Innovating tuberculosis prevention to achieve universal health coverage in the Philippines

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Summary

To contribute to tuberculosis (TB) elimination, TB preventive treatment (TPT) should integrate innovative approaches including tele-contact investigation (TCI), mathematical modelling, and participatory governance. Aligning with the World Health Organisation's primary health care framework, supply is provided by the provincial health system, demand is cultivated by the community, while governance is represented by the governor, who oversees the health leadership structure, local policies, and allocation of resources. A healthy dynamic between these three components is required to achieve universal health coverage (UHC). Because of their potential to integrate health systems and engage communities, primary health care principles underpin an effective approach to TB prevention. First, the provincial health system should connect with the community through TCI to transform the status quo of passive service delivery. Second, community participation should strengthen the linkage between the health system and governance, which ensures that community action plans are aligned with provincial TPT targets. Third, governance should leverage mathematical modelling to allocate resources to those with greatest need. Central to this is a reliable TB information system that should validate a robust mathematical model to measure cost-effectiveness of the intervention. Collectively, this holistic approach to TB prevention could provide a proof-of-concept that investing in primary health care is the key to UHC.

Keywords: Tele-contact investigation; Tuberculosis preventive treatment; Mathematical modelling; Universal health coverage; Primary health care approach; Community participation; Participatory governance; Evidence-based planning

Background and context

The Philippines accounts for 11% of global tuberculosis (TB) cases, with an estimated 591,000 new TB cases emerging every year. Based on the 2021 Global Tuberculosis Report, four Filipinos die of TB every hour.[1] Over the years, efforts have focused on TB treatment, testing, and diagnosis, but prevention has been neglected. From 2018 through 2020, TB preventive treatment (TPT) coverage declined from 11% to 2%.[2]

When community transmission of COVID-19 was reported in March 2020, quarantine protocols were enforced. Health facilities redirected their efforts to outbreak response, resulting in limited services for non-emergency care, including TB case finding activities, causing a 20% reduction in TB case notification.[3] To recover from COVID-19's impact on TB, current efforts need to be optimised and new tools introduced to strengthen the country's TB elimination efforts,

which include treating latent TB infection (LTBI).[4] Studies have demonstrated that TPT can prevent progression to active TB disease.[5] Thus, the national government expanded its TPT eligibility not only to childhood contacts who are under-five and people living with HIV, but also to all household contacts regardless of age.[6]

The TB Innovations and Health Systems Strengthening Project, funded by USAID, partners with the Department of Health (DOH) to introduce integrated, innovative, and viable organisational systems and approaches to achieve national TB program targets, including TPT coverage. Prior to the COVID-19 pandemic, TPT was not routinely offered in facilities. The project therefore developed a Field Implementation Guide on contact investigation and TPT. It was later disseminated by the DOH through a policy document (i.e., Department Circular 2021-0512). However, its implementation on a nationwide scale appears to be slow, owing in part to the country's decentralised governance structure.[7] Local health systems have not yet been fully integrated to respond to UHC challenges, one of which is TPT coverage.[8]

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Viewpoint

The Field Implementation Guide positions contact investigation as a strategy to identify household contacts of index TB cases that are eligible for TPT.[9] However, the COVID-19 pandemic revealed that contact tracing has been the weakest link of the government's pandemic response.[10,11] Community health workers were not adequately mobilised because of the strict lockdown measures that the national government enforced in 2020, which negatively impacted contact tracing of TB cases as well.[10] In addition to health facilities focusing their efforts on the COVID-19 response, there was also a notable decline in the number of clients going to hospitals due to travel restrictions and lack of sense of urgency to seek care.[11]

