

New Insights into an Old Problem: The Increase in Medical Complexity of Patients with Active Tuberculosis, 1993–2016

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Background

- Although active tuberculosis (TB) has decreased in the last 25 years, TB patients are increasingly older and more likely to have co-morbidities including immunosuppression
- Such medical complexity may influence TB treatment success and may require more resources for successful management.
- However, TB case complexity and its components have never been quantified or defined.

Purpose

- Describe the medical complexity of patients with active tuberculosis in terms of their co-morbidities, social status, and medication exposures over the period between 1993 – 2016.

Methods

- Data / source: California Department of Public Health (CDPH) TB Registry data on comorbidities, clinical features, and demographics
- Population: All adult patients with culture positive TB who were alive at the time of diagnosis in California during 1993–2016
- Factors deemed by an expert panel to define a patient as complex (i.e. increased resources or expertise required for successful management): age >75 years, HIV infection, multi-drug resistance (MDR), and extrapulmonary TB.
- Data on other comorbidities became available in 2010 and were analyzed separately
- Linear regression performed to examine whether annual proportion of complex patients increased over time.

Table: Complex Patients and Complexity Features, 1993–2016

	1993	2004	2016	
	n (%)	n (%)	n (%)	p*
Total Cases	4020	2733	1503	
Complex Patients	1580 (37.4)	1112 (40.7)	674 (44.8)	<0.001
Complexity Features:				
Extrapulmonary Disease	957 (22.7)	749 (27.4)	382 (25.4)	<0.001
Age >75 years	385 (9.1)	334 (12.2)	293 (19.5)	<0.001
MDR TB	50 (1.6)	35 (1.6)	22 (1.8)	0.007
HIV Positive	467 (11.1)	144 (5.3)	56 (3.7)	<0.001

*p values are derived from linear regression models

Figure 1: Proportion of Patients with Complexity, 1993–2016

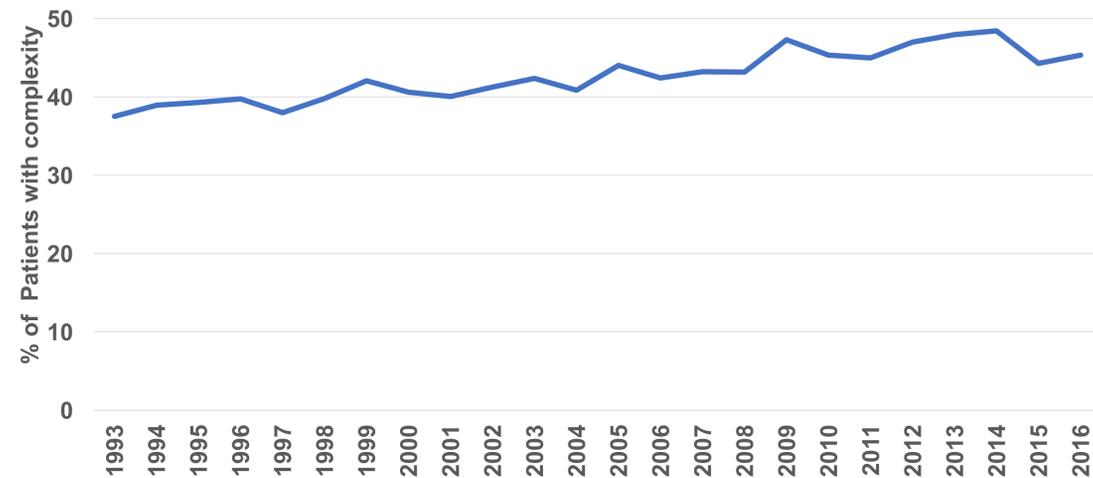
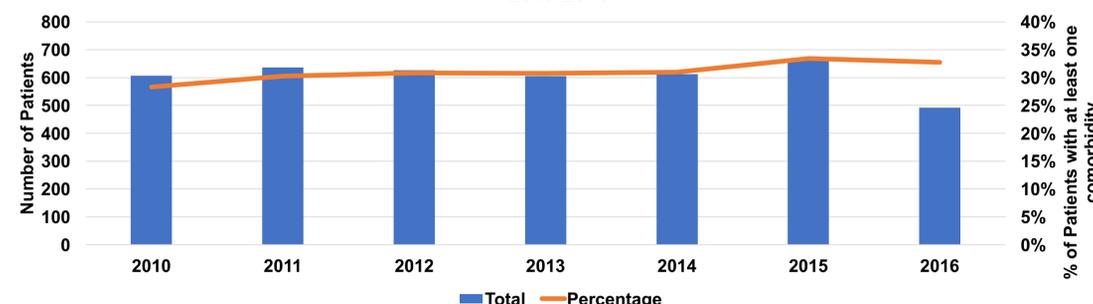


Figure 2: Patients with Diabetes, End Stage Renal Disease, or Immunosuppression, 2010-2016



Results

- 67,512 patients were analyzed in the study period. Yearly totals of patients with active TB declined from 1993 to 2016 (data not shown).
- Three of the four features contributing to complexity (extrapulmonary disease, age >75 years, and MDR) increased in prevalence (**Table**).
- The proportion of patients that were complex significantly increased, with the proportion of patients with at least one complexity feature rising from 37.5% to 45.3% from 1993 to 2016 (**Figure 1**).
- Adding comorbidity to definition of complexity starting in 2010, we found same trend of increased complexity (p<0.001) during 2010–2016 (**Figure 2**).

Conclusion

- First description of TB patient complexity
- Medical complexity of patients with active TB has risen over last 25 years in California.
- Findings suggest that despite the overall decline in active TB, effective management of more complex patients may require additional attention and resource investment.
- Additional study will aim to determine how patient complexity affects patient outcomes
- A limitation is that not all factors that may make a patient complex were included in this initial analysis. These include housing, substance abuse, and other social factors that also complicate management of TB.

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