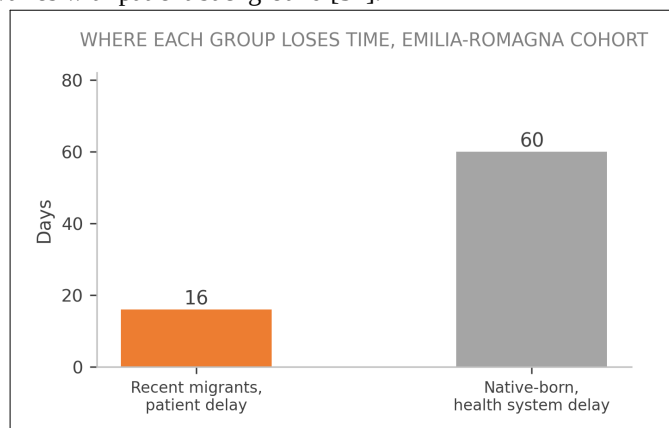


Figure 4: Where each group loses time in the Emilia-Romagna cohort [13]

Study	Design and cohort	Principal reported finding
Italian multicentre 2024 [11]	669 patients, 10 hospitals, 2018-2023	Migrants: patient delay 90 vs 10 days; system delay 5 vs 40 days
Italian multicentre 2018 [12]	137 patients, 7 referral centres	Total delay 66 days; system delay twice the patient delay
Emilia-Romagna [13]	Regional notification cohort	Recent migrants longest patient delay; natives longest system delay
Istanbul cohort [14]	Migrant and local patients	47% of migrants exceeded 14 days against 30% of locals
Quattrocchi et al. 2018 [15]	Multicentre, Italian and foreign-born	Determinants of patient and system delay compared
Gerrish et al. 2013 [7]	Systematic review, qualitative literature	Economic, legal, cultural and system barriers to seeking care
ERS correspondence [16]	Survey of language discordance	Interpreter availability and confidentiality problems

Table 1: Principal studies reviewed, with the finding as reported by the original investigators

Why patients delay presenting: The qualitative literature is consistent. Economic, legislative, cultural, social and health-system barriers all delay treatment-seeking, and fear of deportation or of contacts being traced can prevent people from seeking medical assistance at all [7,17]. Indirect costs matter: losing a job, eviction by a landlord, or a child being unable to attend school [7]. Stigma compounds this, with immigration status and the infectiousness of tuberculosis reinforcing each other [7,18]. In the larger Italian study the most commonly self-reported reasons to delay were the mild nature of symptoms (82 per cent) and good self-perceived health (76 per cent) [12].

Language and interpretation: Language discordance impairs access to diagnostics and to continued management, and professional interpreters, though widely used, are often not readily available in emergencies and may be limited by cost [16,19]. Confidentiality is a specific problem in tuberculosis, where the sensitivity of the information and the risk of stigmatisation make patients reluctant to speak through family members or community interpreters [7,16]. Interpretation itself introduces error through addition, omission, substitution and condensation [16,20]. A systematic meta-review found that absence of professional translation limits patients' understanding of diagnosis and treatment and reduces their capacity to make decisions [20,21,26]. Standards of care for the European Union set expectations that language-discordant consultations frequently fail to meet [27].

Interval	Who is slower	What drives it
Symptom onset to presenting	Migrants, markedly	Cost, fear of authorities, stigma, mild symptoms [7,11,12]
Presenting to diagnosis	Native-born patients, markedly	Lower clinical suspicion in the lower-risk group [11,13]
Total delay	Migrants, modestly	Net of two opposing components [11]
First contact in primary care	Slower than hospital contact	OR 5.1 for system delay over ten weeks [12]
Extrapulmonary presentation	Slower	OR 4.3 for system delay over ten weeks [12]
Language discordance	Affects both intervals	Access, consent, adherence, contact tracing [16,20]

Table 2: The two delay intervals, which group is slower in each, and the reported drivers

Discussion

The finding that should change how this problem is framed is the inversion. Migrants in the largest cohort waited a median of 90 days before presenting, against 10 for native-born patients, and were then diagnosed in 5 days against 40 [11]. The health system, once reached, moved eight times faster for the migrant patients. That is the opposite of the account usually offered, and it is reported at $p < 0.0001$ in 669 patients.

The explanation is not mysterious. Clinicians in low-incidence countries consider tuberculosis readily in someone born in a high-incidence country and consider it late in a native-born patient with a cough. Country of birth functions as a prompt. That prompt works, in the narrow sense that it shortens the interval after presentation, and it is simultaneously the reason native-born patients wait 40 days and in one cohort 60 [11,13].

It follows that a patient attending four times without a diagnosis is describing health-system delay, and that this is the interval where a migrant patient is statistically least likely to be disadvantaged. Language barriers plausibly explain repeated attendance in an individual case, and the mechanisms are documented [16,20,21]. But the cohort data do not support a general claim that language access is the dominant driver of the measured system delay, and a review that asserted otherwise would be overstating what has been shown.

What the data do support is that the disparity in total delay is real, large, and generated almost entirely before contact with services [11,13]. The remedies for that are not clinical: they concern fear of immigration enforcement, the cost of taking a day off, whether a diagnosis threatens housing or work, and whether people know that treatment is free [7,17,28]. Interventions designed for hard-to-reach populations, including video-observed treatment, address the period after diagnosis rather than before it [29,30]. Interventions inside the clinic, including better interpreting, will improve the quality and safety of care and are worth doing on those grounds. They should not be expected to close a gap that opens before the patient arrives.

Study limitations

The limitations belong to the underlying literature. Delay intervals are reconstructed retrospectively and depend on patient recall of symptom onset, which is unreliable over months [11,12]. The boundary between patient and health-system delay is placed differently between studies, so figures are not strictly comparable [5,13]. Migrant is a heterogeneous category spanning recent arrivals, settled residents and undocumented people with very different access, and most studies do not disaggregate it [11,15]. Patients who never reach diagnosis are absent from every cohort, and they are plausibly the most excluded. Language proficiency is rarely measured directly, so its contribution is inferred rather than quantified [16,20]. The quantitative evidence here is heavily Italian, reflecting where these studies were done rather than where the problem is worst [11,12,13,33]. European-wide surveillance describes the burden but not the intervals [34,35]. And qualitative studies describe mechanism without establishing how much of the delay each mechanism accounts for [7,17].

Conclusion

Total diagnostic delay in tuberculosis is a composite of two intervals that behave differently and sometimes oppositely. In the largest comparison available, migrants waited nine times longer before presenting and were diagnosed eight times faster once they did. Treating the total as a single quantity, and attributing it to the health system, misdescribes both halves. For the individual patient attending repeatedly without a diagnosis, language access is a real and documented risk to safe care and deserves to be fixed. For the population-level disparity in how late tuberculosis is found, the evidence points earlier still, to the reasons people do not come at all.

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Conflict of Interest

The authors declare no competing interests.

Ethics Statement

This article reviews previously published studies only. No new patient data were collected and no participants were recruited, so ethical approval was not required.

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