A Clinical Audit and Cost Analysis of Tuberculosis Management in the Republic of Ireland

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1. National Tuberculosis (TB) Epidemiology 2019

- Declining incidence; 315 cases, 5.6 cases per 100,000 in 2019 vs 6.6 cases per 100,000 2018
- 43.8% non-Irish born
- 5 Multi-drug resistant (MDR)-TB cases
- 13 cases of HIV-TB coinfection (of 131 cases screened for HIV)

2. National Healthcare System

- Mixed public-private system
- 74% of healthcare expenditure in 2018 was funded by government, 14% by private health insurance and 12% by out of pocket payments
- Cost of all TB medications covered by government
- TB clinics in centres with specialists experienced in managing TB

3. Research Question

- Quality assurance is a process which aims to improve the level of health care based upon measures of quality
- Maintaining and improving quality in TB care is important for patients and systems
- We aimed to evaluate the quality of care provided by our TB clinic and to estimate the cost of illness due to TB in the Republic of Ireland (ROI)

4. Methods

- Retrospective review of patients referred to TB clinic with signs or symptoms of active TB in a tertiary referral centre over 1.5 years
- We assessed the quality of care across the following domains: prevention, access, assessment, treatment, and patient safety
- National pharmacoeconomic and cost evaluation guidance was used to estimate direct [outpatient care (TB drugs, investigations, staff, clinics) inpatient care (emergency and elective hospital admissions) and indirect costs of TB (productivity losses and value of disability adjusted life years].
- Cost estimates extrapolated to all TB cases according to national surveillance data

5. Quality of Care

54 patients evaluated for active TB in reference period; 37 diagnosed with active TB
MDR-TB: 0;Mono-drug resistant TB: 6/37 (16%); HIV-TB coinfection:3/37 (8%) Born in a country of high TB incidence (≥30/100,000) 22/37 (60%)

Prevention: 32/37 (86.5%) had a risk factor for TB reactivation, 3/37 (8%) documented previous latent TB infection screening.

Access: Median time from first presentation to a healthcare provider to review in TB clinic 4.1 weeks (IQR 0.4-23). Median time from first review in TB clinic to diagnosis was 0 weeks (IQR -0.6-0.3 weeks). 20/37 (54%) patients were referred from the emergency department but 17/37 (46%) patients had been attending their primary care physician with their symptoms.

Assessment: 91.9% (34/37)) were lab confirmed, 78.3% (29/37)) were culture positive, 63.2% (12/19) with respiratory TB were smear positive.

Treatment: 35 patients completed TB treatment, 2 transferred care out, 30/35 (88%) attended a 6-month post treatment appointment with zero treatment failures.

Patient Safety: No deaths due to TB. 14 adverse events, 3 of which were serious adverse events due to hospitalization

6. Direct Cost of Care Provided at TB Clinic (N=35 patients)

	Median cost of outpatient care per patient (IQR) (€)	Median cost of inpatient care per patient (IQR) (€)	Median cost of all care per patient (IQR) (€)
Tuberculosis	2024 (1,520-2,649)	5924 (839-17,588)	7374 (3,898-19,538)
Respiratory tuberculosis	1810 (1,478-2,222)	5924 (1,914-17,588)	7374 (4,879-19,296)
Non-respiratory tuberculosis	2127 (1,931-3,169)	2590 (769-17,164)	5695 (3,285-19,679)

7. Estimated National Direct and Indirect Costs of Tuberculosis 2019 (N=267 patients)

Productivity losses (€)	Year lost due to disability	Years of life lost	Disability-adjusted life years	Value of life years (€)	Total indirect costs (€)	Total direct costs (€)
0.791m	49.8255	197.5	247.33	12.87m	13.65m	9m

8. Discussion: Prevention of TB among those from high incidence countries, the time taken to refer and utilization of unscheduled emergency care are areas where quality of care could be improved.

Strengths: This study provides a comprehensive evaluation of a TB clinic in the ROI highlighting domains where quality of care is high and domains where quality of care needs to be improved.
We provide the first direct and indirect cost of care estimates in the ROI which provide economic justification for financial investment into evidence based interventions to reduce the TB burden nationally.

Limitations: This single centre retrospective study was unable to estimate the cost of illness due to MDR-TB. Our quality assessment was from a provider perspective and did not consider a patient definition or patient defined metrics of quality. **Conclusion:** Our clinic had a high rate of treatment success. Interventions to improve TB prevention, reduce diagnostic delay and cost are needed.