TPT innovation

To respond to COVID-19-related challenges, tele-contact investigation (TCI) was piloted in a tertiary hospital in April 2020 to find people with LTBI amid the pandemic. It comprised a modified strategy of contact tracing where a health facility staff member proactively screened household members of bacteriologically-confirmed drug-susceptible index TB cases via mobile phone, instead of through conventional home visits. Using a standardised TCI script, the facility's assigned personnel obtained consent from the index case, initiated tele-consultation of all household members by enquiring about the presence of TB symptoms, elicited the presence of TB risk factors (HIV, diabetes, smoking, malnourished, immunosuppressive condition), and discussed the risks of TB exposure and benefits of TPT. Screening of contacts was then performed to rule-out active TB disease. This included symptom screening for under-five contacts, with chest X-ray for other household members. Staff performed tuberculin skin testing for those without TB risk factors, and bacteriologic diagnostics for those presumptive of TB. The team then coordinated referral to a facility physician for those requiring further clinical evaluation and offered eligible clients TPT with specific treatment regimen based on patient preference—daily isoniazid for 6 months (6H), daily isoniazid-rifampicin for 3 months (3HR), or weekly isoniazid-rifapentine for 3 months (3HP).[6] Of the 333 household contacts that completed screening between April 2020 and July 2022, 210 (63%) were eligible for TPT and 89% of those initiated TPT, demonstrating potential for replication at the provincial level.

Provider-initiated contact tracing facilitated the identification of both latent and active TB in the community as an effective tool in the armamentarium to control infectious diseases.[12] Using contact investigation as an entry point for TPT implementation,[9] TCI could provide critical household-level data on different stages of TB disease progression, including subclinical TB.[13] Interestingly, TCI's added feature of extracting information on TB risk factors (e.g., HIV, diabetes mellitus, and malnutrition) enhances the opportunity for its use as an integrated ("universal") screening tool. However, the approach to scaling up TCI to increase TPT coverage should be aligned with the Philippine Health Sector Reform (Republic Act 11223), otherwise known as the UHC Law.[14] With TB positioned as a tracer program for UHC implementation in the country, TCI should be used as a universal screening tool to integrate health services within provinces, with resulting TPT indicators providing a snapshot of the healthcare access of a given locality. Therefore, the TB prevention cascade should be prioritised because of its potential for community impact, integration with health services, and government response to improve TPT coverage.[15,16] As such, reforms aimed at improving health system performance should translate to increased TPT uptake, especially in provinces with high TB burden.

The prolonged latency period of TB is epidemiologically significant as evidenced by the global LTBI burden, with nearly a quarter of the world population infected.[17] Mathematical modelling data in the Asia Pacific suggests that LTBI is one of the key drivers of TB transmission. Therefore, TPT is a crucial tool to help empty the LTBI reservoir, which will greatly contribute to TB elimination goals.[18] Additionally, with the current lack of an effective TB vaccine, TPT is the primary modality available to prevent progression to active TB disease. Modelling studies in South-East Asia show that increasing TPT coverage could reduce annual TB incidence and mortality rates.[19] Interestingly, the timely publication of The Global Plan to End TB 2023−2030 has provided high-TB burden countries like the Philippines a clear roadmap and guide for high-level decision-making on TB elimination strategies with cost implications. Considering the current political climate of the country, a practical approach in subnational settings is to start with the least resource-intensive intervention to obtain political buy in. Since the prevention cascade constitutes less than 5% of the total resources needed to operationalise the Global TB Plan,[16] TPT strategies should be creatively packaged to sensitise provincial stakeholders towards contributing to a TB-Free Philippines.

