



Increased detection of pulmonary tuberculosis amongst hospitalised inpatients during the COVID-19 pandemic

To the Editor:

We read with interest the article by NIKOLAYEVSKYY *et al.* [1] reporting significant disruption to clinical tuberculosis (TB) services during the coronavirus disease 2019 (COVID-19) pandemic. Reductions in TB diagnoses during the pandemic have been reported worldwide [1–4]. These findings have been attributed to a reduction in admissions due to lockdown, the spillover effect of public health measures against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on other respiratory infectious diseases, and diversion of resources towards the COVID-19 response [1–4]. During the pandemic, healthcare systems grappling with a surge in COVID-19 cases encountered sustained disruptions to TB services [1], potentially delaying diagnosis. Delayed detection of TB amongst hospitalised patients increases risk of nosocomial transmission [5]. In centres that were not overwhelmed, however, increased vigilance for respiratory symptoms may potentially translate into increased detection of active pulmonary tuberculosis (pTB) amongst hospitalised patients.

TB is endemic in Singapore, a Southeast Asian city-state; the first COVID-19 case was recorded on 23 January, 2020. Integrated containment strategies were implemented across all hospitals to mitigate nosocomial transmission of SARS-CoV-2 [6]. At our institution, the largest hospital in Singapore, chest radiographs were utilised to risk-stratify patients at initial presentation [6]. Individuals presenting with respiratory syndromes or pulmonary infiltrates on chest imaging were housed in converted general wards, with reduced bed density per cubicle to mitigate nosocomial transmission [6]. A purpose-built isolation ward housed high-risk COVID-19 suspects and confirmed COVID-19 cases in airborne infection isolation rooms (AIIRs). To cope with the increased demand for AIIRs, our institution constructed an additional 50-bedded isolation ward extension using prefabricated containers [7]. Our hospital's TB laboratory remained fully functional throughout the pandemic and our isolation ward was not overwhelmed due to increased capacity, allowing us to evaluate trends in pTB detection and isolation of suspected pTB cases during the pandemic period. We compared the numbers of culture-proven TB cases (both pTB and extrapulmonary TB) over the pandemic period (January 2020 to December 2020) with historical trends at our institution in the preceding 3 years, as well as the percentage of pTB cases with delayed isolation (failure to isolate within 48 h after TB was clinically suspected and testing performed). As this study utilised aggregated anonymised data collected as part of routine surveillance, waiver of informed consent was obtained from our hospital's institutional review board.

Our results showed a significant increase in the rate of pTB cases detected amongst hospital admissions during the pandemic (figure 1a). The incidence rate of pTB was 18.9 cases per 10000 admissions (149 cases, 78989 admissions) during the pandemic, compared with 14.4 cases per 10000 admissions (401 cases, 279135 admissions) pre-pandemic (incidence rate ratio 1.3, 95% CI 1.1–1.6; $p=0.004$). Conversely, there was no significant increase in the rate of extrapulmonary TB detected amongst hospital admissions in the pandemic period (5.7 cases per 10000 admissions, 45 cases, 78989 admissions), when compared against the 3 years (4.6 cases per 10000 admissions, 129 cases, 279135 admissions) pre-pandemic (incidence rate ratio 1.2, 95% CI 0.8–1.67; $p=0.226$) (figure 1b). There was no significant downtrend in TB-related laboratory testing (figure 1c). During the pandemic, 4.4% (3471/78989) of hospital admissions were tested for pTB; conversely, 3.7% (10390/279135) of hospital admissions pre-pandemic were tested for pTB.

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This study shows an increase in the rate of pulmonary tuberculosis (TB) detected amongst hospitalisations during the COVID-19 pandemic, while detection of extrapulmonary TB remained unchanged; due to improved surveillance and chest imaging utilisation <https://bit.ly/3fhVaMG>

