National surveys of costs faced by tuberculosis patients and their households 2015–2021

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The country-specific profiles for the 20 national TB patient cost surveys that were completed 2015–2021, which form Part II of the book, were prepared by the WHO core team together with key members of the national survey teams (listed below) and people who provided technical assistance to these teams. Inés Garcia Baena, Nobuyuki Nishikiori and Takuya Yamanaka designed the standard country profile. Peter Nguhiu and Takuya Yamanaka produced and checked the final datasets and reports that were used for each profile in close collaboration with national survey teams, analysed the data and produced the standard sets of figures and tables. All profiles were reviewed and finalized by Inés Garcia Baena, Katherine Floyd, Nobuyuki Nishikiori and Cicilia Gita Parwati.

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Abbreviations and acronyms

4Ps	Pantawid Pamilyang Pilipino Program
AIDS	acquired immunodeficiency syndrome
CCT	conditional cash transfer
DHS	demographic and health surveys
DR-TB	drug-resistant tuberculosis
GCP	good clinical practice
GTB	Global Tuberculosis Programme (WHO)
HIV	human immunodeficiency virus
ILO	International Labour Organization
LEAP	Livelihood Empowerment Against Poverty (Ghana)
LMIC	low- and middle-income countries
LSMS	living standards measurements surveys
MAF-TB	Multisectoral Accountability Framework to accelerate progress to End TB
MICS	multiple indicator cluster surveys
NHIA	National Health Insurance Authority (Ghana)
NTP	national TB programme
OR	odds ratio
PPS	probability proportional to size
TB	tuberculosis
SDG	Sustainable Development Goal
UHC	universal health coverage
UN	United Nations
WHO	World Health Organization

Glossary

Catastrophic health spending. The population incurring catastrophic out-of-pocket health spending, as tracked by the United Nations (UN) Sustainable Development Goal (SDG) Indicator 3.8.2. It is defined as the population spending more than 10% or 25% of their household budget on health out-of-pocket. This is the SDG indicator to monitor financial protection and universal health coverage *(1, 2)*.

Percentage of tuberculosis (TB) patients and their households facing catastrophic total costs due to TB (one of the three high-level target indicators of the End TB Strategy). Total costs borne by patients receiving TB treatment that exceed 20% of the household's annual pre-TB disease income or expenditure. This indicator examines whether the sum of direct medical expenditures, direct nonmedical expenditures and indirect costs (e.g. income losses) exceed a certain threshold (>20%) compared with the household's economic resources available to pay for basic subsistence needs.

Coping mechanisms and strategies. Borrowing funds or selling assets to finance, for example, health care expenditure. The TB patient cost survey monitors the proportion of TB-affected households that are "coping". The indicator "coping mechanisms" is tracked in TB patient cost surveys; it refers to taking loans or selling household assets, or a combination of the two strategies. Surveys implemented using 2015 methodology tracked four indicators for coping mechanisms: dissaving, taking loans or selling household assets, or a combination of the three strategies. Surveys that followed the methods set out in the World Health Organization (WHO) handbook *(3)* and that used (with adaptation) the associated 2017 generic instrument *(3)* collected data about three main strategies: taking loans or selling household assets, or a combination of the two strategies.

Direct medical expenditures for TB care. Out-of-pocket payments made by TB-affected patient or guardian for medical services (e.g. consultations, tests, medicines and other medical procedures), net of any reimbursements.

Direct nonmedical expenditures for TB care. Out-of-pocket payments made by a TB-affected patient or guardian (e.g. for transportation, accommodation, food and nutritional supplements), net of any reimbursements.

Dissaving. Economics literature refers to "dissaving" in reference to borrowing or selling assets to finance, for example, health care expenditure. The term highlights the fact that it involves reducing the financial strength of a household, in the same way that saving increases a household's resilience to financial shocks *(4)*. Surveys implemented using 2015 methodology tracked four indicators for coping mechanisms: dissaving, taking loans and selling household assets, and a combination of the three (see "Coping mechanisms") *(5)*.

Food insecurity (or hunger). The absence of food security. Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life *(6)*.

Household. A small group of people who share the same living accommodation, who pool some, or all, of their income and wealth, and who consume certain types of goods and services collectively (mainly housing and food).

Health insurance scheme. A type of insurance providing coverage of medical expenses that result from illness or injury. There are various organizational mechanisms or schemes to provide health insurance, depending on the country.

Household income. The amount of money received by a household during the reference period in exchange for labour or services, from the sale of goods or property, or as a profit from financial investments *(7)*. TB patient cost surveys collect self-reported household income over the TB episode (e.g. before TB, at the time of TB diagnosis and during the TB episode). This indicator measures "current income" *(8)* and is one of the main indicators used in the calculation of the End TB indicator (denominator).

Household expenditure. Money payments or the incurrence of a liability to obtain goods and services. Expenditure excludes consumption that does not involve market transaction (e.g. home-grown products) and includes consumption of "durable goods". In the TB patient cost survey, the estimate is for the last 12 months before the survey. This indicator is used in the calculation of the End TB indicator (denominator). It is used to reflect the impact of health costs on the total resources available to the household, and thus captures any potential long-term depletion in financial well-being in the household *(8)*.

Household consumption. Sum of the monetary values of all items (final goods and services) consumed by the household (including home-grown products) during the reference period. In the TB patient cost survey, the estimate is for the last 12 months before the survey. This indicator is used in the calculation of the End TB indicator (denominator). It is used to reflect the impact of health costs on the total resources available to the household, and thus captures any potential long-term depletion in financial well-being in the household *(8)*.

Human capital approach. Measurement approach for estimating indirect costs of care seeking and TB treatment. It estimates the value of production losses owing to illness, disability or premature death, by multiplying the total period of absence by the wage rate of the absent worker. This approach captures all time off required for seeking and staying in TB care. At the discretion of the (TB patient cost) survey investigators, this measurement approach is used instead of the output approach (see "Output approach") *(8)*.

Indirect costs of care seeking and TB treatment. Productivity and economic costs of a patient or household incurred as a result of TB health care visits and hospitalization during the TB episode. Indirect costs are commonly estimated using two alternative methods: the output approach and the human capital approach.

National TB programme (NTP) network. Health facilities, public or private, treating and notifying TB in line with the guidelines of the NTP.

Out-of-pocket health spending. Any spending incurred by a household when any member uses a health good or service to receive any type of care; excludes any type of prepayment (e.g. taxes, contributions or premiums) or reimbursements of the household by third parties. A more detailed definition is as follows *(9)*:

> Any spending incurred by a household when any member uses a health good or service to receive any type of care (preventive, curative, rehabilitative or long-term care); provided by any type of provider; for any type of disease, illness or health condition; in any type of setting (outpatient, inpatient, at home). It includes formal and informal expenses directly related to the cost of seeking care as mapped in division 06 (health) of the United Nations classification of individual consumption according to purpose (COICOP 2018), that is, on medicines and health products (06.1); outpatient care services, including dental care (06.2); inpatient care services, including inpatient dental care (06.3); diagnostic imaging services and medical laboratory services (06.4.1); and patient emergency transportation services and emergency rescue (06.4.2) *(10)*. It excludes prepayment (e.g. taxes, contributions or premiums) and reimbursement of the household by a third party such as the government, a health insurance fund or a private insurance company. It also excludes indirect expenses (for example, nonemergency transportation cost) and the opportunity cost of seeking care (for example, lost income) *(11)*. COICOP was revised in 2018 to provide more information on important components of household care consumption.

Output approach. Measurement approach for estimating indirect costs of care seeking and TB treatment. This approach seeks to estimate actual economic losses resulting from disease and injury; it does this by evaluating changes in economic output resulting from a productive activity, either market or non-market based *(12)*. This approach captures the loss of paid work *(8)*. At the discretion of the (TB patient cost) survey investigators, this measurement approach is used instead of the human capital approach (see "Human capital approach").

Social assistance. Refers to in-kind or cash transfers, including disability grants, cash transfers for poor or vulnerable populations, or other types of benefits (e.g. food packages or transport vouchers) that are non-contributory.

Social insurance. A contributory scheme, usually mandatory, that pools funds from individuals and provides benefits to those contributing, in accordance with specified rules, against risk. The benefit is guaranteed through contributions without any type of need or means testing.

Social protection. An integrated set of policies and programmes (including social assistance, labour market programmes and social insurance) providing minimum income security in the event of illness or other external and unforeseen event, which aims for poverty reduction, and sustainable and inclusive economic growth.

School interruption. Any school days missed by the children in the TB-affected households.

Social exclusion. A process and a state that prevents individuals or groups from full participation in social, economic and political life and from asserting their rights.

TB episode. The period from "self-reported onset of TB-related symptoms" until end of treatment or death.

TB patient cost survey. Survey of costs faced by TB-affected patients and their households.

Universal health coverage. Access for all to necessary health services (including promotion, prevention, treatment, rehabilitation and palliation) without financial hardship *(13)*.

References for glossary

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PART I.

An overview of the 20 surveys completed 2015–2021

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1. Introduction

Tuberculosis (TB) has long been recognized as a disease that can only be adequately addressed, and ultimately ended as a global health problem, through a comprehensive multisectoral response that encompasses social and economic progress as well as public health measures and medical interventions.

The nature of TB disease – including its severity, the prolonged time over which symptoms can develop and worsen, and the time required for effective treatment (several months but sometimes more than a year if drug resistance is present) – means that people who develop TB as well as their households can face large financial and economic costs. These include indirect costs resulting from illness and disability (e.g. income losses arising from time lost from work, reduced capacity to work or job loss) and direct costs (e.g. medical fees and travel costs) associated with seeking health care until a diagnosis is made and with accessing treatment services following diagnosis. These costs pose major barriers that can have a major negative impact on the ability of people with TB to promptly access diagnosis and treatment, and to complete treatment once started. Most people with TB can be cured if they access and complete treatment, but without treatment the death rate is high (about 50% overall) *(1)*. A wider consequence of delays to diagnosis and treatment is prolonged transmission of infection to others; this slows the rates of decline in TB incidence (i.e. the number of people who develop TB disease each year) that can be achieved in the general population. Hence, cost barriers to prompt access to TB diagnosis and successful completion of treatment have a direct impact on progress towards global and national targets for reductions in TB deaths and TB incidence, which have been part of global and national TB strategies since 2006.

Reducing and eliminating the costs faced by TB patients and their households is a central component of the World Health Organization (WHO) End TB Strategy (**Box 1.1**) *(2)*, with milestones set for 2020 and 2025 and targets for 2030 and 2035. The first milestone, for 2020, was that no TB patients and their households should face catastrophic total costs as a result of TB disease, to be sustained thereafter. In subsequent WHO guidance *(3)*, "catastrophic" was defined as total costs (including direct medical expenditures, direct nonmedical expenditures and indirect costs) during a TB episode that exceeded 20% of household income or expenditure.[1] The strategy was adopted by all of WHO's 194 Member States in 2014 *(2)*. The two other indicators for which milestones and targets have been set are TB incidence and TB mortality (**Box 1.1**).

Reducing the percentage of TB patients and their households facing catastrophic total costs due to TB disease to zero can only be achieved through progress on multiple fronts. Within the health sector, it requires ensuring that universal health coverage (UHC) is in place; that is, that everyone can obtain the health services they need without suffering financial hardship *(4)*. UHC plays a critical role in ensuring that direct medical expenditures are minimized. Other sectors (e.g. those responsible for labour and welfare) have a key role to play in preventing or mitigating other causes of economic and financial hardship for people with TB, such as time lost from work or job loss. Multisectoral action, including both UHC and social protection, are core components of Pillar 2 of the End TB Strategy (**Box 1.1**).

To assess progress towards the End TB Strategy milestones and targets for reductions in total costs faced by TB patients and their households, it is necessary to monitor direct medical expenditures, direct nonmedical expenditures and indirect costs (e.g. income losses). In 2014–2015, WHO developed standard methods for measuring these costs and assessing whether they were catastrophic, using nationally representative surveys of TB patients.[2] These methods were subsequently published *(3)* and provided the basis for global coordination of support to countries for the design, implementation, analysis and reporting of such surveys.

[1] This indicator for TB should not be confused with the indicator for catastrophic health expenditures in the Sustainable Development Goals (SDGs). SDG indicator 3.8.2 is defined as the proportion of the population with household expenditures on health exceeding 10% and 25% of total household expenditure or income. Health expenditures include direct medical expenditures for all household members, for any diseases or condition. The indicator measures financial hardship as opposed to financial barriers to accessing and using health care. Indicator SDG 3.8.2 is one of two indicators being used to track progress towards universal health coverage (UHC) by 2030 (SDG Target 3.8) *(5)*. Further explanation is provided in **Annex 1**.

[2] These methods built on previous work by KNCV Tuberculosis Foundation, WHO and Research Institute of Tuberculosis/ Japan Anti-Tuberculosis Association (RIT/JATA) *(6, 7)*.

Box 1.1 The WHO End TB Strategy at a glance

VISION	A WORLD FREE OF TB — zero deaths, disease and suffering due to TB			
GOAL	END THE GLOBAL TB EPIDEMIC			
INDICATORS	MILESTONES		TARGETS	
	2020	2025	2030	2035
Percentage reduction in the absolute number of TB deaths (compared with 2015 baseline)	35%	75%	90%	95%
Percentage reduction in the TB incidence rate (compared with 2015 baseline)	20%	50%	80%	90%
Percentage of TB-affected households facing catastrophic costs due to TB[a] (level in 2015 unknown)	0%	0%	0%	0%

PRINCIPLES

1. Government stewardship and accountability, with monitoring and evaluation
2. Strong coalition with civil society organizations and communities
3. Protection and promotion of human rights, ethics and equity
4. Adaptation of the strategy and targets at country level, with global collaboration

PILLARS AND COMPONENTS

1. **INTEGRATED, PATIENT-CENTRED CARE AND PREVENTION**
   - A. Early diagnosis of TB including universal drug-susceptibility testing, and systematic screening of contacts and high-risk groups
   - B. Treatment of all people with TB including drug-resistant TB, and patient support
   - C. Collaborative TB/HIV activities, and management of comorbidities
   - D. Preventive treatment of persons at high risk, and vaccination against TB
2. **BOLD POLICIES AND SUPPORTIVE SYSTEMS**
   - A. Political commitment with adequate resources for TB care and prevention
   - B. Engagement of communities, civil society organizations, and public and private care providers
   - C. Universal health coverage policy, and regulatory frameworks for case notification, vital registration, quality and rational use of medicines, and infection control
   - D. Social protection, poverty alleviation and actions on other determinants of TB
3. **INTENSIFIED RESEARCH AND INNOVATION**
   - A. Discovery, development and rapid uptake of new tools, interventions and strategies
   - B. Research to optimize implementation and impact, and promote innovations

[a] This indicator is not the same as the SDG indicator for catastrophic health expenditures.

Source: Box 3 of the *Global TB report 2021 (8)*.

Between 2015 and the end of 2021, a total of 20 countries completed national surveys of costs faced by TB patients and their households using WHO-recommended methods, and shared their results with WHO (Fig. 1.1, Fig. 1.2).[1] The coronavirus disease (COVID-19) pandemic severely disrupted surveys in the planning or implementation stages in 2020 and 2021; nonetheless, three countries managed to complete their surveys in this period.

This book provides comprehensive documentation about these 20 national surveys.

Part I comprises cross-cutting chapters: introduction (Chapter 1), methods (Chapter 2), results (Chapter 3), policy implications and translation (Chapter 4) and reflections and future direction (Chapter 5).

Part II contains 20 country-specific profiles, in which methods, results and policy implications are summarized in a standardized format.

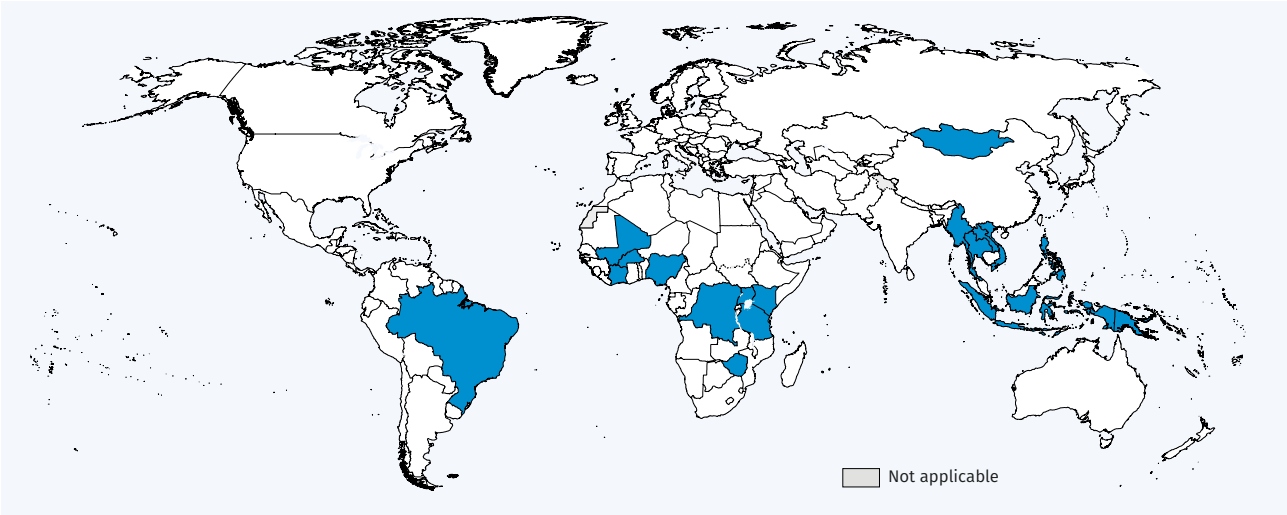
Overall, there are three main findings and messages. First, about half of TB-affected households faced catastrophic total costs due to TB, with none of the

[1] National surveys were also completed by mid-2021 in Benin (2018), Cameroon (2020), China (2016), Lesotho (2019), Republic of Moldova (2016), Timor-Leste (2017) and El Salvador (2021). They are not included in this publication, either because data were not available to WHO in time for inclusion (Benin, Cameroon, China, Lesotho, Timor-Leste and El Salvador) or because only people with drug-resistant TB were included (Republic of Moldova).

Fig. 1.1 The 20 countries in which national surveys of costs faced by TB patients and their households were completed between 2015 and 2021 using WHO-recommended methods and shared results with WHO, by year of data collection

2015	2016	2017	2018	2019	2020	2021
				Brazil		
				Burkina Faso		
				Democratic Republic of the Congo		
		Fiji		Lao People's Democratic Republic		
	Ghana	Kenya		Papua New Guinea		
	Philippines	Mongolia	Uganda	Solomon Islands	Indonesia	
Myanmar	Viet Nam	Nigeria	Zimbabwe	United Republic of Tanzania	Thailand	Mali

Fig. 1.2 The 20 countries that completed national surveys of costs faced by TB patients and their households between 2015 and 2021 using WHO-recommended methods and shared results with WHO, which are featured in this book



surveyed countries coming close to achieving the End TB Strategy target of zero. This shows that people with TB and their households are experiencing major economic and financial barriers to diagnosis and treatment. Second, TB continues to cause severe socioeconomic hardship, such as substantial reductions in household income, loss of assets, increased food insecurity, disruption to schooling for children, and increased rates of unemployment and poverty. Third, policy options are urgently needed to mitigate these costs and consequences, with their operationalization and implementation requiring high-level political commitment and persistent multisectoral efforts.

It is hoped that this publication will serve as a key reference for all those working towards reducing costs faced by TB patients and their households and achieving the milestones and targets of the End TB Strategy.

References for Chapter 1

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2 The End TB Strategy. Geneva: World Health Organization; 2014 (**https://www.who.int/tb/strategy/End_TB_Strategy.pdf**).

3 Tuberculosis patient cost surveys: a handbook. Geneva: World Health Organization; 2017 (**https://www.who.int/publications/i/item/9789241513524**).

4 World Health Organization/World Bank. Tracking universal health coverage: 2021 global monitoring report. Geneva: World Health Organization; 2022 (https://www.who.int/data/monitoring-universal-healthcoverage).

5 Sustainable Development Goals [website]. New York: United Nations; 2016 (**https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals**).

6 The Tool to Estimate Patients' Costs. KNCV, WHO and the JATA; 2011 (**https://www.kncvtbc.org/en/kb/tool_to_estimate_patient_costs-zip-3/**)

7 Tanimura T, Jaramillo E, Weil D, Raviglione M, Lönnroth K. Financial burden for tuberculosis patients in low- and middle-income countries: a systematic review. European Respiratory Journal. June 1 2014. 43(6):1763–75 (**https://pubmed.ncbi.nlm.nih.gov/24525439/**).

8 Global tuberculosis report 2021. Geneva: World Health Organization; 2021 (**https://www.who.int/publications/i/item/9789240037021**).

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1. Fiji, ©WHO/Yoshi Shimizu; 2. Indonesia ©WHO/Jonathan Perugia; 3. Democratic Republic of the Congo, ©WHO/Georges Minga; 4. Fiji, ©WHO/Will Seal; 5. Ghana, ©WHO/Nana Kofi Acquah; 6. Philippines, @WHO/Veejay Villafranca; 7. Mongolia, ©WHO/Khasar Sandag.

2. Methods

To measure progress towards the End TB Strategy target that no TB patients and their households face catastrophic total costs as a result of TB disease *(1)*, WHO has recommended the use of national surveys based in health facilities, and has provided detailed guidance on survey design, implementation, analysis and reporting *(2)*. Surveys based on standardized methods produce internationally comparable estimates of the total costs faced by TB patients and their households (comprising direct medical expenditures, direct nonmedical expenditures and indirect costs [e.g. income losses]) and whether these are "catastrophic". Survey findings are also expected to stimulate national discussions to identify multisectoral strategies that will mitigate socioeconomic hardships experienced by TB patients and their households, and reduce financial and economic cost barriers that affect access to TB diagnosis as well as initiation and completion TB treatment.

This chapter provides an overview of the survey methods used in the 20 countries that completed national surveys of costs faced by TB patients and their households according to the methods set out in the WHO handbook *(2)* and that shared results with WHO: Brazil, Burkina Faso, the Democratic Republic of the Congo, Fiji, Ghana, Indonesia, Kenya, the Lao People's Democratic Republic, Mali, Mongolia, Myanmar, Nigeria, Papua New Guinea, the Philippines, Solomon Islands, Thailand, Uganda, the United Republic of Tanzania, Viet Nam and Zimbabwe. It covers eight topics: survey objectives, the definition of "catastrophic total costs", sampling, the survey questionnaire, data collection, estimation of household income or expenditure, estimation of indirect costs and data analysis.

2.1 Objectives

The WHO handbook on national TB patient cost surveys *(2)* defines two survey objectives:

- to document the magnitude and main drivers of different types of costs incurred by TB patients and their households, to guide policies to reduce financial access barriers and minimize the adverse socioeconomic impacts of TB; and
- to determine the baseline and periodically measure the percentage of TB patients and their households treated in the National TB Programme (NTP) network and incurring catastrophic total costs due to TB.

In addition to the two objectives in the WHO handbook, the national surveys in Brazil, Fiji, Ghana, Papua New Guinea, Solomon Islands and the United Republic of Tanzania explicitly included objectives related to the identification of policy recommendations that would mitigate socioeconomic impacts among TB-affected households. The relationship between the incidence of catastrophic total costs due to TB disease and the households' coping behaviours (e.g. selling assets or borrowing money), with the aim of identifying a proxy indicator for catastrophic total costs, was included as an additional objective in Kenya, Mongolia, Nigeria and Uganda. In the Democratic Republic of the Congo, the Lao People's Democratic Republic, Nigeria, the Philippines, Uganda and the United Republic of Tanzania, survey objectives included identification of subgroups of the population who are most at risk of facing catastrophic total costs.