Global TB targets (including TPT coverage) could be achieved if TB elimination strategies are "provided within the context of progress towards UHC."[1] To improve TPT uptake in the community, individual-based health services like TCI should be seamlessly integrated into the province's primary care provider network.[14] Utilising the World Bank's "accountability triangle," TPT provision could be likened to a service delivery chain with three sets of actors, namely, household contacts of TB index cases as the clients, provincial health system as the provider, and elected government officials as the policymaker.[21] Although contact investigation has historically been one of the strategies of the National TB Control Program (NTP),[6] accountability measures were not established, causing the

fragmentation of services. This resulted in a lack of routine TPT services in facilities. To mitigate its effects on TPT coverage, the provincial health system's direct response should be to implement TCI within its network, and to hold government leaders accountable to the TB-affected communities through improved information systems.[15] Involvement of communities as partners in this paradigm underscores the importance of the primary healthcare approach towards UHC.[22] Juxtaposing this approach with the World Health Organisation's (WHO) primary healthcare framework, an innovative approach to TPT should combine TCI with community participation and mathematical modelling (see Figure 1).[23]

While the DOH has consistently advocated for people-centred care to support UHC, the provincial health system continues to use tiered governance and treats communities as recipients instead of partners. This three-pronged innovative approach to TPT will support a paradigm shift wherein communities are empowered to decide about their own health, and participatory governance becomes instrumental in establishing a platform for community participation.[24] The approach would allow community members to demand for responsive and culturally sensitive programs, and in the process, create a dynamic relationship between the service provider, community, and local governance. Instead of a hierarchical governance approach, communities should demand high-quality health services that are inclusive and transformative.[15] Partnership with a local civil society organisation (CSO) and linkage with the provincial health office should be established to ensure community voices are translated into community action plans.

Purposive involvement of communities in government-led initiatives has sustained initial gains in health.[24,25] Locally driven solutions enforced by leadership and policies have been demonstrated to increase health utilisation indicators.[25,26] Thus, participatory governance should ensure community involvement across provinces to improve access to TB preventive services.

Based on the Western Pacific Regional Framework to End TB in 2021−2030, lack of accountability and weak coordination mechanisms are two of the overarching challenges in TB control and elimination (the other two being inadequate financing and lack of planning in emergency situations).[27] With the landmark passage of the UHC law in 2019, the provincial government is required to be more accountable for the care of their constituents and management of their health systems.[8,15] To manifest UHC reform, the provincial governor should own the problem by recognising the interconnectedness of the causes and effects of TB, contact relevant stakeholders to address social determinants of health, collaborate with TB-affected communities, and co-create solutions with the people to improve access to TB diagnosis, care, and prevention.[25−28]

Guided by the WHO Framework for TB Programming (2021), elected government leaders should ensure that the provincial health system targets people not accessing the health system and guarantees universal access especially among the marginalised who are often overlooked in national health programs.[23] Considering the complex nature of health systems, government leaders cannot do this alone and would need the active participation of communities.[21] New relationships between provincial leaders and CSOs should be built, such that
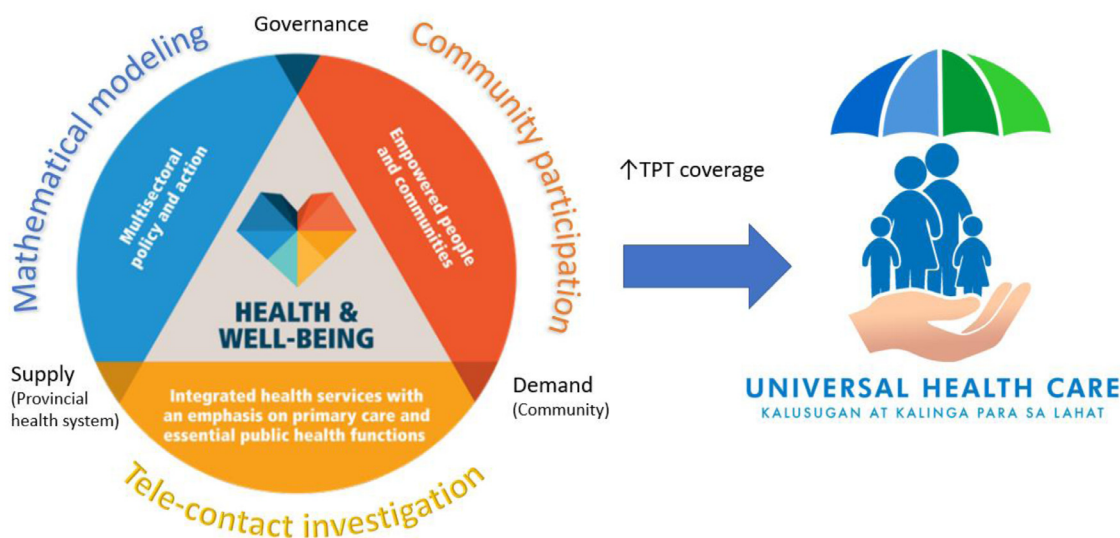