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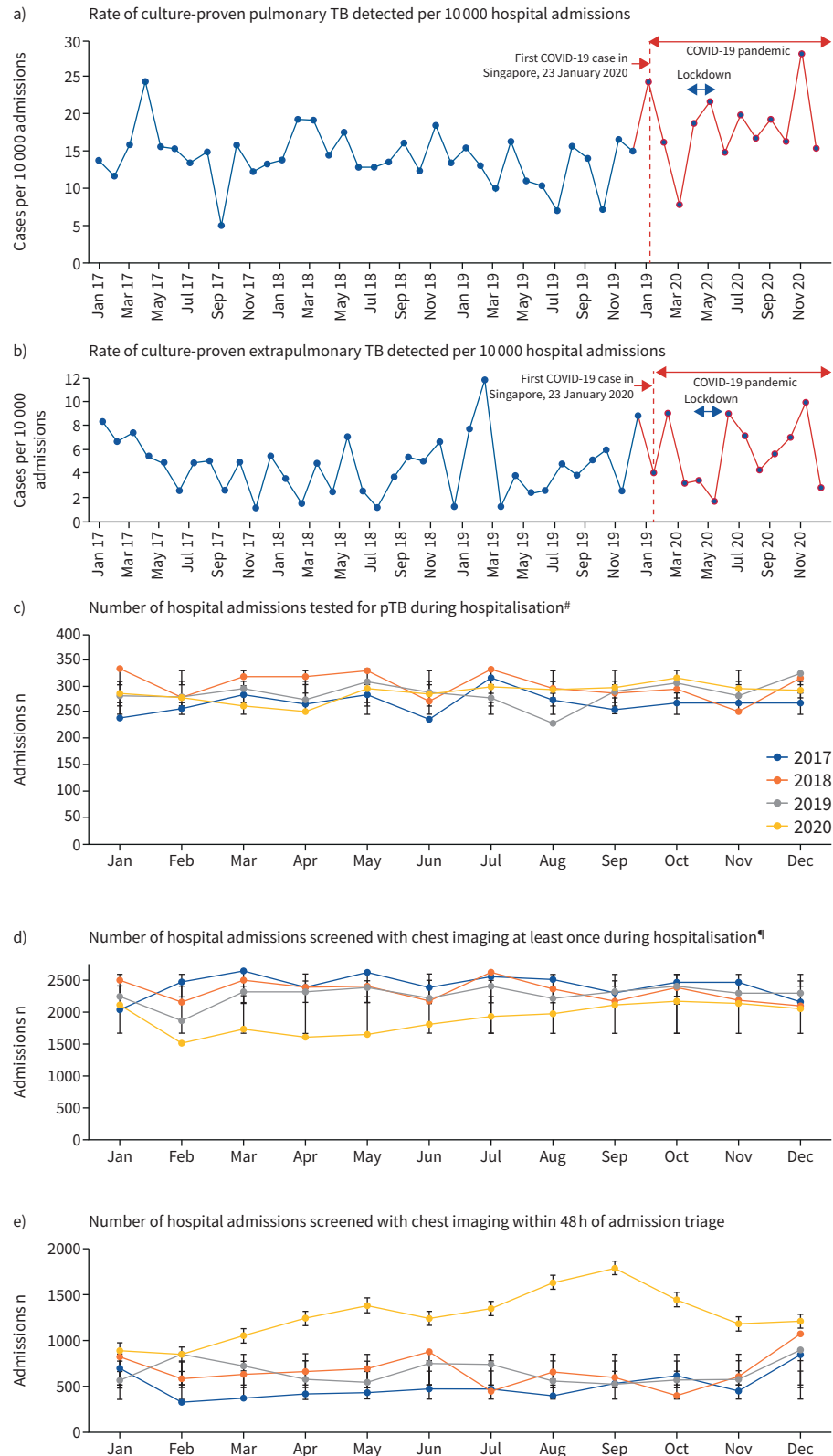


FIGURE 1 Rates of pulmonary and extrapulmonary tuberculosis (TB), TB testing and chest imaging amongst hospitalised inpatients at a Singaporean tertiary hospital, before and during the coronavirus 2019 (COVID-19) pandemic. [#]: testing for pulmonary (p)TB was defined as having at least one respiratory specimen sent for acid-fast smear and TB culture; respiratory specimens included sputum, bronchial lavage washings, and early morning nasogastric aspirates. [¶]: chest imaging was defined as either chest radiograph or computed tomography scan of the chest.

The odds of pTB testing amongst hospitalised inpatients were significantly higher during the pandemic compared with the pre-pandemic period (OR 1.18, 95% CI 1.14–1.24; $p < 0.001$). During the pandemic, 28.9% (22 846/78 989) of hospital admissions had chest imaging, while 30.3% (84 525/279 135) of hospital admissions in the pre-pandemic period received chest imaging (OR 0.94, 95% CI 0.92–0.95; $p < 0.001$). Odds of chest imaging were significantly lower during the pandemic (figure 1d), possibly because public health measures resulted in substantial reductions in admissions for respiratory illnesses [8]. However, during the pandemic, chest imaging was performed earlier in the admission course (figure 1e). More than two-thirds (68.5%, 15 649/22 846) of hospital admissions with chest imaging performed had imaging done within 48 h of admission triage in the emergency department, compared with only 26.1% (22 064/84 525) during the pre-pandemic period (OR 6.16, 95% CI 5.96–6.35). There was no significant change in the proportion of pTB cases with delayed isolation. Pre-pandemic, 81.0% (325/401) of pTB cases were isolated within 48 h; during the pandemic, 85.2% (127/149) of pTB cases were isolated within 48 h (OR 1.35, 95% CI 0.81–2.26, $p = 0.263$).

While reductions in TB diagnoses during the COVID-19 pandemic have been reported worldwide, our institution experienced a significant increase in the rate of pTB detection, while detection of extrapulmonary TB remained unchanged. These differences could potentially be due to increased vigilance for respiratory symptoms and scrutiny of chest imaging as part of surveillance during the pandemic. Increased health-seeking behaviour for respiratory symptoms during the COVID-19 pandemic could also potentially translate into increased likelihood of pTB cases presenting to care. While active TB and COVID-19 can co-exist [9], with co-infection worsening COVID-19 severity and favouring progression of TB [10], our observations were likely attributable to improved surveillance, given that community transmission of COVID-19 in Singapore was significantly contained through public health measures [8]. There were no cases of TB and COVID-19 co-infection at our institution. Given the significance of healthcare-associated transmission of TB [5], admission screening protocols originally meant for COVID-19 containment, including timely chest imaging, have value in facilitating early diagnosis of pTB and should be continued in some form even after the pandemic is over.

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