2.2 Definition of catastrophic total costs due to TB

All of the 20 TB patient cost surveys included in this publication adopted the definition of catastrophic total costs due to TB provided in the WHO handbook *(2)*. The total cost is the sum of direct medical expenditures, direct nonmedical expenditures and indirect costs for the entire TB episode for an individual patient and their household. If total costs exceed 20% of the household annual pre-disease income or expenditure, the household is classified as facing catastrophic total costs due to TB.[1] In the End TB Strategy, the indicator is defined as the proportion of households faced with catastrophic total costs due to TB among all TB patients treated within the NTP network *(1)*.

The indicator may also be reported by income quintile, treatment category and geographical cluster within countries, if the sample size allows. Most countries provided disaggregated estimates by treatment category; for example, for patients treated with first-line as opposed to second-line TB drugs, or patients treated for drug-susceptible as opposed to drug-resistant TB (DR-TB). There were a few exceptions. For example, the surveys in Fiji and Solomon Islands could not produce precise estimates for patients with DR-TB because of the small number of patients in that

[1] This indicator is not the same as the SDG indicator for catastrophic health expenditures. See Chapter 1 and Annex 1 for further explanation.

category. The survey in Solomon Islands used pulmonary and extrapulmonary TB as the factor for disaggregation, because patients with extrapulmonary TB were considered a particularly important subgroup when considering cost implications *(3)*.

Part II of this publication includes a standard country survey profile in which treatment category is the main factor for disaggregation of costs. The profiles for Fiji and Solomon Islands do not include this disaggregation.

2.3 Sampling

To derive a precise and accurate estimate for the End TB Strategy indicator, the sample of TB patients needs to be of a sufficient size and nationally representative. Table 2.1 summarizes the sampling approaches used in the 20 surveys. The WHO handbook provides a comprehensive description of the recommended sampling approaches *(2)*.

2.3.1 Survey population and eligibility criteria

The survey population is defined as all patients (including children accompanied by a guardian) within the NTP network who are on TB treatment, with the NTP network including both public and private facilities that notify cases of TB to the NTP. The WHO handbook recommends the following inclusion and exclusion criteria *(2)*:

- eligible patients are patients registered for TB treatment (regardless of age, and of whether they are affected by drug-susceptible or DR-TB) who are attending a sampled facility and who are at least 14 days into the present intensive or continuation phase of their treatment;
- ineligible patients are:
  - patients treated in facilities that are not notified to public health authorities or the NTP; and
  - confirmed TB cases who have not yet started TB treatment or have been in the current treatment phase for less than 2 weeks, and children aged below 15 years not accompanied by a guardian.

All country surveys adhered to these criteria.

2.3.2 Sampling frame

The sampling frame should include all patients at health facilities (public or private) that treat and notify TB in line with the guidelines of the NTP. The sampling frame is typically obtained from the national TB case notification system, with the numbers of notified TB cases by health facility or by basic TB management unit in the year preceding the survey.

To ensure optimal representativeness, the sampling frame should include the whole country. Table 2.1 includes a column that describes the geographical areas that were excluded from sampling frames because of security concerns or geographical inaccessibility.

2.3.3 Sampling design and sample size

TB diagnosis, treatment and notification are usually implemented through a health system structure; thus, it is often feasible to apply a cluster sampling method with either the health facility or basic TB management unit as the primary sampling unit. Cluster sampling using the probability proportional to size (PPS) approach was applied in most surveys, meaning that the resulting sample was self-weighted; that is, a fixed, predefined number of TB patients were enrolled from each primary sampling unit that was selected based on PPS.

For countries where the annual number of TB patients is relatively small, a total sampling approach is recommended. This approach typically enrols all consecutive TB patients during the predefined period from all health facilities in the country. As a result, the size of cluster (or the number of patients in each facility) varies but the resulting sample is self-weighted. Fiji and Solomon Islands employed this type of approach.

The WHO handbook recommends basing sample size calculations on a standard equation for a single proportion with a desired precision *(2)*. As presented in each country profile (see Part II), most country surveys set a prior estimate between 40% and 60%, with an absolute precision of 4–6%.

2.3.4 Stratification

A stratified sampling approach can be used for several purposes; for example, if estimates for specific subgroups of the population are of particular interest, such sampling helps to improve the representativeness of the sample and the precision of estimators. In the context of TB patient cost surveys, stratification based on whether patients received first-line or second-line TB treatment (also referred as "treatment category") was employed. This is particularly useful in countries where the systems for TB diagnosis, treatment and notification are different for patients on first-line or second-line treatment, which in turn means that the sampling frame for each group is defined differently.

Four of the 20 country surveys used stratified sampling: Brazil, Indonesia, the Philippines and Thailand. Indonesia stratified by drug-resistance status only, whereas two countries combined this with another factor: urban or rural areas in the Philippines, and type of health facility in Thailand. Brazil also stratified by type of health facility: primary health care and specialized services.

A conventional cluster sampling approach might not work well for countries where the annual number of TB notifications per facility is extremely heterogeneous (i.e. a large fraction of TB patients are concentrated in a limited number of facilities, whereas many

other facilities report few patients). Possible ways to overcome this issue include aggregating facilities to form a large cluster (i.e. regrouping facilities with small numbers of TB patients), or stratifying by facility type (hospital versus primary care facilities) or TB case load. Excluding facilities with a low case load (e.g. facilities reporting fewer than three cases per year) may not be ideal but is inevitable, especially when considering the logistics of field operations.

2.4 Survey questionnaire

TB patient cost surveys employ face-to-face interviews primarily at the facility, using a structured questionnaire as the primary data collection method. The WHO handbook includes a generic data collection questionnaire *(2)* that is designed to capture individual and household-level data for the following topics:

- clinical parameters;
- demographics, employment status and household composition;
- socioeconomic position;
- health care use;
- time spent and income lost while seeking and receiving care;
- direct medical expenditures, direct nonmedical expenditures and indirect costs associated with seeking and receiving care for TB;
- household and individual income;
- asset ownership at household level;
- time spent by care givers;
- coping mechanisms deployed (e.g. loans taken out and assets sold); and
- social consequences and other perceived impacts of costs.

Survey investigators are advised to retain the overall structure of the generic data collection instrument and all its questions, so that the resulting dataset will be consistent across countries. However, country-specific adaptations are needed for some questions (e.g. for the way the question is phrased or for the answer options). This is especially the case for questions related to health system structure, socioeconomic status (in particular, asset ownership), health service delivery systems and social protection schemes.

Survey investigators are encouraged to refer to other relevant national surveys (e.g. household income and expenditure surveys) or the national census to determine the options for some questions, especially those related to socioeconomic status (Box 2.1). It is also important to consult the national statistics office or equivalent body providing oversight to national surveys. For example, census and other general household surveys are a good source for understanding how the country categorizes occupation and levels of educational attainment. Demographic health surveys (DHS), multiple indicator cluster surveys (MICS),

Box 2.1 Selecting a country-specific questionnaire on asset ownership and household annual spending: capitalizing on externally validated questionnaires

It is recognized that self-reported data on current household income can be unreliable *(4)*.

The ideal approach to measurement of household income in a TB patient cost survey is administration of a questionnaire that was used in the most recent national survey that included collection of data on household income or alternatively household expenditure. Examples of such surveys include household income and expenditure surveys, or living standards measurement studies. However, short-form expenditure questionnaires that have been validated are often not available, and it may not be feasible to administer long-form questionnaires during a 1-hour interview at a health facility.

Of the 20 national TB patient cost surveys featured in this book, 18 collected data on self-reported household income (Table 2.2). Data on annual household expenditure were collected in the Democratic Republic of the Congo and Kenya. Three countries (Brazil, Uganda and the United Republic of Tanzania) collected data for both household income and household expenditure. Questionnaires were sourced from previously implemented household expenditure or living standard measurement surveys to measure permanent income.

The integration of a prevalidated questionnaire on asset ownership from previous national surveys needs to be done carefully, and preferably in coordination with those who implemented the previous questionnaire or hold the survey dataset (e.g. the country's national statistics bureau). Box 6.1 of the WHO handbook describes how to select country-specific asset variables for the TB patient cost survey questionnaire, using previous national survey questionnaires *(2)*.

It is important to use a sufficiently thorough list of assets or dwelling characteristics (i.e. at least 10 items). The national statistics bureau or its equivalent in the country can provide information on the latest national surveys and the list of questions used to determine ownership of assets or dwelling characteristics. The set of questions on assets retained for the TB questionnaire should be those that have the strongest link to household income in previous household surveys.

Table 2.1 Summary of sampling strategy

COUNTRY	SAMPLING DESIGN	STRATIFICATION	SAMPLE SIZE	CLUSTER NUMBER	CLUSTER SIZE	PATIENT ENROLMENT	GEOGRAPHICAL AREAS EXCLUDED INITIALLY FROM SAMPLING FRAMEWORK
Brazil	Single-stage cluster sampling using probability proportional to size (Group 1)[a] or constant sampling probability (Group 2)[b]	None	760	Group 1: 36 Group 2: 10	Group 1: 20 Group 2: 4	Random sampling from registered patients on treatment	Municipalities with 0 to 2 cases notified in 2017
Burkina Faso	Single-stage cluster sampling using probability proportional to size	None	460	20	23	Consecutive enrolment of eligible patients attending health facilities	Titao district and one facility that had no patients on TB treatment (Karangasso Vigue in Haut Bassins)
Democratic Republic of the Congo	Single-stage cluster sampling using probability proportional to size	None	1118	43	26	Consecutive enrolment of eligible patients on first-line drug treatment attending health facilities All eligible patients with drug-resistant TB attending health facilities	42 districts in conflict areas
Fiji	Total sampling with allocation of sample size at each facility proportional to the TB notification	None	226	3	Size allocated proportional to the TB notification	Consecutive enrolment of eligible patients attending health facilities	None
Ghana	Single-stage cluster sampling using probability proportional to size	None	725	25	29	Consecutive enrolment of eligible patients attending health facilities	None
Indonesia	Stratified single-stage cluster sampling using probability proportional to size	TB (first-line treatment) in public health facilities	1000	25	40	Random sampling from registered patients on treatment	None
		Drug-resistant TB	200	10	20		
Kenya	Single-stage cluster sampling using probability proportional to size	TB (first-line treatment)	1200	30	40	Consecutive enrolment of eligible patients attending health facilities	None
		Drug-resistant TB				Total sampling from all registered patients on treatment for DR-TB	
Lao People's Democratic Republic	Single-stage cluster sampling using probability proportional to size	None	725	25	29	Random sampling from registered patients on treatment	None
Mali	Single-stage cluster sampling using probability proportional to size	None	450	30+1	15	Random sampling from registered patients on treatment	Two districts were excluded due to insecurity (Bankas and Koro)
Mongolia	Two-stage cluster sampling using probability proportional to size	TB (first-line treatment)	504	20	36	Consecutive enrolment of eligible patients attending health facilities	None
		Drug-resistant TB	216			Total sampling from registered patients on treatment for drug-resistant TB	

COUNTRY	SAMPLING DESIGN	STRATIFICATION	SAMPLE SIZE	CLUSTER NUMBER	CLUSTER SIZE	PATIENT ENROLMENT	GEOGRAPHICAL AREAS EXCLUDED INITIALLY FROM SAMPLING FRAMEWORK
Myanmar	Single-stage cluster sampling using probability proportional to size	None	1004	25	40	Consecutive enrolment of eligible patients attending health facilities	None
Nigeria	Single-stage cluster sampling using probability proportional to size	None	1200	40	30	Consecutive enrolment of eligible patients attending health facilities	None
Papua New Guinea	Single-stage cluster sampling using probability proportional to size	None	1000	40	25	Random sampling from registered patients on treatment	None
Philippines	Stratified single-stage cluster sampling using probability proportional to size	TB (first-line treatment) in urban area	780	78	10	Random sampling from registered patients on treatment	None
		TB (first-line treatment) in rural area	780	78	10		
		Drug-resistant TB	320	32	10		
Solomon Islands	Total sampling with allocation of sample size at provincial level proportional to the TB notification	None	228	9	Size allocated proportional to the TB notification	Consecutive enrolment of eligible patients attending health facilities	None
Thailand	Stratified multi-stage cluster sampling using probability proportional to size	Tertiary hospitals in areas with low incidence of poverty	420	12	35	List of tertiary hospitals providing TB treatment in areas with low incidence of poverty	None
		Tertiary hospitals in areas with high incidence of poverty	280	8	35	List of tertiary hospitals providing TB treatment in areas with high incidence of poverty	
		Secondary hospitals in areas with low incidence of poverty	315	9	35	List of secondary hospitals providing TB treatment in areas with low incidence of poverty	
		Secondary hospitals in areas with high incidence of poverty	385	11	35	List of secondary hospitals providing TB treatment in areas with high incidence of poverty	
Uganda	Single-stage cluster sampling using probability proportional to size	None	1174	67	15	Consecutive enrolment of eligible patients attending health facilities	None
United Republic of Tanzania	Single-stage cluster sampling using probability proportional to size	None	764	30	26	Consecutive enrolment of eligible patients attending health facilities	None

COUNTRY	SAMPLING DESIGN	STRATIFICATION	SAMPLE SIZE	CLUSTER NUMBER	CLUSTER SIZE	PATIENT ENROLMENT	GEOGRAPHICAL AREAS EXCLUDED INITIALLY FROM SAMPLING FRAMEWORK
Viet Nam	Single stage cluster sampling enhanced by stratification using probability proportional to size	Six provinces were stratified by 3 zones (North, Central, South). Twenty clusters were divided into each zone proportionate to the notifications in each zone as followed: North (7 clusters), Central (2 clusters) and South (11 clusters)	720	20	36	Random sampling from registered patients on treatment	None
Zimbabwe	Single-stage cluster sampling using probability proportional to size	None	900	60	15	Consecutive enrolment of eligible patients on first-line drug treatment attending health facilities and all eligible patients with drug-resistant TB attending health facilities	None

[a] municipalities that reported ≥35 TB cases in 2017.
[b] municipalities that reported <35 TB cases in 2017.

living standards measurements surveys (LSMS) and other health-related surveys can be a good reference to determine phrasing and options for questions related to health service delivery and people's health-seeking behaviour.

Local adaptations may compromise comparability across the country surveys. For example, there was wide variation in the occupational category applied at country level (see Part II).

Apart from these possible modifications, it is generally recommended that countries do not delete questions; this helps to ensure that the variables necessary to calculate standard indicators across countries are available.

2.5 Data collection

To facilitate effective and efficient data collection, WHO provided guidance and support to survey investigators to use digital methods to implement the questionnaire using open data kit (ODK) tools.[1] The suite of open-access tools provided by WHO allow interviewers to enter data into a portable device (e.g. tablets, mobile phones or laptop computers) in the field, both during or after an interview. The data are then centralized through online synchronization on a cloud-based server. Depending on the country's needs, the WHO Global TB Programme (WHO/GTB) provides a cloud-based server facility (Ona Systems[2]), as described in Box 2.2.

Of the 20 surveys, 15 used digital data collection during the interviews. Some countries used the digital data collection system as a data entry tool after relying on paper-based recording during the interviews. Overall, 13 countries used the ODK-based Ona facility provided by WHO, three used other ODK-based tools and four used other tools such as EpiInfo (United States Centers for Disease Control and Prevention [CDC]), Microsoft Excel (Microsoft) and KoBoToolbox (the Harvard Humanitarian Initiative).

As outlined in the WHO handbook, most countries conducted the survey at health facilities where enumerators interviewed patients on site *(2)*. A few countries combined facility-based and home-based interviews, primarily to reduce the burden on patients of visiting health facilities.

2.6 Estimation of household income or expenditure

As described in Section 2.2, the indicator of catastrophic total costs due to TB uses household annual income or expenditure as the denominator. This is because the indicator examines whether the sum of direct medical expenditures, direct nonmedical expenditures and indirect costs exceeds 20% of the household's economic resources available to pay for it.

Table 2.2 summarizes measures used for the estimation of household annual income or expenditure in the 20 national surveys of costs faced by TB patients and their households. All surveys collected data about self-reported annual household income; this is part of the generic survey instrument and is often preferred by national survey teams for its simplicity. Most surveys also collected data about household asset ownership, as a proxy measure of permanent income. Eight out of 20 surveys collected data about self-reported household expenditure, of which five used it as the main method to assess the household's economic resources to pay for basic subsistence needs.

2.7 Estimation of indirect costs

The WHO handbook provides two options for the measurement of indirect costs: the output approach and the human capital approach *(2)*. The output approach uses self-reported household income at

Box 2.2 An ODK-based online data collection system

WHO/GTB set up a cloud-based digital data collection system for national TB patient cost surveys for use on portable devices such as tablets, mobile phones or laptops. The system was established on the Ona platform, which has been used successfully in the areas of reproductive health, Ebola response, and other health and non-health development areas. Ona was chosen mainly because it is built on ODK, which is an open-access technology that allows data collection offline, with later online uploads to send data to the repository. The system also allows version control, which is required for data quality assurance.

The digital survey hosted in Ona can be accessed via a web browser or through ODK Collect, a free Android application. The survey requires a network connection the first time it is opened; however, once the survey questionnaire has been loaded, users do not need an active network connection for access. If there is an active connection, patient responses will automatically be uploaded onto a web database once submitted. Where network connection is limited, the form can still be completed offline; the app will save responses so that data can be sent to the database once network connectivity is re-established. The database is secure, with designated individuals accessing it through a username and password.

If a digital data entry system is chosen by country survey teams, the ethics review board may require the informed consent form to be completed as a hard copy, with a patient signature or fingerprint. Otherwise, an electronic signature can be used.

[1] See https://getodk.org/.

[2] See https://ona.io/.

Table 2.2 Summary of the methods used to assess household capacity to pay (either self-reported income or consumption-expenditure), 20 national surveys of costs faced by TB patients and their households completed 2015–2021

COUNTRY	SELF-REPORTED INCOME	CONSUMPTION OR EXPENDITURE	ASSETS	SOURCE FOR PRE-VALIDATED EXPENDITURE AND ASSETS QUESTIONNAIRE
Brazil	Main method[a]	Included[b]	Sensitivity analysis[c]	Instituto Brasileiro de Geografia e Estadistica IBEG
Burkina Faso	Main method[a]	Not included[d]	Sensitivity analysis[c]	Enquête Multisectorielle Continue (EMC)–Burkina Faso, quatrième passage
Democratic Republic of the Congo	Not included[d]	Main method[a]	Included[b]	Enquête 1–2–3 sur l'Emploi et le Secteur Informel en RD Congo, 2012
Fiji	Main method[a]	Not included[d]	Sensitivity analysis[c]	Not specified[e]
Ghana	Main method[a]	Included[b]	Sensitivity analysis[c]	Strategies for Health Insurance for Equity in Less Developed Countries (SHIELD), Health Care Financing and Benefit incidence study in Ghana
Indonesia	Main method[a]	Not included[d]	Sensitivity analysis[c]	National socioeconomic survey 2018 (SUSENAS)
Kenya	Not included[d]	Main method[a]	Sensitivity analysis[c]	Kenya Household Health Expenditure and Utilisation Survey (HHEUS) 2013
Lao People's Democratic Republic	Main method[a]	Not included[d]	Sensitivity analysis[c]	Technical consultation with National TB Programme of Lao People's Democratic Republic
Mali	Main method	Not included[d]	Sensitivity analysis[c]	Equity tool 2019 (www.equitytool.org/mali)
Mongolia	Main method[a]	Not included[d]	Sensitivity analysis[c]	Not specified[e]
Myanmar	Main method[a]	Not included[d]	Sensitivity analysis[c]	Myanmar Household Income and Expenditure Survey (HIES) 2012
Nigeria	Main method[a]	Not included[d]	Sensitivity analysis[c]	Nigerian Demographic and Household Survey (DHS) 2013
Papua New Guinea	Main method[a]	Included[b]	Sensitivity analysis[c]	2009 Household income and expenditure survey
Philippines	Main method[a]	Not included[d]	Sensitivity analysis[c]	Annual Poverty Indicators Survey (APIS) 2014 and National Demographic and Household Survey (DHS) 2013
Solomon Islands	Main method[a]	Not included[d]	Sensitivity analysis[c]	Technical consultation with National Statistics Office of Solomon Islands
Thailand	Sensitivity analysis[c]	Main method[a]	Included[b]	Household socioeconomic survey 2017
Uganda	Included[b]	Main method[a]	Included[b]	Uganda National household Survey 2016
United Republic of Tanzania	Included[b]	Main method[a]	Included[b]	Tanzania National Household Survey 2007
Viet Nam	Main method[a]	Not included[d]	Sensitivity analysis[c]	2014 Vietnamese Living Standard Survey
Zimbabwe	Main method[a]	Not included[d]	Included[b]	Not specified[e]

[a] "Main method" means this was the main approach used to estimate household income.
[b] "Included" means the method was included in the data collection but not used in the main analysis (although it might have been used for further secondary analyses).
[c] "Sensitivity analysis" means the measurement was included in the survey and used in the sensitivity analysis.
[d] "Not included" means the method was not used in the survey.
[e] "Not specified" means that the source of data for questions on asset ownership was not specified in survey documents.

three points in time (before the onset of TB symptoms, at the time of diagnosis and during the "current" treatment phase) to estimate a household's income change before and during the TB episode. This is the simplest and conceptually most appropriate method; however, it works well only in settings with a predominantly formal economy, where survey participants can report valid household income in monetary values. If the reported household income data are not reliable, then the output approach is not recommended for valuation of indirect costs.

The human capital approach uses reported time spent while seeking and receiving care during the TB episode (in hours), multiplied by an individual's hourly income. Children are by default given an hourly income of zero; instead, data about the estimated hourly income of the caregiver(s) are used. Hourly income is estimated based on reported individual income collected from all survey participants, or estimated household income and household size. The surveys of four countries (the Democratic Republic of the Congo, Kenya, Mali and Uganda) used an external source[1] to determine the hourly wage (e.g. national minimum wage).

Among the 20 surveys, 14 used the output approach to measure indirect costs, whereas the remaining six countries (the Democratic Republic of the Congo, Kenya, Mali, Thailand, Uganda and the United Republic of Tanzania) used the human capital approach.

2.8 Analysis

A comprehensive description of the recommended approaches to analysis is outlined in the WHO handbook *(2)*. Generic analytical scripts are also available in Stata (StataCorp, Texas, United States of America) and R (R Core Team, Vienna, Austria) in the WHO website and GitHub.[2] Most national surveys adopted these resources with local adaptation. Most countries followed the recommended reporting indicators (**Box 2.3**).

A brief description of the WHO-recommended analytical approach is provided here. The analyses address the main objectives of the survey; that is, estimating the total TB costs incurred by TB-affected households for one episode, the proportion of TB-affected households experiencing catastrophic total costs due to TB (and associated risk factors), and the coping strategies adopted by households to deal with the economic burden imposed by the disease. Statistical analyses and data visualizations were mostly performed using Stata and R (further details are provided in **Part II**).

[1] References to these sources are provided in the country profiles (Part II).

[2] https://github.com/GTB-PCS/

Box 2.3 Recommended reporting indicators of national TB patient cost surveys

The WHO handbook recommends the following indicators as minimum reporting requirements *(2)*:

- descriptive statistics, by treatment category (first-line and second-line treatment) and overall;
- selected sociodemographic characteristics;
- model of care (e.g. hospitalization and treatment support);
- hours lost in seeking or accessing care and reported individual income;
- estimated total costs borne by patients' households, mean breakdown in US$ per year;
- reported dissaving mechanisms and social consequences;
- households facing catastrophic total costs due to TB under various thresholds; and
- risk factors for experiencing catastrophic total costs due to TB.

Additional indicators used in several surveys included:

- pre- and post-TB-disease household poverty rates (assessed using either national or international thresholds);
- household income pre-diagnosis, at diagnosis and during treatment; and
- changes in employment status before and during the TB episode.