Figure 1. Integrating tele-contact investigation, community participation, and mathematical modelling to achieve universal health coverage through the primary health care approach. Using TB as a tracer program for UHC implementation, TPT coverage should be employed as a proxy indicator for UHC.[23]

linkage between the provincial health system and affected communities are strengthened, and platforms for trust-building dialogue between the governor and communities are established.[16,27] The need for human resource capacity in data collection and management, for example, should be addressed by CSO involvement. TB indicators at the community level should be cross-checked with the barriers to early TB diagnosis, whereby community organisers contextualise cultural, socio-economic, and health system factors and translate them to quantitative data.[15,28] Information generated through community-led monitoring activities should be integrated in mathematical models for TB programming.[20,29] In this way, the provincial health system would be able to manifest its patient-centred care approach in TPT implementation.

Communities can hold policymakers accountable for public services through community voice, and the most powerful means is through better information.[20,24] However, establishing this relationship of accountability is complex because of problems in monitoring health services, which are both "discretionary and transaction-intensive."[20] Recording and reporting TB data has been a challenge because, in addition to keeping statistics, health personnel are required to provide immunisations, conduct screening and testing, monitor compliance, make decisions about diagnosis and treatment of specific patients, etc. Nevertheless, recent advances in technology could potentially tackle the "transaction-intensive" challenges through a mobile digital application, which could help health personnel in automating the processes of patient data encoding, linking with index cases, symptom screening of household contacts, tagging for the presence of risk factors, and intuitively identifying the next step of the TB prevention cascade—all in one go. It should simplify data segregation, collation, and evaluation of TPT indicators, which would otherwise take weeks to complete if performed manually. The uptake of this tool should be extended to partner CSOs who could provide context to TB barriers, streamline the feedback mechanism, and create a platform for community participation to unfold. However, alleviating the "discretionary-intensive" space is more complex; nonetheless, intelligent solutions such as computer-aided TB detection in X-rays, connectivity of molecular diagnostic tools, and video-observed treatment monitoring could help by decreasing turnaround time for optimal diagnosis and management. As the Philippines is a hub for digital health innovation,[30] these new technologies should accelerate progress toward the country's End TB goals. Yet, greater government accountability should be explored for optimised monitoring of TPT implementation at subnational settings.

By strengthening health information systems using digital technologies, relevant TPT indicators such as contact investigation coverage and TPT coverage rate could readily reflect health system performance. While TPT coverage is the proposed indicator for UHC progress in the province, use of mathematical modelling could provide a more comprehensive analysis on how several variables affect the entire health system.[20] In 2016, Villasin et al[31] analysed TB transmission dynamics in the Philippines based on an earlier model developed by Trauer et al[18] for high-TB burden settings in the Asia Pacific. Using localised data, parameters such as partial immunity (either acquired from vaccination or developed from previous TB disease), treatment success rate, and treatment duration were identified to significantly affect projected TB incidence rates from 2013-2023. Another modelling study in 2018 utilised optimal control framework to assess NTP strategies with minimum intervention implementation costs for 2016−2035. Results demonstrated that while distancing is the most effective single control strategy and case holding the least, latent case finding is more effective than active case finding but are both complementary.[32] Moreover, the combination of strategies, such as distancing, active case finding, and latent case finding, instead of case holding, provide the most optimal TB control with minimum implementation costs.[32] Therefore, TCI and TPT provision, together with the new tools for active case finding, should be advocated to provincial leaders using this evidence.