2.8.1 Costs borne by TB-affected households over a TB episode

Extrapolation of cross-sectional cost data to obtain episode costs

Almost all surveys followed the cost extrapolation method recommended in the WHO handbook *(2)*. The method is to extrapolate any costs beyond a participant's current treatment phase and until treatment completion, using the median costs incurred by other patients and their households in the alternative treatment phase at the time of the interview *(2: pp. 27–28)*.

As an alternative, the survey in Kenya used a multiple imputation method, in which computation of the total costs of treatment involved imputation of a respondent's costs for the unobserved treatment phase. Given that cost data for health care use often do not follow a normal distribution, the investigators adopted a predictive mean matching imputation strategy *(5)*. This involves selecting a missing value randomly from 10 nearest matches *(6)*, with matching based on the respondents' observed covariates. The

mean imputation approach was used to handle missing data *(7)*.

The survey in Ghana also used an alternative approach, employing a regression-based method for imputing missing parts of the cost data *(8)*. This involved estimating costs using a multiple linear regression model with a set of variables conceptually linked to costs (e.g. gender, age, occupation, residence [rural or urban] and treatment category). Thus, the method used statistically modelled means rather than simple median values, which is expected to provide more accurate estimates for individual patient costs based on their characteristics.

The survey in Kenya used the multiple imputation approach described above to derive the final dataset (and all subsequent indicators); in contrast, Ghana used the regression-based method only for sensitivity analysis, to compare the results with the standard approach recommended in the WHO handbook.

Calculation of the total episode costs

Total episode costs are estimated as the sum of direct medical expenditures (i.e. out-of-pocket payments for TB services, net of any reimbursements), direct non-medical expenditures (e.g. out-of-pocket payments made by TB patients or their guardian related to transportation, accommodation, food and nutritional supplements, net of any reimbursements) and indirect costs. One survey (Uganda) included the cost of borrowing (i.e. dissaving) in the computation of total costs, although this was not in line with the standard calculation of the total episode costs described in the WHO handbook *(2)*.

2.8.2 Proportion of households faced with catastrophic total costs due to TB

As explained in **Section 2.2**, one of the indicators of the WHO End TB Strategy for which a global target has been set is the proportion of TB patients and their households faced with catastrophic total costs due to TB. To estimate this indicator, the total episode costs are expressed as a percentage of annual household income or expenditure; if the value exceeds 20%, the household is classified as facing catastrophic total costs due to TB.[1]

The risk factors for TB-affected households incurring catastrophic total costs (e.g. patient's sociodemographic and clinical characteristics) were examined using univariate and multivariate analysis. Unadjusted odds ratios (ORs) from univariate regressions and the adjusted odds ratios (aORs) controlling for covariates were calculated. Given methodological differences across the national surveys, the country profiles included in **Part II** show a set of risk factors (**Fig. 6, Part II**) that were identified using consistent methods in which a rigorous process of variable selection was used to derive the final model.

2.8.3 Changes in poverty rates

Surveys evaluated pre- and post-TB-disease household poverty rates by comparing respondent's daily income against the international poverty threshold of US$ 1.90 at purchasing power parity adjusted dollars. The threshold was converted to the respective local currency units using the 2011 purchasing parity exchange rate, and then inflated using the ratio of changes in values of the annual consumer price index (reported in the international finance statistics database *(9)*) in the year of the survey compared with 2011 *(10)*.[2]

2.8.4 Coping strategies, employment changes and social consequences of a TB episode

All surveys collected information on the coping strategies used by households during a TB episode (e.g. borrowing money or selling assets) and the social consequences that were experienced (e.g. social exclusion or school disruption). The surveys in Brazil and Uganda also collected information on the amount borrowed. Perceived social impact and impoverishment were measured to assess the social impact of a TB episode on households. A set of questions on employment status before and after a TB diagnosis were used to assess changes in employment status. There were some variations in the categorization of employment status because this depends on a country's socioeconomic structure.

[1] This indicator is not the same as the SDG indicator for catastrophic health expenditures. See **Chapter 1** and **Annex 1** for further explanation.

[2] This approach is in line with current practice for poverty monitoring. However, there are other methodological differences. The estimates of poverty rates pre- and post-TB in this publication are not directly comparable to those used for global monitoring of the number of people in the general population living below the international poverty line. They are also not directly comparable to the indicators used to track impoverishment related to health spending as a complement to the SDG indicator related to catastrophic expenditure on health *(11)*.

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1. Kenya, ©WHO/Khadija Farah; 2. Lao PDR, ©WHO/Yoshi Shimizu; 3. ©WHO/Inés Garcia Baena; 4. Papua New Guinea, ©WHO/Yoshi Shimizu; 5. Myanmar, ©WHO/Shehzad Noorani; 6. Mali, ©WHO/Mariam Traore.

3. Results

This chapter provides an overview of the main results from the 20 national surveys of costs faced by TB patients and their households that were completed according to WHO-recommended methods between 2015 and 2021. It covers eight major topics:

- descriptive statistics;
- changes in household income or expenditure during an episode of TB;
- costs faced by TB-affected households, and the distribution of these costs according to three major categories (direct medical expenditures, direct nonmedical expenditures and indirect costs [e.g. income losses]);
- the proportion of TB-affected households facing costs that exceeded 20% of household income or expenditure, which is the threshold used to assess progress towards the WHO End TB Strategy target that no TB-affected households face catastrophic total costs due to TB disease;[1]
- coping mechanisms adopted by TB-affected households;
- social and economic consequences experienced by TB-affected households; and
- the extent to which costs faced by TB-affected households resulted in changes in poverty rates.

3.1 Descriptive statistics

The number of participants in each of the 20 national surveys of costs faced by TB patients and their households, implemented between 2015 and 2021, and selected indicators for which data were collected for all participants, are summarized in Table 3.1.

Across 20 countries, the number of survey participants per country ranged from 183 in Solomon Islands to 1912 in the Philippines. All surveys collected data that could be disaggregated according to treatment category (first-line or DR-TB treatment), with two exceptions (Fiji and Solomon Islands). Most surveys included more male than female participants; the exceptions were Papua New Guinea and Solomon Islands, where the proportions of male and female participants were similar. The proportion of males among the total number of new and relapse cases of TB notified in the year of the survey were similar to the proportions among survey participants in most countries; the exceptions were the Democratic Republic of the Congo, Fiji, Myanmar and the United Republic of Tanzania, where the proportion of male survey participants was higher. The mean age of participants was lowest in Papua New Guinea (30 years) and highest in Thailand (53 years).

The proportion of survey participants without education varied across countries, ranging from less than 1% in the United Republic of Tanzania to 55% in Burkina Faso. However, education level was unknown for a high proportion of participants (23%) in the United Republic of Tanzania, which may explain its low proportion. The median value for household size ranged from three (Brazil, Thailand) to eight (Mali), with the widest ranges of household size seen in Ghana (median 6, range: 1–58) and the United Republic of Tanzania (median 5, range: 1–45).

Among 18 countries where data on participants' HIV status were collected, all reported that the proportion of those living with HIV exceeded 1% except for two countries: Mongolia (0.27%) and Solomon Islands (0.55%). A high proportion of people living with HIV was observed in Kenya (30%), Uganda (41%), the United Republic of Tanzania (30%) and Zimbabwe (37%).

In nine countries, about half of TB patients[2] surveyed experienced a long diagnostic delay (>4 weeks): Brazil, the Democratic Republic of the Congo, Ghana, the Lao People's Democratic Republic, Mongolia, Papua New Guinea, the Philippines, Solomon Islands and Uganda. A very high proportion was observed in Burkina Faso (88%) and Mali (92%).

The proportion of TB patients ever hospitalized during their current TB episode was high in Fiji (60%), Mongolia (68%), Solomon Islands (64%) and Thailand (48%). For Mongolia and Solomon Islands, this finding is consistent with national TB policies that mandate or encourage systematic hospitalization for all TB patients. In the case of Fiji, high levels of hospitalization are common practice for patients coming from small and outer islands, where return to their home islands is logistically difficult.

3.2 Changes in income among TB-affected households

All 20 surveys systematically collected self-reported monthly household income data at two time points in

[1] This indicator is not the same as the SDG indicator for catastrophic health expenditures. See Chapter 1 and Annex 1 for further explanation.

[2] This indicator was measured only among the patients interviewed during the intensive phase to avoid recall bias, as recommended in the WHO handbook.

Table 3.1 **Summary of survey participants and selected indicators for which data were collected for all participants, 20 national surveys implemented in 2015–2021**

COUNTRY	SURVEY YEAR	SAMPLE SIZE			MEN		AGE (YEARS)		NO EDUCATION[a]		HOUSEHOLD SIZE		HIV-POSITIVE[b]		DIAGNOSTIC DELAY (>4 WEEKS)[c]		HOSPITALIZATION[d]	
		ALL TB PATIENTS	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB														
		N	N	N	N	%	MEAN	MIN–MAX	N	%	MEDIAN	MIN–MAX	N	%	N	%	N	%
Brazil	2019–2021	603	538	65	371	62	43	0–88	85	14	3	0–20	60	10	80	45	86	14
Burkina Faso	2020	465	457	8	338	73	42	3–82	254	55	4	1–27	21	4.5	184	88	43	9.3
Democratic Republic of the Congo	2019	1108	911	197	660	60	38	1–94	191	17	6	1–30	89	8.0	293	55	127	11
Fiji	2017	227	na	–	134	59	36	1–83	13	5.7	5	1–30	na	–	15	31	134	60
Ghana	2016	691	625	66	465	67	42	1–95	133	19	6	1–58	129	19	90	45	207	30
Indonesia	2020	1168	990	178	686	59	41	0–87	60	5.1	na	–	20	1.7	74	25	337	29
Kenya	2017	1353	1071	282	840	62	34	0–89	155	11	4	1–20	404	30	208	30	124	9.2
Lao People's Democratic Republic	2018–2019	725	717	8	433	60	51	2–96	267	37	5	1–25	19	2.6	147	54	88	12
Mali	2021	453	439	14	283	62	40	2–85	205	45	8	1–29	46	10	150	92	72	16
Mongolia	2017	739	546	193	417	56	36	1–79	36	4.9	4	1–16	2	0.27	160	63	497	68
Myanmar	2015–2016	967	901	66	595	62	37	1–87	83	8.6	4	1–21	59	6.1	112	39	127	13
Nigeria	2017	1190	1095	95	782	66	36	1–100	270	23	6	1–20	121	10	180	36	217	18
Papua New Guinea	2018–2019	1000	981	19	491	49	30	1–75	173	17	6	1–51	49	4.9	192	55	163	16
Philippines	2016–2017	1912	1592	320	1242	65	40	0–92	24	1.3	5	1–22	na	–	135	48	75	3.9
Solomon Islands	2017–2019	183	na	–	92	50	33	1–79	32	17	7	1–20	1	0.55	44	53	117	64
Thailand	2019–2021	1400	1382	18	965	69	53	1–98	77	5.5	3	0–17	119	8.5	229	32	671	48
Uganda	2017	1178	1142	36	754	64	38	1–94	169	14	4	1–5	485	41	221	45	192	16
United Republic of Tanzania	2019	777	752	25	488	63	42	1–91	4	0.51	5	1–45	234	30	94	31	63	8.1
Viet Nam	2016	735	676	59	558	76	48	2–90	25	3.4	4	1–10	10	1.4	100	28	91	13
Zimbabwe	2018	841	793	48	474	56	37	1–85	36	4.3	4	1–20	308	37	90	24	192	23

HIV: human immunodeficiency virus; min–max: minimum to maximum; na: not available; TB: tuberculosis.

[a] As defined by country survey.

[b] As documented in the TB treatment register.

[c] Among patients in the intensive phase of TB.

[d] Ever hospitalized during the current TB episode.

relation to the TB episode: before the onset of symptoms, and at the time of the patient's interview. A few surveys also collected data at the time of diagnosis.

Table 3.2 summarizes the percentage change in self-reported monthly household income during a TB episode, compared with its level before the onset of symptoms. It also shows the proportion of households unemployed before and during a TB episode. Fig. 3.1 illustrates income changes, both overall and by income or expenditure quintile.

In most countries, there were large reductions in household income during the TB episode. The only exceptions were Papua New Guinea and the United Republic of Tanzania. Overall falls in monthly household income ranged from 19% in Brazil to 89% in Ghana. In 11 of the 20 countries (Burkina Faso, Fiji, Ghana, Kenya, Mali, Myanmar, Mongolia, Nigeria, Solomon Islands, Uganda and Zimbabwe), monthly income dropped by more than 50%.

In the 18 countries in which there were overall reductions in monthly household income, these reductions affected all income or expenditure quintiles, and the size of the reduction was generally similar across quintiles (Fig. 3.1). Exceptions, where there were striking differences for the poorest quintile compared with the overall average for all quintiles, were Mongolia (a 54% reduction among those in the poorest quintile compared with 6% overall) and Solomon Islands (a 70% reduction among those in the poorest quintile compared with 37% overall).

Changes in the income level of TB-affected households are influenced by changes in employment status. The overall proportion of survey participants who were unemployed increased during their TB episode in most countries (Table 3.2). Papua New Guinea was the only exception, where there was a slight reduction. Job loss and unemployment during TB treatment are discussed further in Section 3.7.

Table 3.2 Monthly household income (mean,[a] current US$[b]) and unemployment status in 20 national surveys implemented in 2015–2021

	SELF-REPORTED HOUSEHOLD INCOME (MONTHLY)			UNEMPLOYED			
	BEFORE TB, IN US$	DURING TB, IN US$	% CHANGE[c]	BEFORE TB		DURING TB	
COUNTRY	MEAN (95% CI)	MEAN (95% CI)		N	%	N	%
Brazil	409 (374–447)	332 (303–363)	-19	140	23	264	44
Burkina Faso	138 (102–188)	55 (37–81)	-60	35	7.8	89	19
Democratic Republic of the Congo	42 (30–59)	24 (16–37)	-42	198	20	284	27
Fiji	30 (21–44)	11 (7.7–16)	-64	137	63	185	82
Ghana	135 (117–156)	15 (8.3–26)	-89	47	6.9	151	23
Indonesia	123 (103–147)	97 (80–117)	-22	149	13	361	31
Kenya	93 (74–117)	13 (9.2–17)	-86	238	18	638	47
Lao People's Democratic Republic	201 (152–268)	140 (104–190)	-30	122	17	257	35
Mali	270 (230–315)	79 (56–111)	-71	56	12	55	12
Mongolia	221 (197–249)	102 (90–116)	-54	84	11	304	41
Myanmar	140 (127–155)	63 (53–75)	-55	33	3.4	278	29
Nigeria	125 (111–141)	58 (48–70)	-54	na	–	882	74
Papua New Guinea	33 (23–49)	43 (33–54)	130	384	38	342	34
Philippines	107 (95–120)	74 (65–85)	-30	917	48	1276	67
Solomon Islands	20 (12–34)	6.0 (2.0–18)	-70	89	49	96	52
Thailand	544 (499–593)	282 (247–322)	-48	220	16	546	42
Uganda	65 (52–80)	8.1 (6.1–11)	-87	532	45	781	66
United Republic of Tanzania	42 (30–58)	103 (92–115)	245	42	5.4	400	51
Viet Nam	262 (233–294)	165 (144–190)	-37	225	31	411	56
Zimbabwe	157 (122–202)	76 (54–105)	-52	313	37	319	38

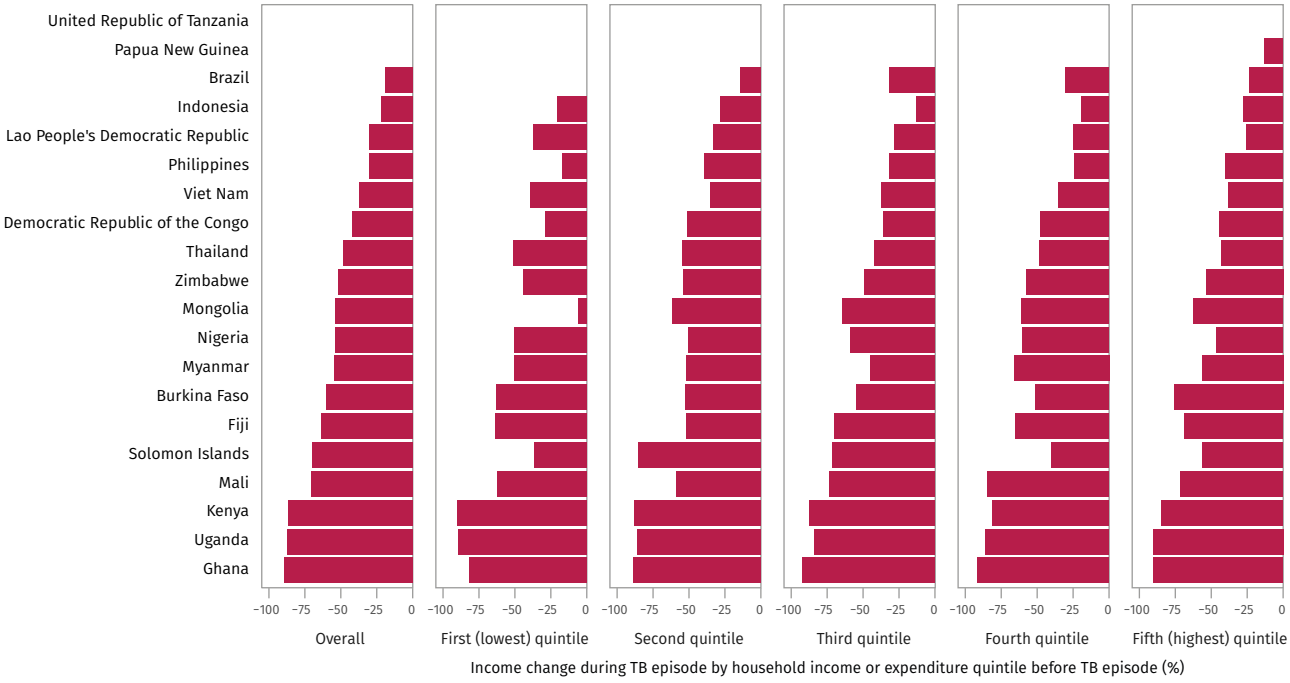
CI: confidence interval; na: not available.

[a] Geometric mean.

[b] Current values are for the year of the survey, which varied among countries.

[c] Negative values indicate reduction in means of household income during a TB episode. In Papua New Guinea and United Republic of Tanzania, household income increased during a TB episode, thus presented as positive values.

Fig. 3.1 Reduction in monthly household income[a] during a TB episode in 20 national surveys implemented in 2015–2021



TB: tuberculosis.

[a] Percentage change in geometric means of income before and during TB. Bars are not shown for the groups with increased income during the TB episode (Papua New Guinea and the United Republic of Tanzania).

3.3 Costs faced by TB-affected households, and their distribution

Total costs (including direct medical expenditures, direct nonmedical expenditures and indirect costs) incurred by TB-affected households for one episode of TB treatment, both overall and for first-line TB treatment and treatment for DR-TB separately, are shown in Table 3.3.

The mean total cost per episode[1] ranged from US$ 54 (95% confidence interval [CI]: US$ 42–70) in Papua New Guinea to US$ 1028 (95% CI: US$ 862–1227) in Mongolia (Table 3.3).[2]

The total cost during an episode of DR-TB treatment was consistently higher than the total cost during an episode of first-line TB treatment. The biggest difference was in Uganda, where the cost during an episode of treatment of DR-TB was 20 times higher: US$ 4188 (95% CI: US$ 3161–5548) compared with US$ 187 (95% CI: US$ 161–216) for first-line treatment. Other countries where the total cost per episode of treatment for DR-TB was much higher were Papua New Guinea (by a factor of 10); Indonesia, the Philippines and Thailand (by a factor of 7); and Kenya (by a factor of 6).

The breakdown of costs by three major standard cost categories (direct medical expenditures, direct nonmedical expenditures and indirect costs) is shown in Fig. 3.2. The share of each of these costs varied across the 20 national surveys, highlighting the need for tailored actions to mitigate costs (as discussed further in Chapter 4).

Direct medical expenditures accounted for a considerable share of total costs in most countries, despite the widespread norm of policies for "free TB care". These costs accounted for a particularly large proportion of total costs in Mali (41%), Kenya (23%) and Mongolia (19%). Minimizing direct medical expenditures borne by TB patients should be a high priority for NTPs and ministries of health.

Direct nonmedical expenditures (i.e. the combined costs of transportation, food, nutritional supplements and other nonmedical expenditures) accounted for a substantial share of total costs in some countries, including Solomon Islands (80%), Fiji (73%), Kenya (57%), Uganda (57%), Mali (54%) and the United Republic of Tanzania (51%). Indirect costs associated with loss of employment or time lost while seeking and receiving care accounted for the largest single share of total costs in Burkina Faso (77%), Brazil (65%), Papua New Guinea (60%), Mongolia (57%), Nigeria (47%), Indonesia (47%), Myanmar (48%), Viet Nam (44%) and Ghana (34%).

A major influence on direct nonmedical expenditures is the model of TB care; for example, the extent to which there is reliance on hospitalization or outpatient care, the frequency with which attendance

[1] Calculated as a geometric mean.

[2] US$ amounts are in current values for the year of the survey.

Table 3.3 Total cost per episode incurred per TB-affected household (mean,[a] current US$[b]) in 20 national surveys implemented in 2015–2021

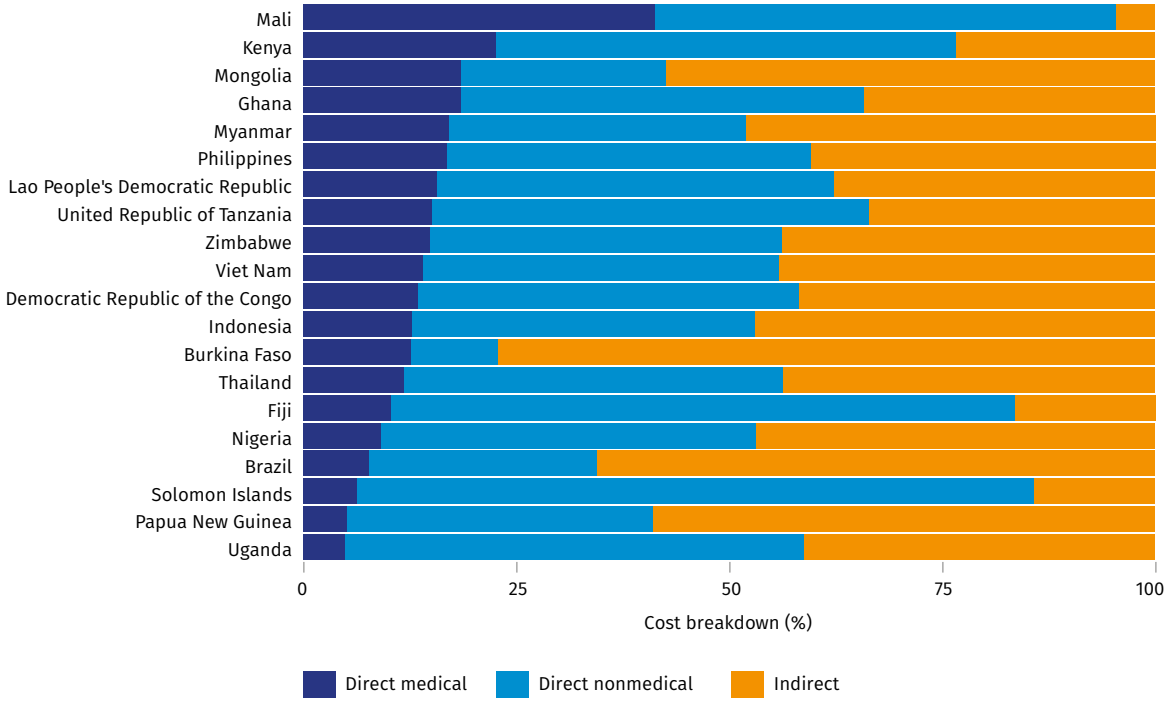
COUNTRY	OVERALL	TB (FIRST-LINE TREATMENT)	DRUG-RESISTANT TB	CURRENCY YEAR
	MEAN (95% CI)	MEAN (95% CI)	MEAN (95% CI)	
Brazil	573 (487–674)	523 (442–620)	1216 (894–1656)	2020
Burkina Faso	88 (69–111)	87 (68–110)	181 (97–338)	2020
Democratic Republic of the Congo	231 (184–289)	181 (146–224)	700 (454–1079)	2019
Fiji	311 (245–394)	na	na	2017
Ghana	457 (384–545)	430 (356–519)	814 (561–1181)	2016
Indonesia	166 (135–205)	160 (129–198)	1046 (852–1283)	2020
Kenya	105 (79–140)	104 (78–139)	605 (481–762)	2017
Lao People's Democratic Republic	716 (610–839)	709 (605–831)	1670 (967–2883)	2018
Mali	596 (497–714)	575 (483–684)	1838 (1152–2932)	2021
Mongolia	1028 (862–1227)	807 (654–996)	2003 (1686–2378)	2018
Myanmar	449 (387–520)	407 (361–460)	1773 (1504–2092)	2016
Nigeria	458 (403–522)	411 (363–466)	1609 (1212–2137)	2017
Papua New Guinea	54 (42–70)	52 (40–67)	537 (411–704)	2018
Philippines	255 (231–282)	248 (224–274)	1751 (1495–2050)	2017
Solomon Islands	673 (380–1192)	na	na	2019
Thailand	402 (353–456)	392 (345–445)	2591 (1367–4909)	2021
Uganda	187 (161–216)	166 (147–186)	4188 (3161–5548)	2017
United Republic of Tanzania	155 (138–174)	151 (135–168)	383 (236–620)	2019
Viet Nam	884 (773–1011)	774 (678–884)	3940 (3470–4473)	2016
Zimbabwe	1226 (1055–1424)	1157 (995–1346)	3310 (2517–4351)	2018

CI: confidence interval; na: not available; TB: tuberculosis.

[a] Geometric mean.

[b] Current values are for the year of the survey, which varied among countries.

Fig. 3.2 Distribution of total costs by cost category in 20 national surveys implemented in 2015–2021



at health facilities is required and the level to which services are decentralized to bring them close to the community. Changes to the model of care that could help to reduce costs faced by TB-affected households are discussed further in Chapter 4.

3.4 TB-affected households facing costs exceeding 20% of household income or expenditure due to TB

The 20 national surveys implemented between 2015 and 2021 show that a substantial proportion of TB-affected households faced a heavy economic burden to access and remain in TB care.

In the 20 surveys, the percentage of TB-affected households facing costs greater than 20% of household income or expenditure ranged from 27% (95% CI: 21–32%) in Kenya to 92% (95% CI: 86–97%) in Solomon Islands (Fig. 3.3, Fig. 3.4). The pooled average for all 20 countries, weighted for each country's number of notified cases, was 47% (95% CI: 36–59%). In 11 out of 20 countries, the proportion was higher than 50%.

No country came close to achieving the 2020 milestone of the End TB Strategy – that no TB patients and their households face catastrophic total costs (defined as >20% of household income or expenditure) as a result of TB disease.

The economic burden was even more serious among households affected by DR-TB. In the 18 countries for which data were available,[1] the percentage facing costs greater than 20% of household income or expenditure ranged from 50% (95% CI: 14–86%) in Burkina Faso to 100% (95% CI: not applicable) in Mali and Uganda. The pooled average for the 18 countries, weighted for each country's number of notified drug-resistant cases, was 86% (95% CI: 79–93%). These figures are consistent with the substantially higher costs for an episode of care for DR-TB (Table 3.3).

The number of patients diagnosed with DR-TB was relatively small in many of the country surveys, unless the survey employed a stratified sampling strategy with over-representation of drug-resistant cases. Countries that enrolled a particularly small number of patients on treatment for DR-TB included Burkina Faso, the Lao People's Democratic Republic and Thailand, and in these surveys there was wide uncertainty around the best estimate (as shown in the lower right panel of Fig. 3.3). Nevertheless, by comparing the pooled averages among patients on first-line treatment and those on treatment for DR-TB, it is possible to conclude that DR-TB has a particularly serious socioeconomic impact on TB-affected households.

When disaggregating by income or expenditure quintile, in general, the proportion of TB-affected households facing catastrophic total costs (as defined in Section 2.2) was substantially higher among those in lower quintiles (i.e. among those who are poorer) than among those in higher quintiles (i.e. among those who are wealthier) (Table 3.4). This highlights the need to prioritize the provision of social and financial support for people in the lowest quintiles, especially in Burkina Faso, Ghana, Kenya, the Lao People's Democratic Republic, Myanmar, Papua New Guinea, Thailand, the United Republic of Tanzania and Viet Nam, where the percentage of households experiencing such costs was much higher among those in the lowest quintile. However, the trend was reversed in Mongolia (i.e. there was a higher percentage in higher quintiles).

Further visual examination in terms of the distribution of economic impact across income or expenditure quintiles is shown in Fig. 3.5. A large spread between lower and higher socioeconomic groups (i.e. a large horizontal bar) was evident in some countries, including the Democratic Republic of the Congo, Kenya, the Lao People's Democratic Republic, Mali, Nigeria, Thailand, Uganda, the United Republic of Tanzania and Viet Nam. The distribution of the five dots (one per quintile) in each bar was also uneven in some countries: for example, the poorest quintile was disproportionately affected in Ghana, Papua New Guinea, Thailand and Kenya, while the richest quintile seemed relatively well protected in Solomon Islands and Zimbabwe, compared with other quintiles.

An assessment of risk factors for households facing catastrophic total costs is shown in Fig. 3.6.

Being hospitalized while undergoing treatment was associated with an increased risk of facing catastrophic total costs in 17 of the 20 countries. Provision of treatment under directly observed therapy was associated with a higher risk in 11 of the 20 countries. Treatment for DR-TB was associated with an increased risk in 10 out of 18 countries.[2]

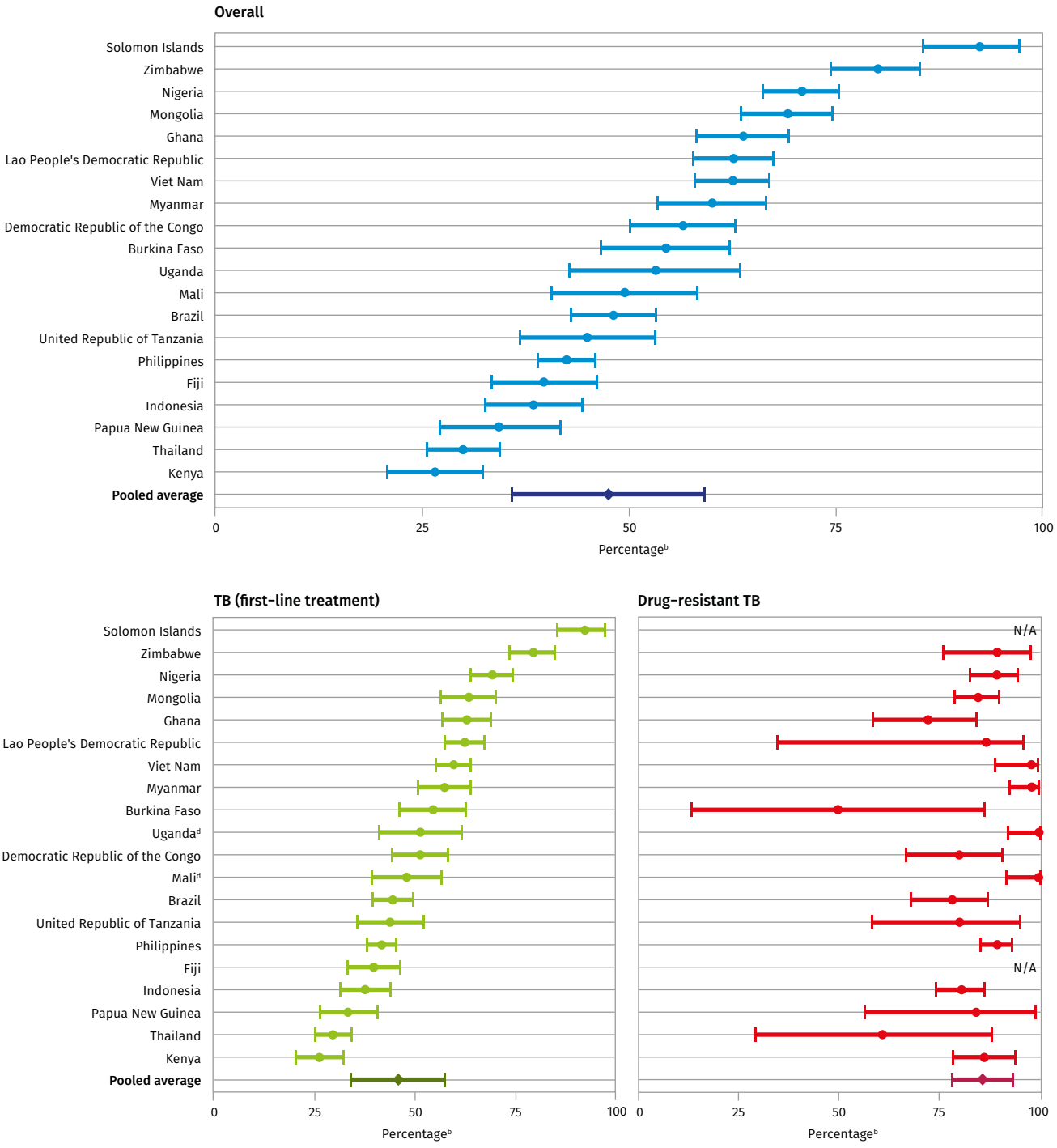
From a socioeconomic perspective, being in the lowest income or expenditure quintile was associated with an increased risk of facing catastrophic total costs in 17 of the 20 countries. When the TB patient was the primary income earner, the household had a higher risk of facing catastrophic total costs in eight out of 20 countries.

There is a great potential for further analysis on risk factors both collectively across the country surveys, and thorough in-depth analysis of the country-specific situation. To illustrate possible applications, three case studies are included. Box 3.1 shows further risk factor categorization and calculation of pooled effects. Box 3.2 highlights an application of risk factor analysis to the development of a prediction

[1] Fiji and Solomon Islands did not have any participants with drug-resistant TB in their survey samples, as described in Chapter 2.

[2] As noted earlier, data disaggregated by treatment category were not available for Fiji and Solomon Islands.

Fig. 3.3 Percentage of TB-affected households facing catastrophic total costs[a] in 20 national TB patient cost surveys implemented in 2015–2021, and the global pooled average[b,c]



TB: tuberculosis.

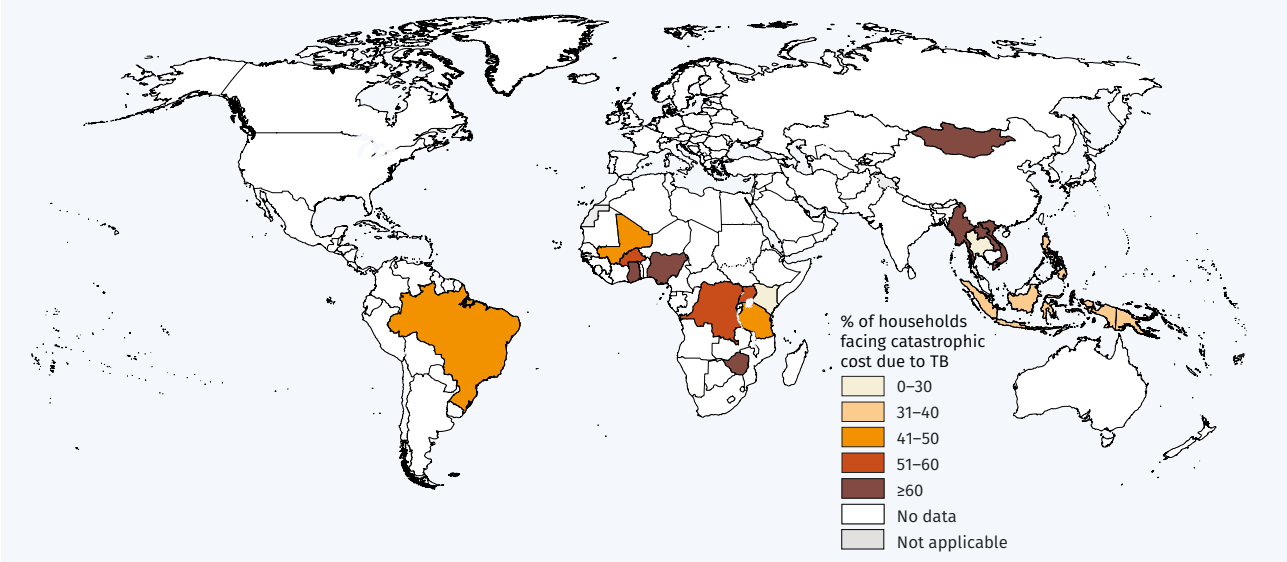
[a] Section 2.2 for the definition of "catastrophic total costs" for TB patients and their households.

[b] The global pooled average is weighted for each country's number of notified cases (i.e. new and relapse cases in the year of the survey).

[c] Error bars represent 95% confidence intervals.

[d] The calculation of confidence intervals for drug-resistant TB for Mali and Uganda did not account for sampling design.

Fig. 3.4 Percentage of TB-affected households facing catastrophic total costs[a] in 20 national TB patient cost surveys implemented in 2015–2021



TB: tuberculosis.

[a] See Section 2.2 for the definition of "catastrophic total costs" for TB patients and their households.

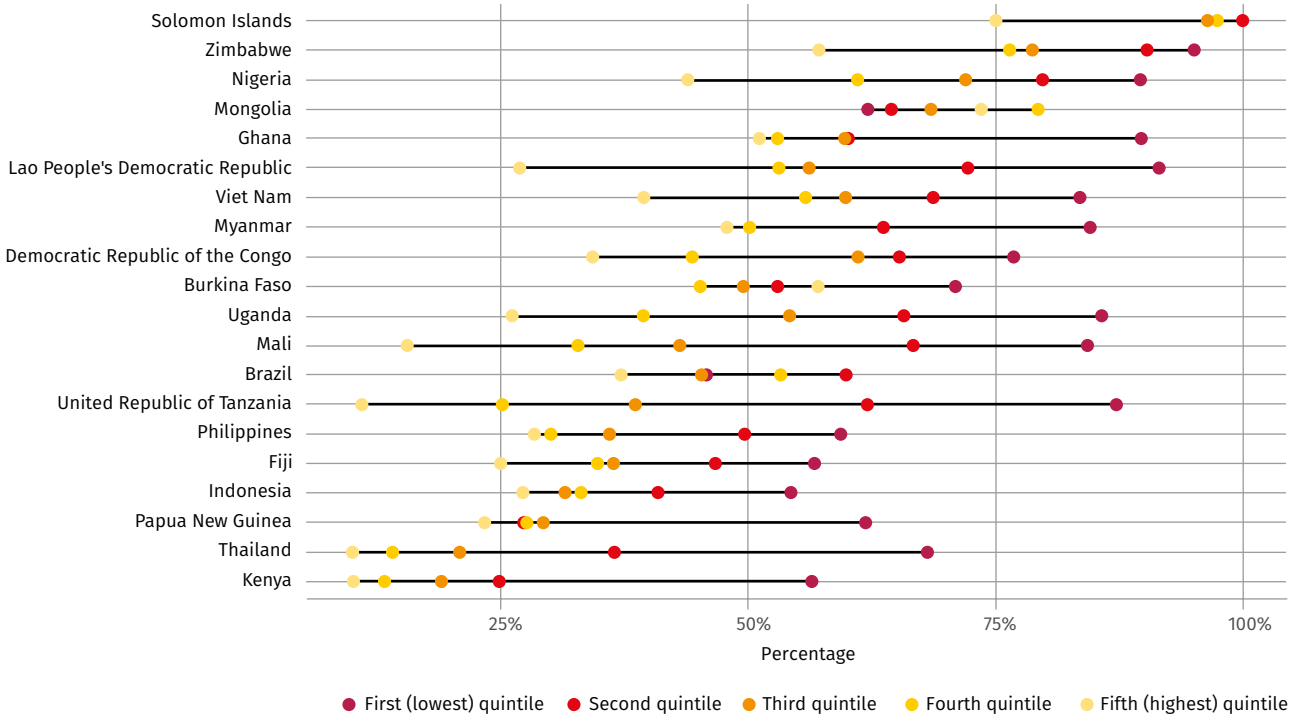
Table 3.4 Percentage of TB-affected households facing catastrophic total costs[a] in 20 national TB patient cost surveys implemented in 2015–2021, by income or expenditure quintile

	OVERALL	INCOME OR EXPENDITURE QUINTILE				
		Q1 (lowest)	Q2	Q3	Q4	Q5 (highest)
COUNTRY	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Brazil	48 (43–53)	46 (36–56)	60 (50–69)	45 (35–56)	53 (42–64)	37 (27–48)
Burkina Faso	54 (47–62)	71 (58–82)	53 (40–66)	50 (38–61)	45 (36–55)	57 (45–68)
Democratic Republic of the Congo	56 (50–63)	77 (68–84)	65 (55–75)	61 (51–71)	44 (35–54)	34 (24–45)
Fiji	40 (33–46)	57 (42–71)	47 (32–62)	36 (23–51)	35 (21–49)	25 (13–39)
Ghana	64 (58–69)	90 (85–93)	60 (47–72)	60 (50–69)	53 (46–60)	51 (41–61)
Indonesia	38 (33–44)	54 (44–64)	41 (33–49)	32 (23–40)	33 (26–41)	27 (17–38)
Kenya	27 (21–32)	56 (49–64)	25 (17–34)	19 (12–26)	13 (8.1–19)	10 (5.3–16)
Lao People's Democratic Republic	63 (58–67)	92 (85–96)	72 (62–81)	56 (47–65)	53 (44–62)	27 (18–37)
Mali	49 (41–58)	84 (76–91)	67 (54–78)	43 (30–57)	33 (17–50)	16 (7.5–26)
Mongolia	69 (64–74)	62 (50–73)	64 (56–72)	68 (61–76)	79 (72–86)	74 (65–82)
Myanmar	60 (53–66)	84 (76–91)	64 (55–72)	50 (42–59)	50 (41–59)	48 (39–57)
Nigeria	71 (66–75)	90 (85–93)	80 (74–85)	72 (65–78)	61 (54–68)	44 (37–51)
Papua New Guinea	34 (27–42)	62 (52–71)	27 (18–38)	29 (21–38)	28 (20–36)	23 (16–32)
Philippines	42 (39–46)	59 (52–66)	50 (43–57)	36 (29–43)	30 (24–36)	28 (22–35)
Solomon Islands	92 (86–97)	100 (NA)	100 (NA)	96 (84–100)	97 (86–100)	75 (59–88)
Thailand	30 (26–34)	68 (58–77)	36 (30–43)	21 (16–27)	14 (10–19)	10 (6.5–14)
Uganda	53 (43–63)	86 (77–93)	66 (56–75)	54 (44–64)	39 (28–51)	26 (21–32)
United Republic of Tanzania	45 (37–53)	87 (80–93)	62 (53–70)	39 (29–49)	25 (18–34)	11 (5.9–17)
Viet Nam	63 (58–67)	84 (73–92)	69 (58–78)	60 (48–71)	56 (42–70)	39 (30–49)
Zimbabwe	80 (74–85)	95 (92–98)	90 (84–95)	79 (70–86)	76 (67–85)	57 (48–66)

CI: confidence interval; Q: quintile; TB: tuberculosis.

[a] See Section 2.2 for the definition of "catastrophic total costs" for TB patients and their households.

Fig. 3.5 Percentage of TB-affected households facing catastrophic total costs[a] in 20 national TB costs surveys implemented in 2015–2021, by income or expenditure quintile



TB: tuberculosis.

[a] See Section 2.2 for the definition of "catastrophic total costs" for TB patients and their households.

tool that can be used to improve patient care. Box 3.3 shows an example of further disaggregated analysis with a focus on gender.

3.5 Coping mechanisms

All 20 surveys collected information about the coping strategies that TB patients and their households adopted to compensate for costs associated with TB disease (Fig. 3.7). Surveys that followed the methods set out in the WHO handbook and that used (with adaptation) the associated 2017 generic instrument *(5)* collected data about three main strategies: taking loans, selling household assets and a combination of both. Several countries also collected data about a fourth strategy, referred to as "dissaving", which was part of the methods initially field tested by WHO in 2015. Dissaving was narrowly defined[1] as a strategy of resorting to the use of savings, which reduces the financial strength of the household (in the same way that saving increases a household's resilience to financial shocks) *(6)*.

Overall, in the 20 surveys, 42% (95% CI: 33–50%, pooled average) of TB-affected households resorted to either borrowing, selling assets or dissaving to ease the economic burden imposed by TB. Borrowing was used by about one in four households (i.e. 26%; 95% CI: 19–33%, pooled average), followed by dissaving (23%; 95% CI: 12–34%, pooled average) and the sale of assets (14%; 95% CI: 6.0–21%, pooled average).