During the COVID-19 pandemic, mathematical modelling has been used by different countries worldwide, including the Philippines, to aid governments in their policy- and decision-making functions through analysis of viral reproduction rates and transmission patterns.[33] But the manner by which mathematical models are closely integrated in decision-making processes is not as established in low- and middle-income countries as in high-income nations. Due to the diversity of subnational contexts, mathematical models developed from national data should be validated by local data using a user-friendly tool to allow the coordination between local administrators and high-level officials.[34] Based on experience from India, the use of COVID-19 simulators should be done in a collaborative manner early on, so that epidemiologists or data scientists who are involved in the analysis would correctly interpret complex parameters, establish rapport with provincial stakeholders, and provide follow-up training and guidance as needed.[35]

To apply lessons learnt from COVID-19 on TB control in the Philippines,[36] a TB modelling resource should be established, taking into consideration the two Philippine modelling studies done by Villasin et al[31] and Soyoung et al[32] as well as the TIME Impact model done by Houben et al[36] to assist TB policy development. Consistent with the UHC Law, development of a collaborative network should involve the provincial health system, taking into account the optimisation of the decentralised governance structure through synergy of decision space, capacity, and accountability.[7] It is in the

DOH's purview to maintain the health managerial standards of provincial leaders (e.g., strategic planning, priority setting, evidence-informed policy making) and their institutional capacities (e.g., multistakeholder processes, private sector engagement), but the Philippine Health Insurance Corporation (PhilHealth) should play a role in the accountability space through financing.[38] Considering that financing has the greatest influence on quality of care, the most effective use of performance-based incentives is when TCI is linked to the active and latent case finding activities of the province. Therefore, the use of PhilHealth's Konsulta package as a performance-based incentive for TCI and TPT provision should be explored.

Quality measurement should be closely linked with accountability and action; otherwise, it can burden the health system.[15] The community should hold the governor accountable to reach TPT coverage, who in turn holds the provincial health system accountable for the quality of TCI and TPT provided—incentivising success while regulating failure.[15,37] In measuring complex systems that warrant policy change,[39] mathematical modelling should be employed to better understand the role of several parameters on the projected TB incidence. Because of the ability to illustrate cost effectiveness of proposed interventions, it should be used as a tool for political support at different levels of governance. Additionally, modelling data on the cost of inaction linked with disability-adjusted-life-years are additional tools to engage provincial governors from being a passive supporter of TCI and TPT implementation to becoming a TB champion eventually.[20]

Future directions

Among the four countries that were modelled in the Global TB Plan 2023-2030, the situation in Indonesia closely resembles that of the Philippines in the context of a fragmented private sector. Improvement of TPT coverage should create an institutional memory for the health system to respond to emerging challenges. Key strategies to curtail the spread of TB should include case finding (with emphasis on early diagnosis of TB), and promotion of public private mix to enhance mandatory notification of TB coupled with provision of TPT to eligible household contacts.[20] While TB vaccine development is ongoing, research and development should focus on subclinical TB, which has not been considered in the previous mathematical models.[17] Localised data, subnational contexts, and key health system changes should challenge existing TB models used for national TB programming. Further refinement of TB transmission dynamics should provide evidence on additional strategies to accelerate the country's race to end TB.

Tackling TB challenges in the country requires a whole-of-government and whole-of-society approach. The experience during COVID-19 has caused major setbacks in TB; yet, it created opportunities for governments to strive for better quality health systems.[40] The political will of key government leaders to embody the primary health care approach provides the opportunity to manifest universal actions on governing for quality, redesigning service delivery, transforming health work force, and igniting people's demand.[15] It is through these channels that the local government units, collectively, would be able to achieve universal health coverage—one province at a time.

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