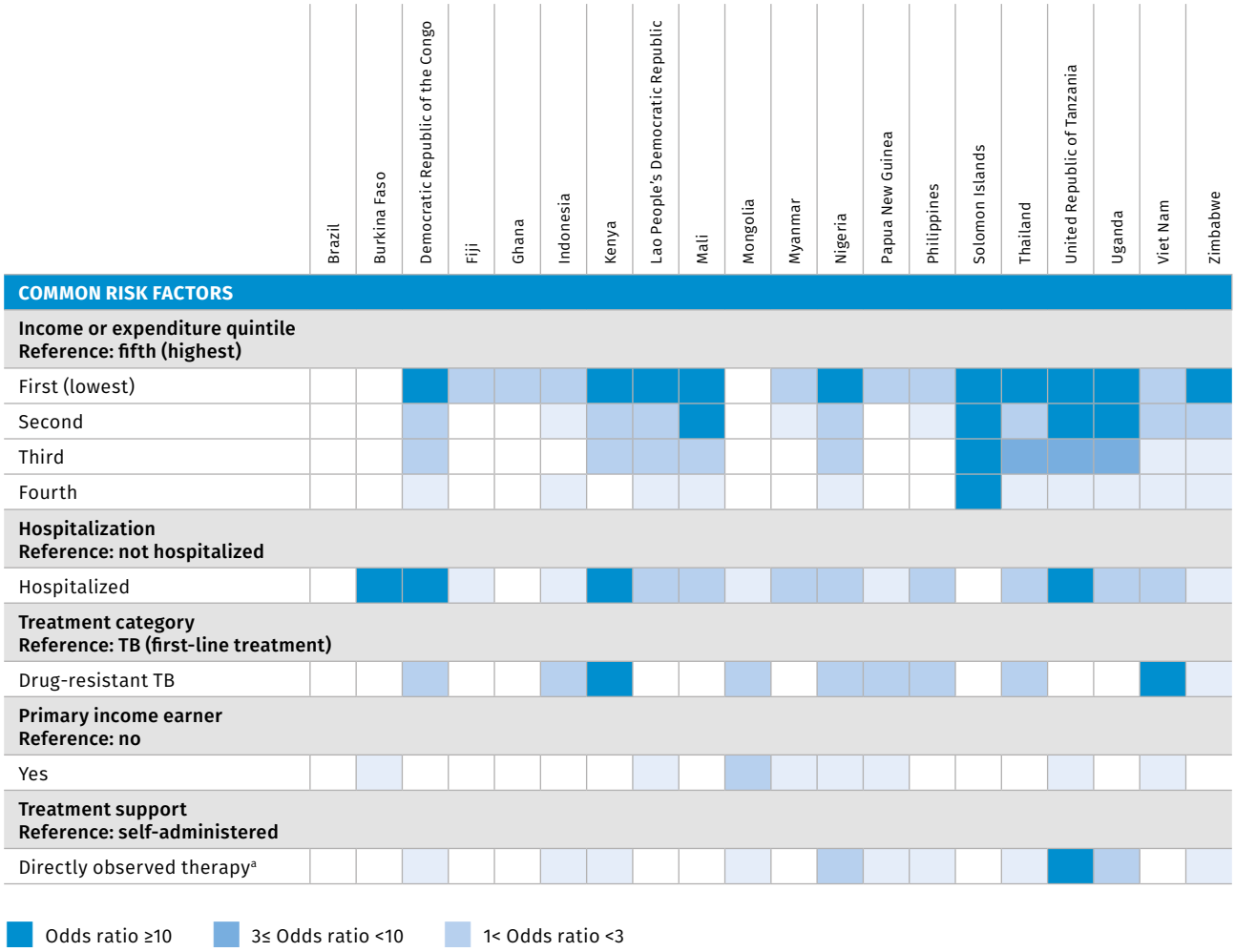
There was variation by region in the patterns and strategies selected by households to compensate for costs faced while in treatment. In Asia and the Pacific, 40% (95% CI: 26–53%, pooled average) of TB-affected households resorted to either borrowing (used by 24%; 95% CI: 15–33%, pooled average), dissaving (19%; 95% CI: 11–28%, pooled average) or the sale of assets (10%; 95% CI: 3.9–16%, pooled average). In African countries, 30% (95% CI: 20–41%, pooled average) of TB-affected households resorted to either borrowing, selling assets or dissaving. Dissaving was the preferred method; it was used by more than one in three households in African countries (35%; 95% CI: 15–55%, pooled average),[2] followed by borrowing (30%; 95% CI: 20–41%, pooled average) and the sale of assets (22%; 95% CI: 12–32%, pooled average). In Brazil (WHO Region of the Americas), 32% (95% CI: 28–36%) of TB-affected households resorted to either selling assets or borrowing.

There was considerable country variation in the coping strategies adopted by TB-affected households. In African countries, dissaving (for which data were collected in only four of the surveys) was favoured

[1] The broader definition of dissaving refers to coping strategies that encompass borrowing, selling assets and using savings.

[2] The uncertainty on these estimates is large.

Fig. 3.6 Risk factors for TB-affected households facing catastrophic total costs in 20 national TB patient cost surveys implemented in 2015–2021



TB: tuberculosis.

[a] Category of treatment support varied across countries; also, the type of treatment modality identified as a risk factor was different in each survey. For details, see the relevant country profile in Part II.

by households in Nigeria, with more than one in two patients resorting to this strategy (54%; 95% CI: 49–59%), compared with only 11% (95% CI: 8.3–14%) in Uganda. Borrowing was favoured by patients in Zimbabwe (39%; 95% CI: 34–45%), whereas it was little used in Kenya (4.7%; 95% CI: 2.4–7.7%). The third option used in African countries, selling household assets, was heavily used by patients in Mali (35%; 95% CI: 28–42%) and the United Republic of Tanzania (35%; 95% CI: 30–41%).

In countries in Asia and the Pacific, although the preferred strategy was borrowing, its use ranged from 11% (95% CI: 7.6–16%) of TB-affected households in Fiji to 38% (95% CI: 34–42%) in Mongolia. A total of eight out of 10 countries that included "dissaving" in their questionnaire;[1] they revealed differences in the percentage of patients using this strategy, ranging from 37% (95% CI: 31–44%) in Myanmar to 9.3% (95% CI: 0.68–26%) in Solomon Islands. The sale of assets, was most prevalent in Myanmar, where it was used by one in four households (24%; 95% CI: 19–29%); it was least used in Solomon Islands (3.3% of TB-affected households; 95% CI: 0.35–9.0%).

3.6 Social and economic consequences

All 20 surveys collected data about the social and economic consequences experienced by households during a TB episode (Fig. 3.8). These included divorce or separation, food insecurity, interrupted schooling, job loss and social exclusion.

Overall, few TB-affected households were affected by divorce or separation; the average across the 20 surveys was 3.0% (95% CI: 1.6–4.4%). However, there was a high value of 24% (95% CI: 16–34%) in Kenya. The average rate of separation or divorce among TB-affected households was higher in African coun-

[1] Thailand and Papua New Guinea did not include "dissaving" as the fourth measure of coping.

Box 3.1 Classification and pooled odds ratio of common risk factors associated with catastrophic total costs due to TB

Risk factors associated with catastrophic total costs due to TB were assessed through a standard approach using multivariate analysis across the 20 country surveys included in this publication (Fig. 6, Part II). Based on the findings from these surveys, the risk factors were categorized into biological and disease factors, socioeconomic factors and health system factors as follows:

Biological and disease factors: the person's sex, treatment category (new, relapse or retreatment), HIV status, type of TB disease (bacteriologically confirmed, clinically diagnosed or extrapulmonary), drug-resistance status and site of disease (pulmonary or extrapulmonary TB).

Socioeconomic factors: the person's education level and health insurance status, the household income quintile and whether the TB patient was the primary income earner prior to TB.

Health system factors: hospitalization during TB treatment and receipt of treatment support (directly observed treatment, regardless of support by health or community workers, or family members).

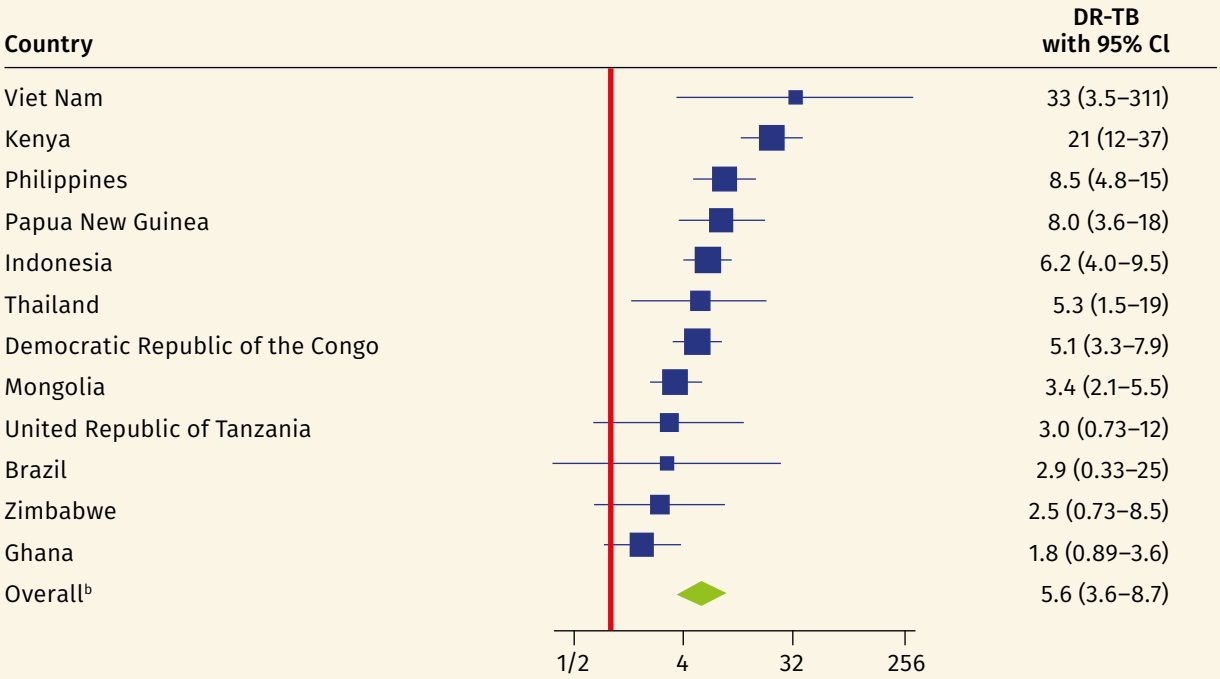
From each category, pooled ORs of the two most commonly observed risk factors were estimated using adjusted ORs and standard errors from each country's multivariate analysis (summarized in Fig. 3.6). The generic inverse-variance method was used to estimate the uncertainty of the pooled effect estimate, taking into account the size of individual surveys.

Biological and disease factors

Being treated for DR-TB was associated with facing catastrophic costs with a pooled OR of 5.0 compared with the first-line treatment (95% CI: 3.1–8.3) (n = 12). (Fig. B1).

Having extrapulmonary TB was also associated with higher odds of incurring catastrophic costs, with a pooled OR of 2.6 (95% CI: 1.5–4.2) (n = 5).

Fig. B1 Association between DR-TB and facing catastrophic costs due to TB[a]



CI: confidence interval; DR-TB: drug-resistant TB; TB: tuberculosis.

[a] Blue squares represent the sample size of each survey.

[b] Restricted maximum likelihood approach is used to pool effect sizes.

Box 3.1 *Continued*

Socioeconomic factors

Using the highest income quintile (quintile 5) as the reference, the poorest households (quintile 1) had the highest odds of incurring catastrophic costs, with a pooled OR of 10.6 (95% CI: 6.5–17.3) (n = 19). This association was weaker as income increased, with a pooled OR of 4.7 for quintile 2, 2.7 for quintile 3 and 1.9 for quintile 4.

Households where the primary income earner was affected by TB were more likely to incur catastrophic costs, with a pooled OR of 1.8 (95% CI: 1.4–2.3) (n = 11).

Health system factors

Being hospitalized during TB treatment was associated with catastrophic costs in 17 out of 20 countries, with a pooled OR of 4.3 (95% CI: 2.7–6.9). There was moderate evidence for an association (OR = 1.5, 95% CI: 1.1–2.0) (n = 14) between treatment supports (including directly observed therapy) and higher risk of facing catastrophic costs.

Conclusion

Common risk factors associated with catastrophic total costs due to TB included:

- biological and disease factors: being treated for DR-TB and affected by extrapulmonary TB;
- socioeconomic factors: household income or expenditure before TB and being the primary income earner of the households; and
- health system factors: hospitalization and treatment supports.

NTPs may consider using the above-mentioned factors to identify the most vulnerable households affected by TB, and identify strategies to mitigate their social and economic hardship.

Box 3.2 Predictive factors for identifying TB patients who are at risk of facing catastrophic total costs due to TB

Low coverage of social protection services among TB-affected households in the Philippines

In 2016–2017, the Philippines NTP and the University of the Philippines conducted a national TB patient cost survey. A total of 1912 TB patients were enrolled in the survey, comprising 1592 with TB (first-line treatment) and 320 with DR-TB, as a nationally representative sample. The mean total cost incurred by TB-affected households was estimated at US$ 601. The overall proportion of households facing catastrophic total costs was 42.4% (95% CI: 40.2–44.6%) *(1)*.

One of the key findings of this survey was that the proportion of survey participants living under the poverty line (US$ 1.9 per day per person *(2)*) increased from 67.8% before diagnosis of TB to 77.9% during the TB episode. Only 1.3% of the TB-affected households were enrolled in the national conditional cash transfer (CCT) scheme for poor households, called "Pantawid Pamilyang Pilipino Program (4Ps)",[a] suggesting that the 4Ps is not easily accessible by TB patients and their households living in poverty.

Need for a tool for ongoing monitoring and identification of patients at risk of financial hardship

WHO recommends that countries periodically conduct a national survey of costs faced by TB patients and their households, to monitor progress towards the End TB Strategy target. However, conducting a national survey is only possible once in several years; thus, it does not allow continuous monitoring of progress over time and geographies. There is also a great need for health care workers and other service providers to identify patients who are at high risk of financial hardship, so that social support can be provided effectively. Building on similar attempts in other medical fields,[b] the identified risk factors for catastrophic total costs were combined in a score that was used to predict the likelihood of financial hardship due to TB.

A total of 12 demographic, clinical and socioeconomic factors that can be assessed within routine TB surveillance were found to be associated with catastrophic total costs due to TB. Seven of these factors had a strong association (OR ≥2.0) and were included in the score: drug-resistance status, TB treatment history, whether the TB patient was the primary income earner, employment status, hospitalization, interrupted schooling and perceived financial impact. An OR-based weighting algorithm was used to combine the values for each factor into a score *(3, 4)*.

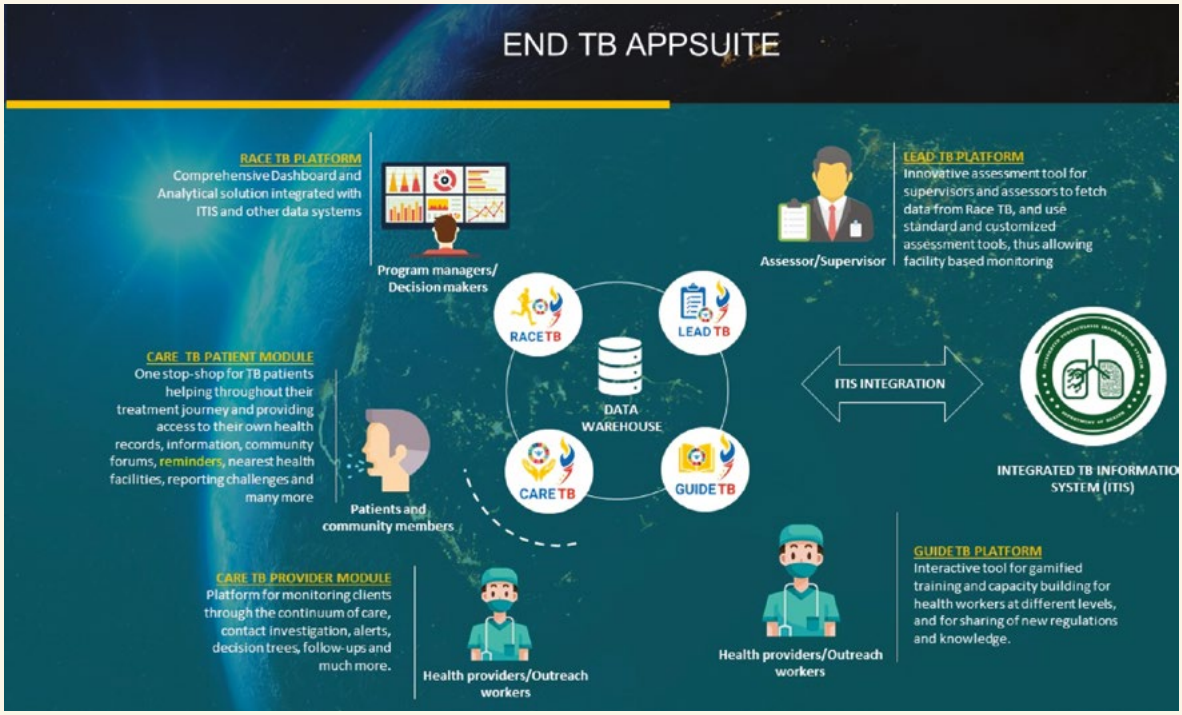
Box 3.2 *Continued*

A score of greater than a predefined cut-off point indicates that the patients and their households are more likely to face catastrophic total costs than those with a lower score. The scores serve as a proxy indicator for households' vulnerability. The proportion of TB-affected households above the score threshold will be routinely monitored within national TB surveillance, to assist with continuous monitoring of progress towards zero catastrophic total costs due to TB.

Integrating the risk assessment tool into a digital App suite

The resulting scoring system was transformed into a digital risk assessment tool as part of the mobile application suite – the **End TB Appsuite** (Fig. B2) – which was developed by the country's NTP. The risk assessment tool was included in one module (CARE-TB) that is designed to help health workers with their daily care of patients and to help patients with self-care.

Fig. B2 Overview of the End TB Appsuite CARE-TB module, which contains the tool for identifying TB patients facing catastrophic total costs due to TB



The digital risk assessment tool can either be self-administered by patients or performed by health care workers; the app will alert health workers, who will take into account the social and financial needs of patients' households under their care. The actions of health care workers include further counselling of patients on their socioeconomic situation and informing patients about the possible social protection services that might be available to them.

The results of the risk assessment will be monitored and analysed regularly by the NTP as a part of routine TB surveillance. Furthermore, the findings will be shared with the multisectoral national coordinating committee for TB, which includes the government departments responsible for social welfare, including the national CCT programme (4Ps).

Conclusion

Results from the national TB patient cost survey were used to develop a risk assessment tool that will help in identifying TB patients and their households who are most at risk of facing catastrophic total costs. The tool will be used within routine surveillance system in the context of TB care. The results using this tool also serve as proxy monitoring for catastrophic total costs due to TB. Lessons learned from this practice in the Philippines might be used by other countries as they develop ways to assess the social and economic hardship experienced by TB-affected households, which in turn can be used to improve care and support for TB patients and their households.

[a] The 4Ps is a national CCT scheme for the poorest people in the Philippines; it is intended to improve the health, nutrition and the education of children aged 0–18 years. This scheme is provided by the Department of Social Welfare and Development in all 17 regions of the country.

[b] Similar tools have been developed, especially in the field of noncommunicable diseases such as cardiovascular events *(3, 4)*.

Box 3.3 Are female-headed households more vulnerable to catastrophic total costs due to TB?

Is there any gender influence on costs incurred by TB-affected households?

It is well established that men are more likely than women to develop TB disease. However, the influence of gender on the socioeconomic consequences of TB among affected individuals and their households is less well defined. Given that TB is the archetypal social disease, it is critical to carefully examine gender aspects when conducting and analysing surveys of people with TB and their households, especially those dealing with the socioeconomic impact of the disease.

In the analysis of 20 surveys included in this publication, risk factors for catastrophic costs were examined using a standardized approach described in Part II. As shown in each country profile (Fig. 6, Part II), only three out of 20 country surveys identified gender as a risk factor for TB-affected households incurring catastrophic costs. In the Democratic Republic of the Congo and Nigeria, households headed by males and affected by TB had higher odds of experiencing catastrophic costs; in contrast, in Kenya, households headed by females and affected by TB were more at risk of experiencing catastrophic costs.

The odds of facing catastrophic costs were increased if the patient with TB was the household's primary income earner, with primary income earner status being an independent risk factor for experiencing catastrophic costs in eight of the 20 country surveys. These findings demonstrate how gender and primary income earner status interact: the impact of gender on the consequences of TB (e.g. catastrophic costs) depends on the household position and the patient's share of household income earning.

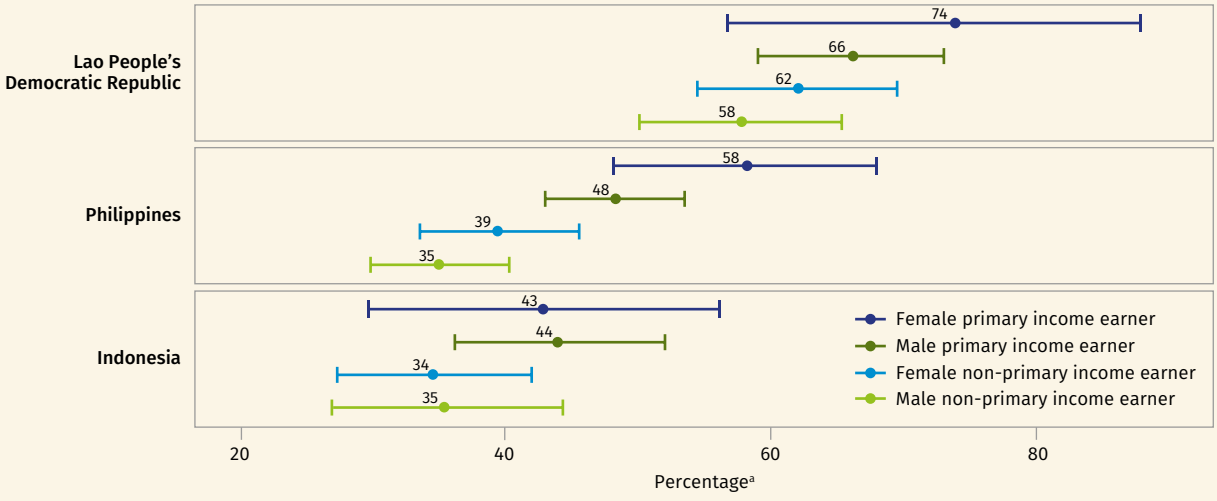
Combining gender and primary income earner status

A secondary analysis was conducted using survey datasets in three selected countries (Indonesia, the Lao People's Democratic Republic and the Philippines). The analysis compared the proportion of catastrophic costs in four groups based on the gender of patients with TB and primary income earner status before having TB (i.e. female primary income earner, male primary income earner, female non-primary income earner or male non-primary income earner).

The results in the Lao People's Democratic Republic and the Philippines showed that the prevalence of catastrophic costs was highest in households with a female primary income earner (the Lao People's Democratic Republic 74%, the Philippines 58%) followed by male primary income earner (66%, 48%), female non-primary income earner (62%, 39%) and male non-primary income earner (58%, 35%). This tendency was not observed in Indonesia. The results implied that households where a female with TB was the primary income earner might require prioritization for social supports (e.g. job protection or financial support, or both) in countries such as the Lao People's Democratic Republic and the Philippines.

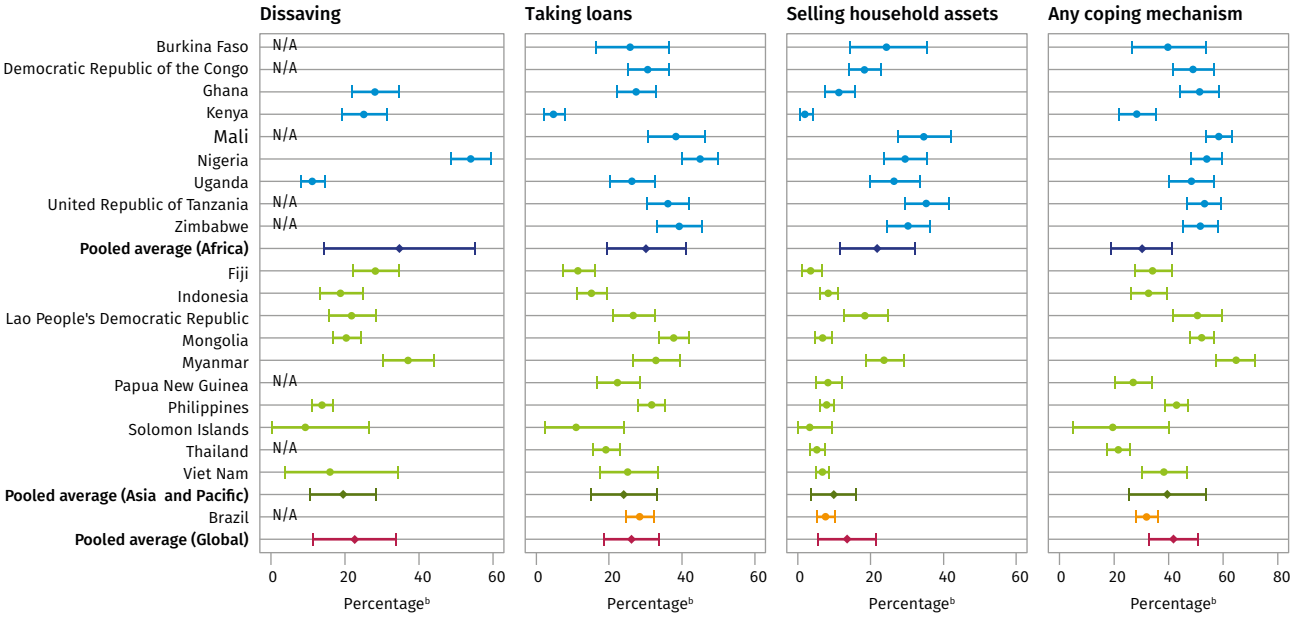
Although the analysis could not show a significant difference because of the small sample size, this approach could be a simple but powerful method to assess whether female-headed households are more vulnerable to catastrophic total costs due to TB, especially in countries with pre-existing gender inequity in socioeconomic status or access to health care services.

Fig. B3 Percentage of TB-affected households facing costs greater than 20% of household income by gender and primary income earner status in Indonesia, the Lao People's Democratic Republic and the Philippines



[a] Error bars represent 95% confidence interval.

Fig. 3.7 Coping mechanisms adopted by TB-affected households in 20 national TB patient cost surveys implemented in 2015–2021, and pooled averages (global and regional)[a]



N/A: not applicable TB: tuberculosis.

[a] The global and regional pooled averages are weighted for each country's number of notified cases (new and relapse cases in the year of the survey).

[b] Error bars represent 95% confidence intervals.

tries (7.8%; 95% CI: 5.8–9.7%) compared with countries in Asia and the Pacific (0.67%; 95% CI: 0–1.4%).

In African countries, food insecurity or hunger disproportionally affected households with TB. Overall, 41% (95% CI: 29–54%) of households were affected, which was much higher than the proportion overall (23%; 95% CI: 12–34%) and in countries in Asia and the Pacific (15%; 95% CI: 4.6–25%). The countries where the lowest proportions of households experienced food insecurity due to TB were Brazil (6.3%; 95% CI: 3.5–9.9%), Fiji (5.3%; 95% CI: 2.7–8.6%), Myanmar (1.5%; 95% CI: 0.56–3.0%) and Thailand (4.7%; 95% CI: 3.1–6.5%). Patients in four countries in Africa – the Democratic Republic of the Congo, Nigeria, Uganda and the United Republic of Tanzania – experienced higher than average food insecurity (45–50%).

School interruption, defined as any school days missed by the children in the TB-affected households, impacted 4.2% (95% CI: 1.3–7.1%) of TB-affected households overall. However, the figure was twice as high in African countries (8.4%; 95% CI: 5.8–11%) and much lower in Asia and the Pacific (2.3%; 95% CI: 0–7.4%). Countries where school dropout was particularly uncommon were Indonesia (0.31%; 95% CI: 0.064–0.73%), the Lao People's Democratic Republic (1.5%; 95% CI: 0.53–3.0%), Thailand (1.5%; 95% CI: 0.87–2.4%), Viet Nam (1.6%; 95% CI: 0.32–3.8%) and Brazil (2%; 95% CI: 0.90–3.5%). At the other end of the scale, the school dropout rate was 21% (95% CI: 7.8–39%) in Solomon Islands.

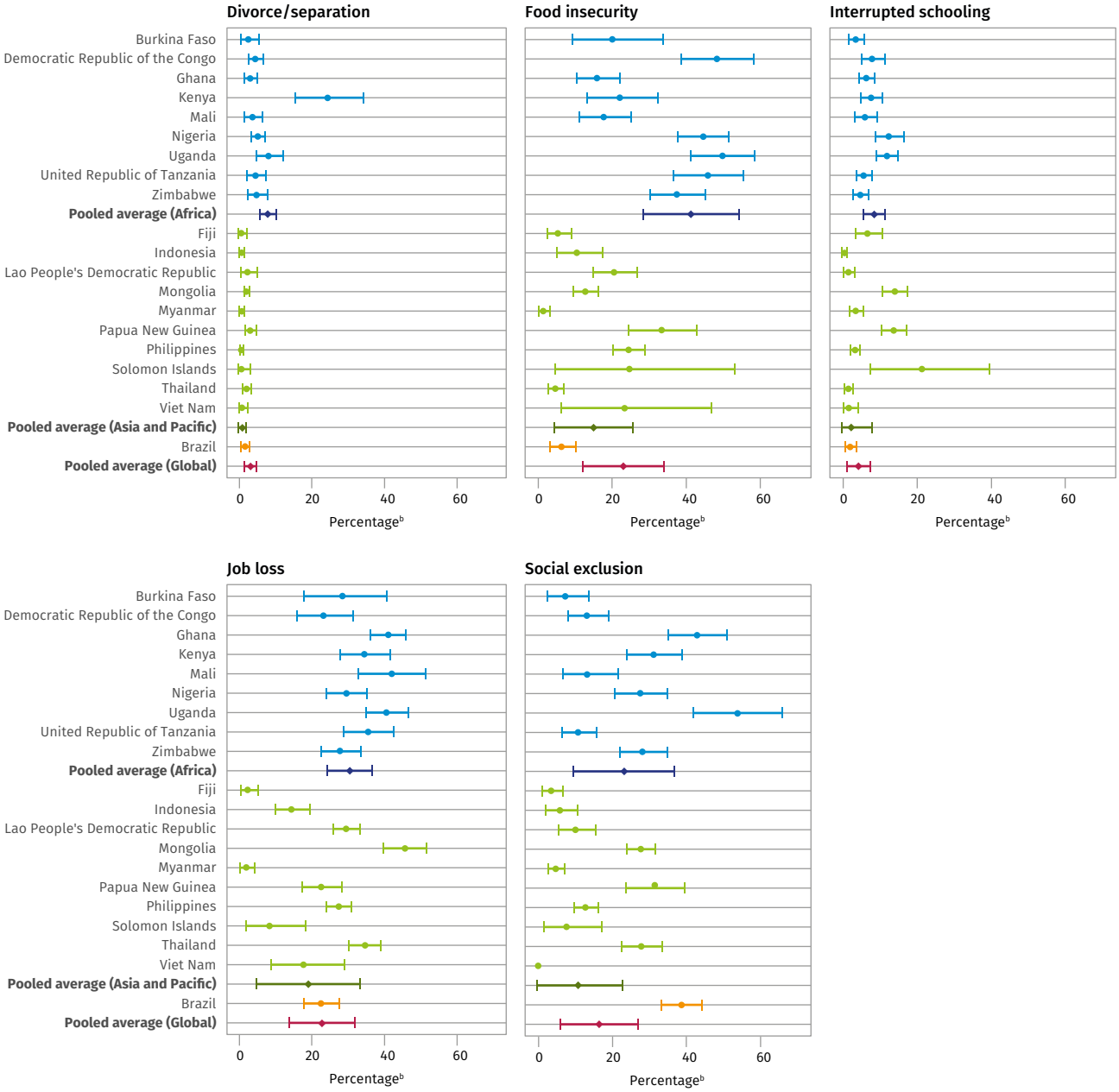
Job loss during TB treatment affected 23% of TB patients (95% CI: 14–31%) overall. The figures were 30% (95% CI: 24–36%) in African countries and 19% (95% CI: 4.8–33%) in countries in Asia and the Pacific. Patients in Fiji and Myanmar seemed best placed to retain their employment, with only 2.2% (95% CI: 0.69–4.5%) and 1.8% (95% CI: 0.56–3.7%), respectively, losing their jobs. The country where TB patients suffered most from job loss was Mongolia (46%; 95% CI: 40–51%).

Social exclusion was reported by 16% (95% CI: 6.3–27%) of TB-affected households, with an even higher figure among African countries (23%; 95% CI: 9.9–36%). The proportion was much lower in countries in Asia and the Pacific (11%: 95% CI: 0–22%). At the ends of the spectrum were Viet Nam and Fiji, with very low or no exclusion, and Uganda, where 54% (95% CI: 42–65%) of TB patients reported feeling socially excluded.

All countries apart from Nigeria collected data on the TB patient's employment or occupational status at a minimum of two points: before the onset of TB symptoms and at the time of the survey (during TB treatment). Nigeria only collected data on employment status at the time of the survey; thus, the country could not ascertain changes in reported employment status because of TB.

There was a significant increase in unemployment among TB-affected households in 14 of the 19 countries (excluding Nigeria) that conducted sur-

Fig. 3.8 Social and economic consequences experienced by TB-affected households in 20 TB cost national surveys implemented in 2015–2021, and pooled averages (global and regional)[a]

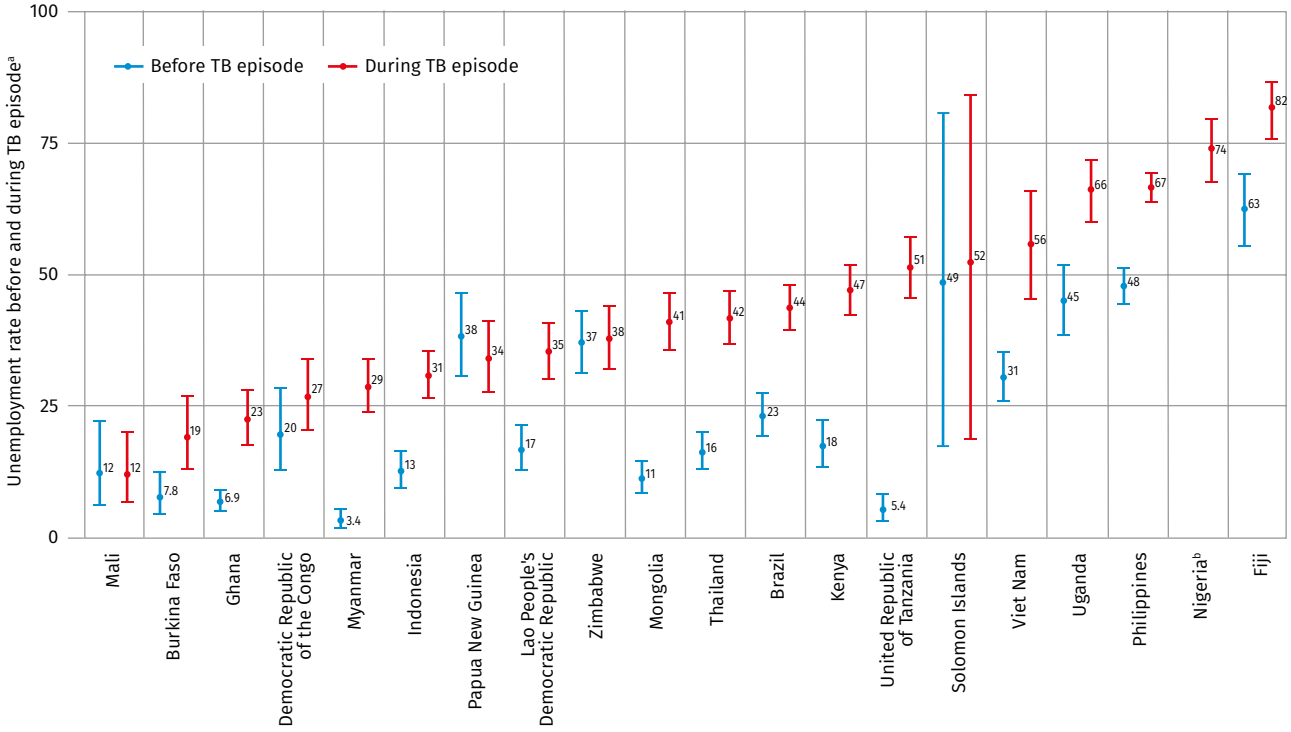


TB: tuberculosis.

[a] The global and regional pooled averages are weighted for each country's number of notified cases (new and relapse cases in the year of the survey).

[b] Error bars represent 95% confidence intervals.

Fig. 3.9 Unemployment rates among TB patients before and during their TB episode in 19 national TB patient cost surveys implemented in 2015–2021



TB: tuberculosis.
[a] Error bars represent 95% confidence intervals.
[b] Nigeria did not collect data on employment status before the TB episode.

veys (Fig. 3.9); the proportion of TB patients who were unemployed increased on average by 17 percentage points among patients on TB treatment. Confidence intervals had considerable overlap in the remaining five countries (the Democratic Republic of the Congo, Mali, Papua New Guinea, Solomon Islands and Zimbabwe), meaning that there was no clear evidence of a change in these countries.

The largest increase in unemployment was in the United Republic of Tanzania, from 5.4% (95% CI:3.6–8.1%) before the TB episode to 51% (95% CI: 46–57%) during it. This was followed by Kenya, where the increase was from 18% (95% CI:14–22%) to 47% (95% CI: 43–52%); and then by Mongolia, where the increase was from 11% (95% CI: 9.0–14%) to 41% (95% CI: 36–46%). As noted in Section 3.2, employment loss for TB-affected patients often involves income losses, and households need to deploy coping strategies to face the costs that TB imposes on them.

Across the 19 surveys, three broad patterns emerged. These are illustrated by three countries (Brazil, the Lao People's Democratic Republic and the United Republic of Tanzania) in Fig. 3.10, in the form of river plots that show the flow of individuals (coloured wavy lines) from the left (before a TB episode) to the right (at the time of the survey). In each plot, the width of the wavy lines represents the proportion of sampled individuals who reported a change in employment status, whereas the width of the straight lines represents the proportion of people in the sample who remained within each employment group despite initiating TB treatment.

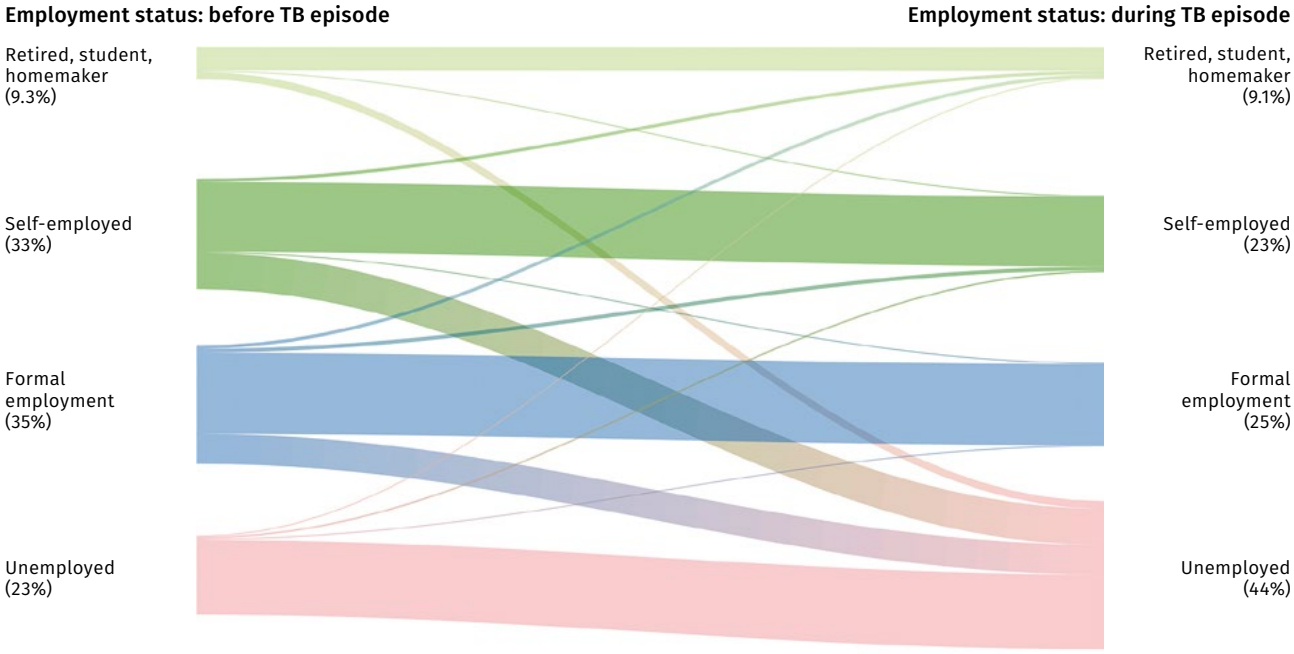
In some countries, TB resulted in unemployment across all groups (formal, informal and others); Brazil is an example of this (Fig. 3.10a). The proportion of people who became unemployed rose from 23% to 44%, and there were large flows of individuals from the categories on the left to the unemployed category on the right. Such a pattern may arise where weak or no mechanisms exist to afford workplace or occupation-related protection, particularly for individuals with TB, coupled with high levels of stigma and compounded by treatment arrangements that do not accommodate part-time work.

In other countries, unemployment related to TB mainly affected those in informal employment (i.e. those in the formal sector remained relatively secure in their employment); the Lao People's Democratic Republic is an example (Fig. 3.10b). Such a picture could arise where workplace protection laws have been enacted for formal workers. However, because of the nature of TB disease, TB treatment and the labour-intensive nature of informal work, workers in informal employment are forced to leave their jobs during treatment.

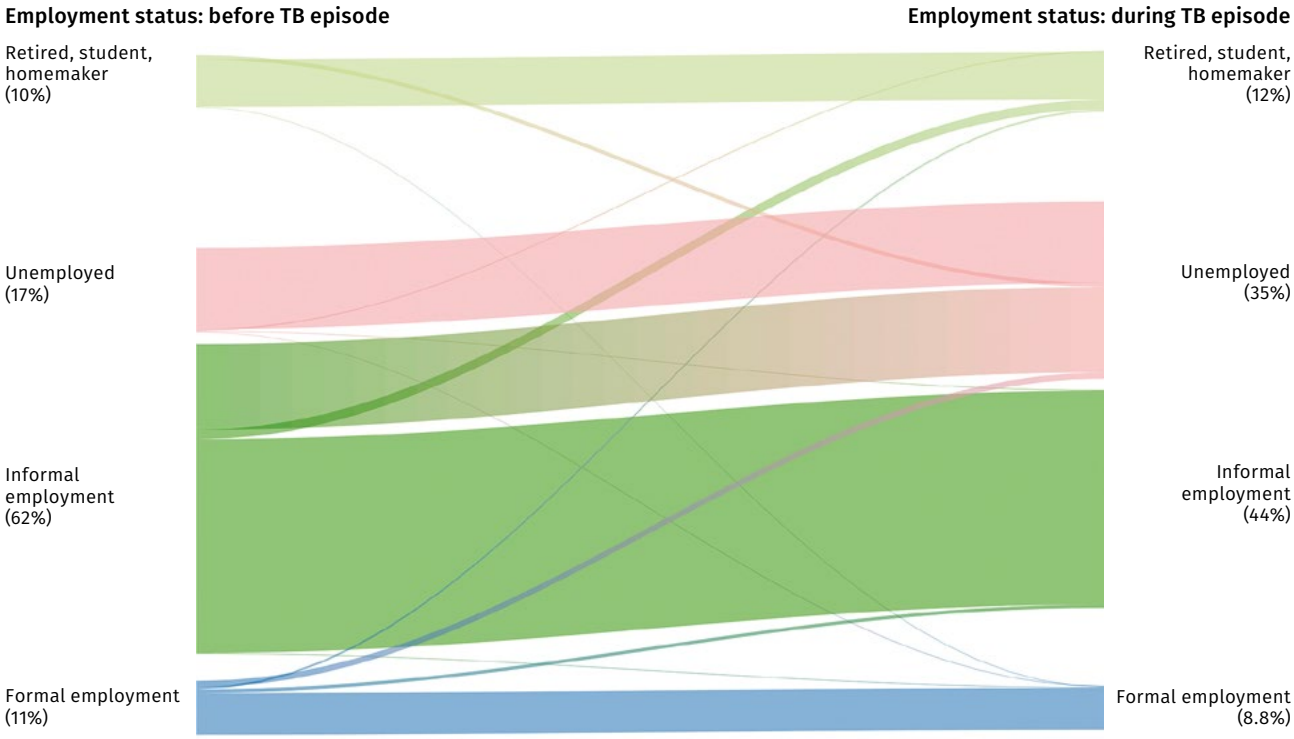
In other countries, such as the United Republic of

Fig. 3.10 Changes in employment status[a] before and during a TB episode: three illustrative examples

a. Affecting all employment groups: Brazil

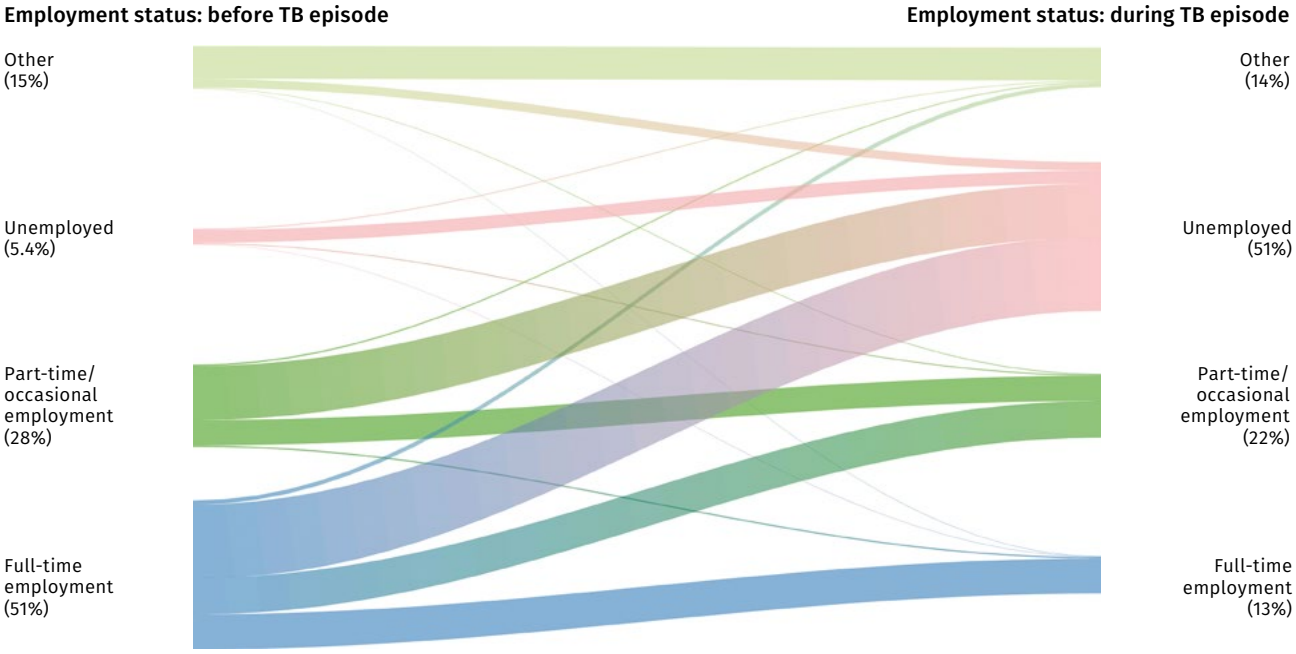


b. Affecting informal employment groups: the Lao People's Democratic Republic



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

c. Irregular change in employment: the United Republic of Tanzania



[a] Categories are those used in the survey.

Tanzania (Fig. 3.10c), there was a mixed pattern characterized by large losses from the formal sector flowing to both the informal and unemployed categories. This may reflect the absence of protective workplace policies within the formal sector, in the context of much lower barriers to engagement in the informal sector. These, together with more patient-centred treatment arrangements and community-based support, allow individuals who lose their formal employment to find a way to cope with the treatment, and not to entirely lose their livelihood.

3.7 Changes in poverty rates

It was possible to estimate changes in poverty rates throughout the TB episode, as the economic burden and other sociodemographic factors evolved among TB-affected households.[1] All countries collected self-reported household income data at two time points: before the onset of TB symptoms and at the time of the survey. Using these data, the proportions of TB-affected households with income below the international poverty line were estimated before and during the TB episode (for each household the per capita poverty threshold was multiplied by the respondent's household size and then compared with self-reported household income at two time points).

In 15 countries, during the TB episode, the proportion of TB-affected households living in extreme poverty was significantly higher than before the onset of TB symptoms, reflecting reductions in income driven by TB disease specifically as well as other unobserved socioeconomic factors that affected the patient's household (Fig. 3.11). In the other five countries there was an increase, but this was not statistically significant. On average, the proportion of TB-affected households with a self-reported income below the international poverty line increased by 12 percentage points during the TB episode compared to before the onset of TB symptoms. The largest change was seen in Ghana, where the proportion of TB-affected households living in extreme poverty increased from 42% (95% CI: 36–48%) to 74% (95% CI: 67–80%), followed by Mali, where the proportion increased from 26% (95% CI: 20–33%) to 52% (95% CI: 44–60%).

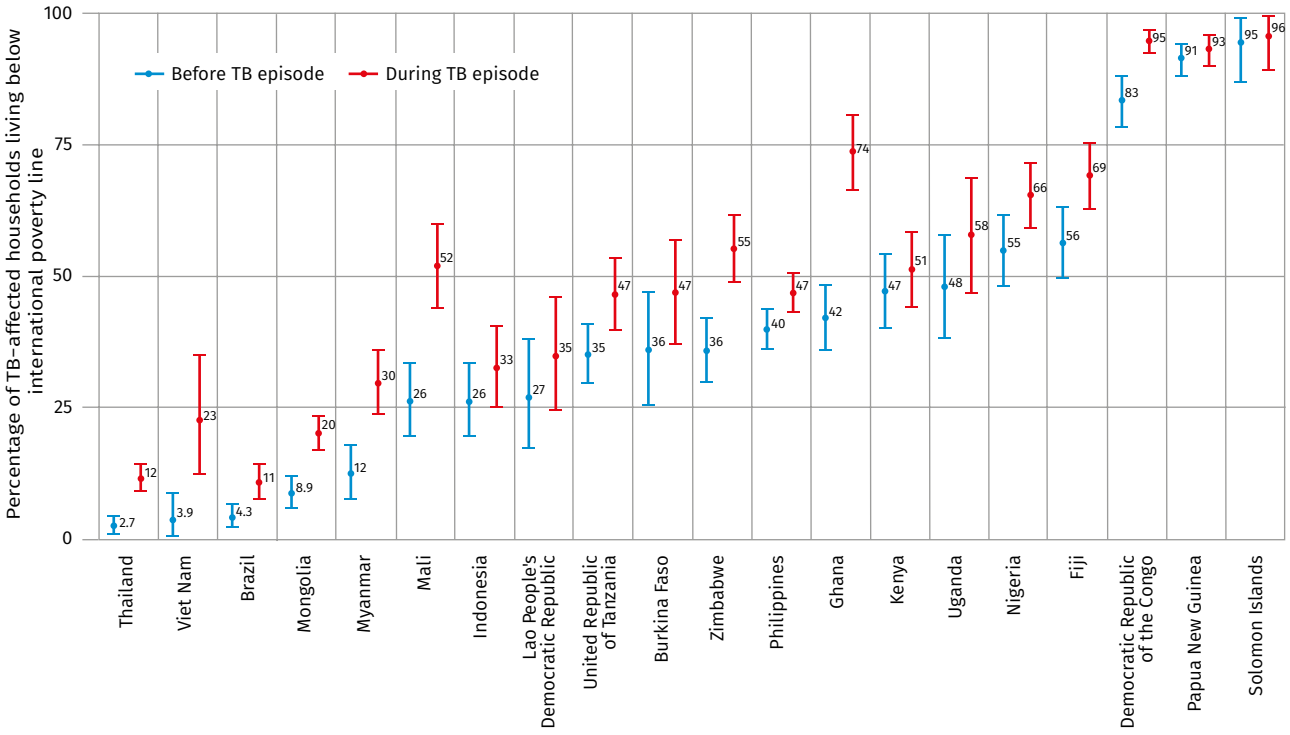
3.8 Summary

The 20 national surveys of costs faced by TB patients and their households implemented in 2015–2021 clearly show that TB-affected households experience severe social and economic hardship due to the disease. Overall, about half of TB-affected households faced total costs greater than 20% of household income or expenditure due to TB, and this was even worse for people with DR-TB (86% overall). No country is close to achieving the 2020 milestone of the End TB Strategy; that is, that no TB patients and their households face catastrophic costs due to TB.

The 20 surveys also reconfirmed that TB patients

[1] As explained in Chapter 2 (page 18), the estimates of changes in poverty rates should not be directly compared with estimates of the incidence of impoverishment resulting from out-of-pocket expenditures on health *(7)*. They should also not be directly compared with the incidence of extreme poverty.

Fig. 3.11 Impoverishment of TB-affected households during TB treatment in 20 national surveys implemented in 2015–2021[a]



TB: tuberculosis.

[a] Error bars represent 95% confidence interval.

and their households continue to face a wide range of socioeconomic hardships and consequences. Coping strategies deployed by TB-affected households included taking loans, selling assets or using savings. Other serious consequences included food insecurity, an impact on children's schooling, job loss and impoverishment.

Various actions are needed to mitigate these costs; such actions need to be customized at country level, and are the subject of the next chapter.

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1. Nigeria, ©WHO/Benedicte Kurzen; 2. Kiribati, ©WHO/Yoshi Shimizu; 3. Nigeria, ©WHO/Andrew Esiebo; 4. Papua New Guinea, ©WHO/Yoshi Shimizu; 5. Viet Nam, ©WHO/Inés Garcia Baena; 6. Philippines ©WHO/Veejay Villafranca.

4. Policy implications and translation

The aim of national TB patient cost surveys is to provide evidence that can inform the development and implementation of policies and associated interventions to mitigate, or even eliminate, the financial hardship and economic burden faced by TB patients and their households. This should enable substantive improvements to the prevention, diagnosis, treatment and cure of TB, and in turn progress towards the targets and milestones of the End TB Strategy *(1)* (Box 1.1, Chapter 1), which were adopted by all WHO Member States in 2014.

Ensuring full social and economic recovery of households affected by TB requires a comprehensive set of policy measures to address different types of costs, including enhanced social support and protection. Broadly, there are two distinct domains of action: health sector policies and multisectoral collaborations beyond the health sector.

In terms of health sector policies, some costs incurred by TB patients and their households are closely associated with how a country's health services are organized and financed. This is influenced by national progress towards achieving UHC, the services included as part of "free TB care" polices, the modality of service delivery and the level of service decentralization. UHC means that everyone can obtain the health services they need without suffering financial hardship *(2)*. Through their adoption of the SDGs, all countries have committed to achieving UHC by 2030.[1]

In terms of multisectoral collaboration, even after optimizing health sector polices and services, reducing costs faced by TB-affected households will usually require substantial enhancements to social support and protection through collaborations beyond the health sector. Sectoral policies that are highly relevant include those related to social welfare and protection, labour and employment, poverty reduction and social development.

Once a national survey of costs faced by TB patients and their households has been completed, countries are encouraged to use the results to facilitate discussions with relevant stakeholders across social sectors and identify policy options to enhance support to TB-affected households.

[1] Target 3.8 is "Achieve universal health coverage, including financial risk protection, access to quality essential health care services and access to safe, effective, quality and affordable essential medicines and vaccines for all".

This chapter provides an overview of the main recommendations from the 20 national surveys of costs faced by TB patients and their households implemented between 2015 and 2021. These recommendations are divided into four major areas for action:

- changing health service delivery policies and practices;
- making alterations to health financing schemes;
- improving TB-specific social support; and
- enhancing social protection.

An overview of which of these areas for action was recommended in each of the 20 countries is provided in Table 4.1.

Major examples of specific actions that are relevant to each of the four categories are summarized in Table 4.2.

4.1 Changing health service delivery policies and practices

The way in which health services are organized has a major impact on the experience of people affected by TB and on the costs faced by those people. Individuals with presumptive TB may need to make multiple visits to different health facilities before being diagnosed and enrolled in appropriate treatment and care. If free-service policies cover only basic diagnostic procedures (e.g. sputum examinations) or become free only after a diagnosis of TB is confirmed, diagnostic testing may require out-of-pocket medical spending. Once a TB diagnosis has been made and treatment started, patients and their care givers may need to spend substantial time to access treatment; they may also incur out-of-pocket payments for treatment and follow-up tests, including those related to adverse reactions to TB treatment.

To mitigate these costs, TB services need to be as close as possible to where people live. In response to survey findings, many countries made recommendations to improve access by integrating TB services into the general health system and decentralizing services. Bringing care closer to patients will reduce the time required for each visit for TB diagnosis and treatment. Its primary impact on costs will be reductions in direct nonmedical expenditures and indirect costs (e.g. income losses).

Decentralization of TB services was recommended in several countries. In Burkina Faso, the recommendation was to minimize hospitalization and refer patients to lower level facilities as soon as possible (depending on the patient's condition). In the Demo-

Table 4.1 **An overview of the areas for action for which recommendations were made following the 20 national surveys of costs faced by TB patients and their households implemented in 2015–2021**

COUNTRY	CHANGING HEALTH SERVICE DELIVERY POLICY AND PRACTICES	ALTERATIONS TO HEALTH FINANCING SCHEMES	IMPROVING TB-SPECIFIC SOCIAL SUPPORT	ENHANCING SOCIAL PROTECTION
Brazil	■		■	■
Burkina Faso	■	■	■	■
Democratic Republic of the Congo	■	■	■	■
Fiji	■		■	■
Ghana	■	■	■	■
Indonesia	■		■	■
Kenya	■	■	■	■
Lao People's Democratic Republic	■	■		■
Mali	■	■		
Mongolia	■		■	■
Myanmar	■	■	■	■
Nigeria	■	■	■	■
Papua New Guinea	■	■	■	■
Philippines	■	■		■
Solomon Islands	■			■
Thailand	■	■	■	■
Uganda	■	■		■
United Republic of Tanzania	■	■	■	■
Viet Nam	■	■	■	■
Zimbabwe	■	■	■	■

TB: tuberculosis.

Blue cell indicates the area was included in the recommendations following the survey.

Table 4.2 **Examples of policy responses that can be used to mitigate costs incurred by TB patients and their households**

HEALTH SECTOR POLICIES		MULTISECTORAL POLICIES	
Changing health service delivery policies and practices	Making alterations to health financing schemes	Improving TB-specific social support coverage, content and sustainability for TB patients	Enhancing social protection
• Improving access through service integration and decentralization • Enhancing community-based services • Avoiding unnecessary hospitalization • Introducing newer technologies and strategies for TB care	• Expanding "free-TB care" policies • Harmonizing with emerging health coverage schemes (e.g. benefit package design, fast-track enrolment and inclusion of TB patients in existing schemes covering the poor)	• Improving TB-specific social support (coverage, contents and sustainability) through raising awareness of existing schemes (eligibility and practical access) and well-designed health and social interventions at health facilities or social support centres	• Explore opportunities to link with: — non-contributory social protection schemes (e.g. cash transfer programmes and disability grants) — contributory schemes (e.g. social insurance with sickness grants and income compensation) • Measures to protect employment, especially against discrimination on the grounds of health

TB: tuberculosis.

cratic Republic of the Congo, Fiji, Ghana, the Lao People's Democratic Republic, Mongolia, the Philippines, Myanmar, Uganda and Zimbabwe, it was recommended to improve access to quality TB diagnostic services, including through specimen referral mechanisms.

Strengthening community-based TB services (e.g. through collaboration with community health workers, and development of a community mobilization and engagement strategy) was identified as an effective way to improve access to care and minimize costs to TB-affected households in the Democratic Republic of the Congo, Fiji, Ghana, Mali, Mongolia, Papua New Guinea, the Philippines and Uganda.

To promote people-centred care and reduce direct medical expenditures, direct nonmedical expenditures and indirect costs, it is critical to strengthen all primary health care services so that they can respond to the health care needs of the population in an integrated and holistic way. In countries with a high burden of both TB and HIV, particular attention to continued improvement in the integration of TB/HIV services is needed. This will improve not only access and expansion of services (e.g. HIV testing for TB patients) but also the quality of care for TB among people living with HIV (examples included Brazil and the Philippines).

In some countries, TB policies mandate or encourage systematic hospitalization, particularly for patients with DR-TB. Examples of the latter in the 20 surveyed countries included the Democratic Republic of the Congo, the Lao People's Democratic Republic, Mali and Papua New Guinea. In Brazil, Mongolia and Solomon Islands, there was a policy for hospitalization during or at the beginning of the intensive phase of treatment for all TB patients. To mitigate direct medical expenditures and indirect costs associated with hospitalization, recommendations from surveys encouraged avoidance of unnecessary hospitalization in Fiji, Solomon Islands and the United Republic of Tanzania.

Private sector engagement is a key issue in some countries. Effective collaboration and engagement of private sector providers and adequate financing of TB care in such settings may improve access to early TB diagnosis and treatment. Conversely, unregulated TB services in the private sector can lead to increased costs and delays to provision of care. Strengthening of public–private collaborations was recommended in Mali, the Philippines and Uganda. Designing financing strategies to lower barriers to quality care in both public and private settings may also help to increase access to care.

Use of up-to-date technologies and strategies can help to minimize costs faced by TB patients and their households; for example, by shortening the time to diagnosis. Expanding the use of rapid molecular diagnostics for initial diagnosis of TB was recommended in the Democratic Republic of the Congo and Papua New Guinea, which is expected to shorten the patient pathway to diagnosis. Accelerated introduction of shorter regimens for the treatment of DR-TB was among the mitigation actions adopted in the Philippines, whereas Uganda and Viet Nam planned to expand systematic screening (active case finding), especially among vulnerable populations.

Lastly, in the Philippines and Uganda, wider coverage of TB preventive treatment among high-risk groups to reduce the total number of people developing TB disease was identified as a strategy to reduce the total number of TB patients and their households facing catastrophic total costs.

4.2 Making alterations to health financing schemes

Despite the widely implemented norm of "free TB care" policies, direct medical expenditures accounted for a sizable proportion of the total costs incurred by TB patients in some countries (e.g. 41% in Mali, and 21% in Kenya and Mongolia). Such costs pose a barrier to TB care and may fuel disease transmission and resistance. There are two major reasons for such costs. First, services included under the "free TB care" policies may not cover the latest technology and tools recommended by WHO. At the time of the surveys, many countries had policies that provided patients with free sputum smear microscopy and TB medicines; however, the costs for chest radiography, hospitalization and ancillary medicines were often not covered or only partly covered. In some countries, diagnostic tests for DR-TB were only covered for people who were officially notified (reported) as a TB case. In addition, the costs associated with treating adverse events or other comorbidities were not covered in many countries. Timely expansion of the range of tests and services included in free TB care policies following the availability of newer tools and updates to WHO guidelines were included in the recommendations from surveys in Brazil, Burkina Faso, the Democratic Republic of the Congo, Papua New Guinea and the United Republic of Tanzania.

Beyond TB-specific policies, there is a need to increase public funding for health; without this, out-of-pocket expenditures will be high. In many low- and middle-income countries (LMIC), health care is disproportionately financed by out-of-pocket household spending because only limited protection is offered through mandatory prepayment mechanisms (i.e. funded from general revenues or mandatory insurance contributions). Financing for TB care might follow the same pattern, despite being branded as "free TB care". However, emerging national health insurance schemes often do not include TB care in their service package; when they do include such care, it

Box 4.1 Improving national health insurance coverage for TB patients in Ghana

A national survey of costs faced by TB patients and their households was implemented in Ghana in 2017.

The major findings included the following:

- Overall, 63% (95% CI: 57–69%) of TB-affected households, and 72% (95% CI: 59–84%) of households of patients with DR-TB, experienced costs greater than 20% of annual household income.
- The largest share of total costs was accounted for by direct nonmedical expenditures (47%), followed by income losses (34%) and direct medical expenditures (19%).
- In total, 52% of patients were unable to pay for TB treatment from their existing income sources, and had to rely on savings, borrowing or sale of assets.
- Social protection coverage was low among TB-affected households: 45% were enrolled in Ghana's national health insurance scheme (NHIS) and less than 1% benefited from a cash transfer programme (the Livelihood Empowerment Against Poverty programme, or LEAP). LEAP provides CCTs to extremely poor households, with the aim of alleviating short-term poverty and supporting long-term resilience and human capacity development.

Following the survey, discussions about the key results and their implications were held with a wide range of multisectoral stakeholders. These included:

- The Policy, Planning and Monitoring and Evaluation directorate, Ministry of Health;
- Ghana Health Services, Ministry of Health;
- the National Health Insurance Authority (NHIA);
- the National AIDS Control Programme;
- the Ghana AIDS Commission;
- the Ministry of Gender, Children and Social Protection;
- the Ministry of Monitoring and Evaluation;
- the National Development Planning Commission; and
- the Ministry of Monitoring and Evaluation.

As part of policy discussions, the NTP and NHIA identified two critical issues among survey participants in relation to the NHIS: direct medical expenditures account for 19% of total costs, and health insurance coverage is low among people with TB. Although basic TB services were provided for free according to NTP policy, TB patients were still required to pay for TB-related services, such as chest radiography, hospitalization and any medicines needed for the treatment of adverse events. Among survey participants, 45% were enrolled in the NHIS at the time of diagnosis, a further 35% were enrolled after diagnosis and the remaining 20% were uninsured throughout.

The NTP and NHIA held extensive bilateral discussions and negotiations to explore ways to address these issues. As a result, in 2018, the Ghana Health Service and NHIA agreed on the need for TB patients to be enrolled into the NHIA as soon as they are diagnosed with TB, without the need to pay insurance premiums. Ghana's NHIS had already been providing premium-free enrolment for vulnerable households (according to defined criteria). Using this existing mechanism for inclusion of people from vulnerable households, TB patients were added as beneficiaries of the NHIS. By implementing the policy, together with the free TB services provided through the NTP, Ghana aims to eliminate direct medical expenditures incurred by people with TB.

Further details are available in journal articles *(5,6)*.

might not encompass all recommended prevention, diagnosis and treatment services (e.g. the most recent WHO model lists of "essentials" for TB *(3)*), possibly because TB care is already assumed to be "free to patients". The development or refinement of benefit packages that include TB care is a priority for some countries, especially given the large share of domestic financing for national TB services in many high TB burden countries *(4)*. This requires a relatively large-scale "insurance" scheme in which the TB benefit is universal (i.e. non-contributory), and funding is shifted, at least in part, from the NTP to the health insurance scheme. In countries that rely on large streams of TB-specific funding (e.g. grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria), this may be difficult to do.

Based on TB patient cost surveys, nine countries identified issues with the existing coverage of health insurance among people with TB and identified corresponding mitigation strategies. Examples included:

- fast-tracking the enrolment of all TB patients in the national health insurance scheme[1] (Ghana and Kenya);
- subsidizing insurance premiums for TB patients through an innovative funding mechanism (Viet Nam);
- discussing the integration or expansion of TB services within the national health insurance scheme (the Lao People's Democratic Republic, Myanmar, the Philippines, Thailand and Viet Nam);
- establishing a mechanism for simplified reimbursement for medical costs incurred by people with TB (the Democratic Republic of the Congo); and

[1] These recommendations were based on national-level discussions specifically related to reducing medical costs incurred by TB-affected households. It is recognized that wider changes to a country's health financing system, including those related to national health insurance schemes, requires consideration of broader system wide issues.

Table 4.3 Summary of social support provided for TB patients in countries that implemented national surveys of costs faced by TB patients and their households, 2015–2021[a]

COUNTRY	CASH TRANSFER	FOOD	TRANSPORTATION
Brazil	■		■
Burkina Faso		■	■
Democratic Republic of the Congo	■	■	■
Fiji			■
Ghana	■	■	■
Indonesia			■
Kenya	■		■
Lao People's Democratic Republic	■		■
Mali	■	■	■
Mongolia	■	■	
Myanmar	■	■	■
Nigeria		■	■
Papua New Guinea		■	■
Philippines	■	■	■
Solomon Islands	■	■	■
Thailand	■		■
Uganda		■	■
United Republic of Tanzania		■	■
Viet Nam	■	■	■
Zimbabwe	■		■

[a] Country-specific details are available in the country profiles in Part II.
Blue cell indicates the availability of the type of social support provided for TB patients at the time of the survey.

- expanding existing mechanisms to provide health coverage for certain vulnerable groups (e.g. those below the poverty line, people with disability) so that they can be applied to patients with TB (Brazil).

A case study of how national health insurance coverage for TB patients was improved in Ghana is provided in Box 4.1.

4.3 Improving TB-specific social support

At the time of their surveys, many countries were providing some form of social support to people with TB (Table 4.3). However, in many instances these support schemes were directed towards patients affected by DR-TB, which limits their coverage and impact. Financing was often highly donor dependent, unpredictable and unsustainable.

The Philippines provides a good illustration. As part of the TB patient cost survey, the contribution of TB-specific social support (a "TB enabler package") was assessed. Among people treated for DR-TB, the package reduced the proportion of TB-affected households facing costs greater than 20% of annual income or expenditure from 90% to 77%. However, among all people with TB, the impact was negligible (with the proportion reducing from 42.4% to 42.0%) because the scheme only covered patients with DR-TB, leaving most patients (who were on first-line treatment) without access to the package *(7)*.

Survey results in the Democratic Republic of the Congo showed uneven access to social support according to socioeconomic status (when assessed according to income quintile). This suggested a lack of awareness of existing social support schemes for which TB-affected households are eligible, and knowledge about how to access that support in practice.

Results from national TB patient cost surveys often led to a recommendation to expand TB-specific social support schemes; in particular, to help reduce or eliminate direct nonmedical expenditures. Examples included Brazil, Burkina Faso, the Democratic Republic of the Congo, Fiji, Ghana, Indonesia, Mongolia, Myanmar, Papua New Guinea, Viet Nam and Zimbabwe. A specific request for support from other ministries, partners and donors was also made in Mongolia, Myanmar, Papua New Guinea and Viet Nam.

Among the various possible forms of social support, the need to enhance nutrition support was explicitly recommended in the Democratic Republic of the Congo, Fiji, Indonesia, Kenya, Nigeria, the Lao People's Democratic Republic, Mali, the United Republic of Tanzania and Zimbabwe. This followed evidence from the cost surveys about food security (assessed in all

Table 4.4 The availability of selected social protection schemes among countries that implemented national surveys of costs faced by TB patients and their households, 2015–2021

	NON-CONTRIBUTORY				CONTRIBUTORY			
COUNTRY	DISABILITY	CASH SICKNESS BENEFIT	UNEMPLOY-MENT	FAMILY AND HOUSEHOLD BENEFITS	DISABILITY	CASH SICKNESS BENEFIT	UNEMPLOY-MENT	FAMILY AND HOUSEHOLD BENEFITS
Brazil	■		■	■	■	■		■
Burkina Faso					■			■
Democratic Republic of the Congo					■	[a]		■
Fiji				■	■	[a]		
Ghana					■			
Indonesia						[a]		
Kenya					■	[a]		
Lao People's Democratic Republic					■	■	■	
Mali					■	[a]		■
Myanmar					■	■	■	■
Nigeria					■	[a]		
Papua New Guinea					■	[a]		
Philippines				■	■	■		
Solomon Islands					■	[a]		
Thailand					■	■	■	■
Uganda					■	[a]		
United Republic of Tanzania					■	[a]	■	
Viet Nam	■			■	■	■	■	
Zimbabwe					■	[a]		

TB: tuberculosis.

Blue cell indicates the availability of the social protection scheme.

[a] Employer-liability system only.

Source: World social protection data dashboards (7).

surveys) as well as measurement of body mass index assessed in two countries (Ghana and Kenya) *(4)*. The recommendation to provide enhanced nutritional support was combined with a suggestion to systematically assess the nutritional status of people with TB and to provide related counselling in Fiji, the Lao People's Democratic Republic and Kenya, and to collaborate with other programmes and sectors to help ensure the provision of better nutritional support in the Lao People's Democratic Republic, the Philippines and Zimbabwe.

4.4 Enhancing social protection

The health sector is important in improving TB service delivery and shaping health financing schemes; however, it is also necessary to enhance social protection among TB-affected households through effective collaborations across the social sector. The indirect costs faced by TB-affected households, representing the loss of income or productivity during a TB episode, occupy a substantial proportion of the total costs those households incur. The costs can only be addressed through social protection measures; thus, national authorities responsible for health (including TB) and social affairs are jointly responsible for designing policies geared towards ensuring social protection for TB patients and their households.

The availability of social protection schemes and the awareness of services offered to the general population or to those with disease conditions varied by country. Table 4.4 summarizes social protection schemes available in the countries included in this publication, based on the database of the International Labour Organization (ILO) *(8)*.[1]

At the time of their national survey, only four of the 19 countries had any form of non-contributory social protection scheme. Most had contributory social protection schemes. However, since these contributory schemes were mainly tied to employment, it is likely that population coverage overall remains limited in most of these countries.

Following the surveys, several countries began to

[1] Mongolia is not included in the table because there are no data for this country in the database.

explore how to effectively use their existing contributory schemes for TB-affected households. Examples included sickness and benefit schemes in the Democratic Republic of the Congo, the Lao People's Democratic Republic and Thailand, and income compensation schemes in Nigeria and the Philippines. Although these attempts can be a quick "win" in making an effective link with social protection schemes, their impacts may be limited, given their limited coverage among TB-affected households *(8–10)*.

In the countries with an existing cash transfer programme (e.g. Brazil, Fiji, Ghana, Indonesia, Kenya, Myanmar, Philippines and Zimbabwe), the NTP intended to open a dialogue with relevant stakeholders to modify the eligibility criteria of the programme beneficiaries so that people with TB are considered eligible. Mongolia explored the potential to apply social protection packages to people with TB.

Loss of employment is one of the major causes of financial hardship in TB-affected households. Stigma and discrimination in workplaces and in relation to employment needs to be addressed through awareness raising and regulatory measures. A range of labour-sector policies aimed at protecting the employment and income of TB-affected households is applicable and potentially impactful. Possible entry points include health-related workplace policies (e.g. TB-HIV workplace policies), polices on occupational health services (e.g. workplace TB services in the Philippines), occupational hygiene regulations and inspection, and labour codes. Most countries that have implemented a national TB patient cost survey proposed to develop or review and implement such policies, or to strengthen the enforcement of legislation to prevent dismissal from work and to address stigma and discrimination in the community and workplace due to TB. Dialogue and collaboration with other sectors (e.g. workers unions and the corporate sector, the ministry of labour, the ministry of social welfare, parliament and civil societies) are required to advance these policies.

In several countries, social protection policies and schemes are still severely limited or absent.[1] Even in such countries, it is critical for NTPs and the ministry of health to be engaged in multisectoral policy discussions related to the overall social protection agenda (e.g. through the national development council or SDG committee). In general, the health sector holds highly relevant and valuable information on the linkages between health and poverty. Together with other programmatic information (e.g. on nutrition, immunization, malaria, HIV and neglected tropical diseases), the results of national TB patient cost surveys can provide powerful evidence to advocate for effective links between the health and social protection sectors.

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[1] Country-specific information is available in global data sources such as the ILO social protection data dashboards *(8)* and the International Social Security Association country profiles *(12)*.

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1. United Republic of Tanzania, ©WHO/Andy Craggs; 2. Thailand, ©WHO/Inés Garcia Baena; 3. Myanmar, ©WHO/Shehzad Noorani; 4. Thailand, ©WHO/Thailand; 5. Uganda, CDC/Julia Ershova; 6. Kenya, ©WHO/Inés Garcia Baena; 7. Viet Nam, ©WHO/Yoshi Shimizu.

5. Reflections and future direction

This chapter provides reflections on national surveys of costs faced by TB patients and their households that were completed between 2015 and 2021. It looks at major achievements, factors contributing to success in survey implementation, challenges faced and the future direction of such surveys.

5.1 Achievements

The first major achievement was that, in 2015–2021, 20 countries managed to successfully complete a national survey of costs faced by TB patients and their households, using methods recommended by WHO including publication of results. This enabled direct measurement of the status of progress towards achieving one of three high-level targets of the WHO End TB Strategy; that is, that no TB patients and their households face catastrophic total costs (defined as total costs exceeding 20% of household income or expenditure) due to TB disease *(1)*. The 20 countries accounted for 32% of the estimated global burden of TB disease in 2020, in terms of their estimated number of incident cases.

The second major achievement was that, individually and collectively, the 20 surveys generated a large body of new evidence (Chapter 3) about the socioeconomic hardships faced by TB-affected households, with findings documented in various formats (e.g. published reports, policy briefs and articles in peer-reviewed scientific journals). This provides the basis for action to mitigate or end such hardships, which is critical to ensuring universal access to TB care and the completion of TB treatment. Ensuring that everyone with TB can access prompt diagnosis and treatment is in turn essential for the achievement of the two other high-level targets of the WHO End TB Strategy; that is, large reductions in TB incidence and in the annual number of TB deaths between 2015 and 2035.[1]

All surveys highlighted the main types of costs that affect TB patients and their households, and the most important cost drivers. They also showed the social and economic consequences of TB, including loss of livelihoods and impoverishment, negative impacts on schooling for children, food insecurity, disruption of family structures and social isolation.

The third major achievement was that countries have used survey results to formulate policy responses to improve TB services and patient support. Examples include revisions to TB screening and diagnostic algorithms, and improvements to delivery of TB treatment, such as more decentralized approaches to care delivery, greater flexibility in the scheduling of patient appointments, and adoption of digital case-based surveillance and patient management tools. In many countries, survey findings facilitated policy dialogue and triggered actions that extended well beyond the usual scope of TB programmes. Examples include revisiting service packages for TB patients and people seeking care, establishment of linkages with nutrition programmes to provide food supplements for specific populations, improved criteria for enrolment in social support mechanisms and advocacy for adoption of protective workplace policies.

Overall, the capacity of countries to conduct surveys has been substantially enhanced. This will strongly facilitate the implementation of repeat surveys. Repeat surveys are already planned in some countries that implemented a first survey (e.g. Viet Nam) and then implemented a multisectoral action plan to mitigate costs. Countries undertaking repeat surveys provide a pool of expertise on which countries implementing their first surveys can draw.

5.2 Factors contributing to success in survey implementation

As a first step, survey implementation required mobilization of research teams and funding. Financial support was provided by national and international partners, as detailed in country-specific profiles (Part II). Required budgets ranged from US$ 25 000 in Mongolia to US$ 298 000 in Indonesia, with most countries requiring funding of about US$ 100 000.

Development and dissemination of standard survey methods was also essential. Pathfinding countries that implemented a survey between 2015 and 2017 used the field-testing version of a WHO generic protocol published in 2015 *(2)*. Experience gained in these countries then provided the basis for a comprehensive WHO handbook that set out recommended methods for the design, implementation, analysis and reporting of surveys *(3)*, and was used by countries that implemented surveys from 2018 onwards. The WHO Global Tuberculosis Programme (GTB) led the production of the handbook, under the umbrella of a global task force on TB patient cost surveys that was convened by GTB.

Global coordination by WHO of support to local research teams, based on the generic protocol and handbook, was used to promote the consistent appli-

[1] See Box 1.1 in Chapter 1.

cation of recommended methods across countries. Support was provided either directly by WHO staff or through WHO's global and regional network of technical assistance providers. Uptake of the methods in the WHO handbook was also facilitated by development and provision of ready-to-use and adaptable digital survey tools for data collection, validation, analysis and reporting, and training in the use of those tools. Seminars and training at regional and global levels were used to encourage the development of cross-country research team collaborations, helping to expand knowledge and understanding of all aspects of the surveys.

The establishment of multidisciplinary coordination and research teams at a national level was critical to the surveys in all countries.[1] Many NTPs were able to draw on existing collaborations with local institutions or to establish new ones. This enabled them to strengthen their capacity to formulate and interpret health economics concepts such as economic burden, costing and formulation of health-related economic policies.

5.3 Challenges

Several challenges were faced during the surveys. These can be categorized into general challenges, and challenges specifically related to methodological aspects.

5.3.1 General

Most NTPs and local research teams did not have prior experience in conducting facility-based national patient cost surveys. Extensive advocacy and communication efforts to engage relevant stakeholders were needed. The methods in the WHO generic protocol and handbook were developed through extensive consultations and a careful step-by-step approach; however, their application in practice required intensive collaboration among the country team, technical assistance providers and WHO.

Most surveys took at least 12 months from protocol development through ethical approval to implementation, reporting and policy discussions.

The COVID-19 pandemic had a big impact on surveys that were planned for 2020–2021. Two countries (Brazil and Thailand) had to suspend their data collection midway through or adopt phased designs; they also needed to implement specific training on protective measures for their data collection staff. Remote technical support and virtual training for data collectors had to be relied upon in Indonesia and Mali. Many other countries postponed workshops for dissemination of results (e.g. the Democratic Republic of the Congo, Burkina Faso and Mali). Despite these challenges, countries found ways to adapt their protocols, with approval from their respective institutional review boards, and were able to complete their surveys.

Not all countries made use of the publicly available tools that were provided, promoted and disseminated by WHO.

In some countries, queries about survey methods were raised during reviews of protocols by country-specific institutional review boards. The main query related to how adherence to good clinical practice (GCP) guidelines was being ensured, such as maintaining confidentiality of documentation (e.g. patient consent forms and demographic data), the traceability of patient sampling and recruitment, and the traceability of edits in collected survey data. GTB, in collaboration with WHO's Special Programme for Research and Training in Tropical Diseases (TDR), has been working to improve the relevant guidance *(4)*.

5.3.2 Methodological

In terms of methods, three main challenges were reported during survey implementation.

The first related to the choice of method used to estimate household income or expenditure (see **Section 2.6** in **Chapter 2**). This is a key measure, given that it is used as the denominator for assessing whether costs faced by TB patients and their households exceed 20% of household income or expenditure (and are thus defined as "catastrophic"). National survey teams were required to make an appropriate choice (either reported household income or reported household expenditure[2]). The choice of method had to take into consideration the country's socioeconomic structure, the survey design (including where patients were interviewed at the facility) and whether the necessary time and funding were available to collect data on household consumption using the methods commonly applied in living standards measurement surveys *(5)*.

The second was whether to use the output approach or human capital approach to estimate indirect costs (see **Section 2.7** in **Chapter 2**). This depended on the level of completeness and validity of data about self-reported income.

The third challenge related to sampling design. In the first instance, it was necessary to decide whether to use stratified sampling, especially if the number of patients with DR-TB was relatively small. In countries

[1] The WHO handbook *(3)* recommends that, ideally, the survey implementation and coordinating team should have multidisciplinary expertise, including in epidemiology, health economics and other social sciences.

[2] The WHO handbook *(3)* also includes a method to predict household income from asset ownership (as a proxy for household permanent income) and dwelling characteristics. This method can be complementary to either reported income or expenditure and can be used in sensitivity analyses.

where there was substantial geographical variation in TB notification rates, it was not always straightforward to ensure a nationally representative sample of TB patients that was well balanced across those geographical areas and across different types of health facilities (e.g. primary care facilities and hospitals). For example, in countries with a relatively low TB notification rate overall, there is often a concentration of TB patients in a few facilities and geographical areas (e.g. the capital city). In such cases, it can be difficult to obtain a sample that is well balanced across survey clusters (e.g. those in rural remote communities and those in highly urbanized communities). These sampling issues need to be carefully considered by survey staff with expertise in statistics, not only during the design stage but also during implementation and analysis. To help with analysis and reporting, WHO established minimum reporting standards and an associated standardized analysis script[1] (in Stata and R) that enabled adjustment for sampling design effect.

5.4 Future direction

5.4.1 Expanded and repeat implementation of surveys

All Member States of WHO and the United Nations (UN) have committed to ending the TB epidemic, through their adoption of the WHO End TB Strategy (in 2014) and the UN SDGs (in 2015). These commitments were reaffirmed in the political declaration at the first UN high-level meeting on TB that was held in 2018 *(6)*. One of the three high-level targets of the End TB Strategy is that no TB-affected households face catastrophic total costs as a result of TB disease; hence, measurement of the costs faced by TB patients and their households is relevant in all countries.

As of June 2021, among WHO regions, progress was most advanced in the WHO African Region and Western Pacific Region. Progress in planning surveys has expanded more recently in the WHO Region of the Americas. However, implementation is limited to a few countries in the WHO European Region and the Eastern Mediterranean Region. Countries where a survey has not been conducted are encouraged to plan and conduct one as soon as possible, especially countries with a high burden of TB. Of the 30 countries in WHO's list of high TB burden countries for the period 2021–2025 *(7)*, 15 have not yet implemented a survey: Angola, Bangladesh, Cambodia, Central African Republic, Republic of the Congo, the Democratic People's Republic of Korea, Ethiopia, India, Liberia, Mozambique, Namibia, Pakistan, Russian Federation, Sierra Leone and Zambia.[2]

As highlighted above (**Section 5.1**), cross-country sharing of experience and provision of technical support could accelerate the expansion of survey implementation to new countries.

Some countries that implemented their first national surveys in 2015–2017 are already planning a repeat survey. This requires careful discussion of survey design, including assessment of the expected impact of mitigation strategies implemented so far.

5.4.2 Operationalization of policy responses at country level

At country level, further efforts are required to operationalize measures to mitigate the costs and other socioeconomic consequences faced by TB-affected households. Although various options informed by survey findings have been identified in many countries through multisectoral discussions and have been formulated as policy recommendations, translating them into concrete and impactful actions has not been straightforward. This is especially true for policies that are outside the remit of the NTP or ministry of health. Usually, such cross-cutting policy responses require persistent negotiations with relevant multisectoral partners. Even if it has been agreed that the NTP and another sectoral ministry will collaborate (e.g. on a joint policy action), it might still take extensive consultations over months or years to define the specifics required to effectively implement a policy in practice. Strong political commitment and ongoing advocacy efforts are needed to make multisectoral collaborations and joint actions a reality. Engagement of civil society partners and affected communities is often critical to such advocacy efforts.

In 2019, WHO published a Multisectoral Accountability Framework to accelerate progress to End TB (MAF-TB) *(8)*, as requested in the political declaration at the UN high-level meeting on TB in 2018. National-level implementation of MAF-TB provides an excellent opportunity to boost multisectoral collaborations to end TB. WHO is strengthening its support to countries in this area; for example, through the publication of guidance and tools, and the provision of technical assistance.

5.4.3 Updating WHO guidance

Between 2015 and 2021, a substantial amount of experience in implementing surveys of costs faced by TB-affected households was gained. This will be used to produce a new and expanded edition of the current (2017 edition) handbook *(3)*.

Priority topics for updated guidance include:

- methods to measure household income or expenditure;
- methods for estimating indirect costs (i.e. the costs associated with time spent seeking and accessing care);

[1] See **https://github.com/GTB-PCS/**.

[2] China, Lesotho and South Africa implemented their national surveys, but the analysis of the results was not made available for the present publication.

- sampling design;
- application of GCP guidelines;
- analytical methods, including adjusting for sampling design; and
- dissemination of results and policy translation, including how these can be linked to related efforts to implement MAF-TB.

5.5 Conclusions

For the first time since the endorsement of the WHO End TB Strategy by all WHO Member States in 2014, this book has provided comprehensive documentation about the 20 national surveys of costs faced by TB patients and their households completed in 2015–2021, according to WHO-recommended methods.

Overall, there are three main findings and messages.

- About half of TB-affected households faced catastrophic total costs due to TB, with none of the surveyed countries coming close to achieving the End TB Strategy target of zero. This shows that people with TB and their households are experiencing major economic and financial barriers to diagnosis and treatment.
- TB continues to cause severe socioeconomic hardship, including substantial reductions in household income, loss of assets, increased food insecurity, disruption to schooling for children, and increased rates of unemployment and poverty.
- Policy options are needed to mitigate these costs and consequences, with their operationalization and implementation requiring high-level political commitment and persistent multisectoral efforts.

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PART II.

Country survey profiles

Brazil

2019–2021

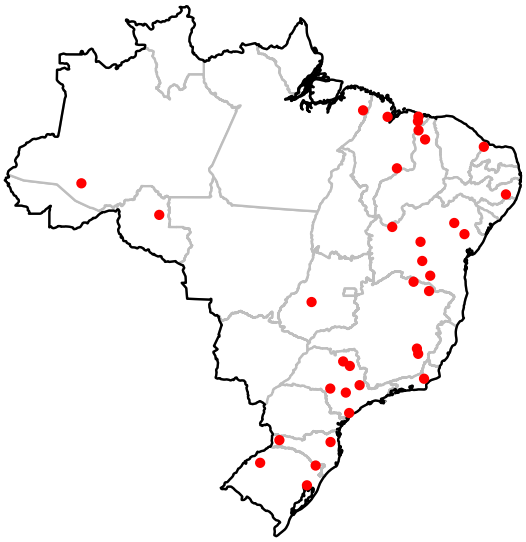
Summary statistics, national TB patient cost survey

Total number of survey participants	**603**
Number of participants by treatment category	
• TB (first-line treatment)	538
• Drug-resistant TB	65
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2020 US$[b] (95% CI)	**573 (487–674)**
• TB (first-line treatment)	523 (442–620)
• Drug-resistant TB	1216 (894–1656)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**48 (43–53)**
TB (first-line treatment)	44 (39–49)
Drug-resistant TB	78 (68–87)

BRL: Brazilian Real (Brazil); CI: confidence interval.

[a] Geometric mean.

[b] The analysis of the survey used an exchange rate of US$ 1 = 5.2 BRL, which was the average for 2020.



Distribution of surveyed clusters (N=38)

• Surveyed cluster

Survey timeline

Initiation of preparation	February 2019
Ethics approval	April 2019
Data collection	September 2019–March 2021
Official dissemination event	October 2021 and March 2022
Publication of survey report	–

Key people

NAME	ROLE	ORGANIZATION
Ethel Leonor Noia Maciel	Primary investigator	UFES, Espírito Santo, Brazil
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Inés Garcia Baena	Technical assistance	WHO GTB
Peter Nguhiu	Technical assistance	WHO GTB
Julia Ershova	Technical assistance	US CDC

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Programme; UFES: Universidade Federal do Espírito Santo [Federal University of Espírito Santo]; US CDC: United States Centers for Disease Control and Prevention; WHO: World Health Organization.

Implementation agency

Universidade Federal do Espírito Santo [Federal University of Espírito Santo]

Total budget: US$ 100 000

Funding source

United States Centers for Disease Control and Prevention

Organization and financing

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	211	2019
GDP per capita (current US$)	8 897	2019
Life expectancy at birth (years)	76	2019
Cause and number of deaths (top 3 and TB)		2019
1. Ischaemic heart disease	165 788	
2. Stroke	123 207	
3. Lower respiratory infections	94 705	
42. TB	4 895	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

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Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	4.9%	2019
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	9.5%	2019
SDG 2: Zero hunger		
Prevalence of undernourishment	2.5%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.23	2019
UHC service coverage index (worst 0–100 best)	75	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	12%	2017
Population with household spending on health >25% of total household budget	1.9%	2017

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	96 000 (82 000–111 000)	2019
HIV-positive	10 000 (9 000–12 000)	2019
TB incidence rate (new cases per 100 000 population per year)		
Total	46 (39–53)	2019
HIV-positive	5.0 (4.2–5.7)	2019
TB treatment coverage	89% (77–100%)	2019
TB notifications		
Total new and relapse TB cases notified	85 154	2019
Percentage of new cases with MDR/RR-TB	1.5 (1.1–2.0)	2008
Treatment success rate		
New and relapse cases	69%	2019
Previously treated cases	38%	2019
HIV-positive TB cases	49%	2019
MDR/RR-TB cases	60%	2018
National TB budget	$34 million	2020

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		• All patients are diagnosed in PHUs; although people with drug-susceptible TB are treated in PHUs, people with drug-resistant TB and people requiring specialty schemes are treated in reference units • All necessary diagnostic tests for drug susceptibility testing are offered through the public health care system
Social support schemes for TB patients	Cash transfer	Available to	All formal workers that contribute to the INSS and are temporarily or permanently incapable of working because of any disease, including TB
		Amount	At least the national minimum wage
		Duration	Until the patient is deemed fit for work again
	Transportation	Available to	Patients in municipalities where local governments have TB-specific transportation benefits
		Amount	Varies
		Duration	During treatment
Treatment support	Intensive phase		Facility based, primary care services and specialized services, at least three times a week
	Continuation phase		Facility based, primary care services and specialized services, at least three times a week
Hospitalization[a]	Eligibility		Based on severity of clinical presentation or serious social vulnerabilities
	Duration		Until the patient recovers clinically
	Location		Hospitals in the service network of the Sistema Único de Saúde
Health service use in 2020[b]	Typical number of facility visits		
	• TB (first-line treatment)		72 visits
	• Drug-resistant TB		288 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		20 days
	• Drug-resistant TB		90 days

INSS: National Institute of Social Security; PHU: primary health care unit.

[a] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[b] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size (Group 1) or constant sampling probability (Group 2)
Stratification	None
Sampling frame	List of health facilities offering TB treatment
Patient enrolment	Random sampling from registered patients on treatment
Assumptions for sample size calculation	
Estimated proportion	40%
Absolute precision	5%
Design effect	2
Sample size	760
Clusters	
Number	Group 1: 36 clusters from municipalities that reported ≥35 TB cases in 2017 Group 2: 10 clusters from municipalities that reported <35 TB cases in 2017
Size	Group 1: 20 (12 from primary care health services and 8 from specialized services) Group 2: 4
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Paper-based questionnaire
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 16.0 (StataCorp) and R 4.0.2 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	538	100	65	100	603	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	208	39	24	37	232	38
Male	330	61	41	63	371	62
Age group (years)						
0–14	15	2.8	0	0	15	2.5
15–24	70	13	5	7.7	75	12
25–34	93	17	14	22	107	18
35–44	118	22	19	29	137	23
45–54	109	20	14	22	123	20
55–64	93	17	6	9.2	99	16
≥65	40	7.4	7	11	47	7.8
Education level						
No education	68	13	17	26	85	14
Primary education	421	78	46	71	467	77
Secondary or higher	49	9.1	2	3.1	51	8.5
Insurance status[b]						
None	442	82	61	94	503	83
With insurance	96	18	4	6.2	100	17
Household size, median (min–max)	3 (0–20)		3 (1–9)		3 (0–20)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	207	38	15	23	222	37
Continuation phase	331	62	50	77	381	63
HIV status						
Positive	50	9.3	10	15	60	10
Negative	430	80	51	78	481	80
Unknown	58	11	4	6.2	62	10
Type of TB						
Pulmonary TB	441	82	59	91	500	83
Extrapulmonary TB	97	18	6	9.2	103	17
Diagnostic delay (>4 weeks)[c]	77	46	3	43	80	45
Treatment support						
Self-administered	358	67	45	69	403	67
Directly observed therapy	180	33	20	31	200	33

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in Portuguese) "Do you have any of the following health insurance types?". The options were "none", "reimbursement scheme", "co-participation or partial coverage with private insurance" and "full coverage".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	297 (271–326)	268 (217–330)	294 (269–321)
Household	422 (385–463)	316 (259–387)	409 (374–447)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	295 (274–318)	267 (232–308)	292 (273–313)
Household	341 (310–375)	264 (214–326)	332 (303–363)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	47 (43–52)	38 (26–51)	46 (42–51)
Yes	48 (43–52)	49 (34–65)	48 (44–52)
Equal contributor	4.5 (2.8–6.5)	12 (4.4–23)	5.3 (3.5–7.4)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	4.3 (2.5–6.5)	4.6 (0.83–11)	4.3 (2.7–6.3)
At the interview	8.7 (6.1–12)	29 (19–40)	11 (8.1–14)

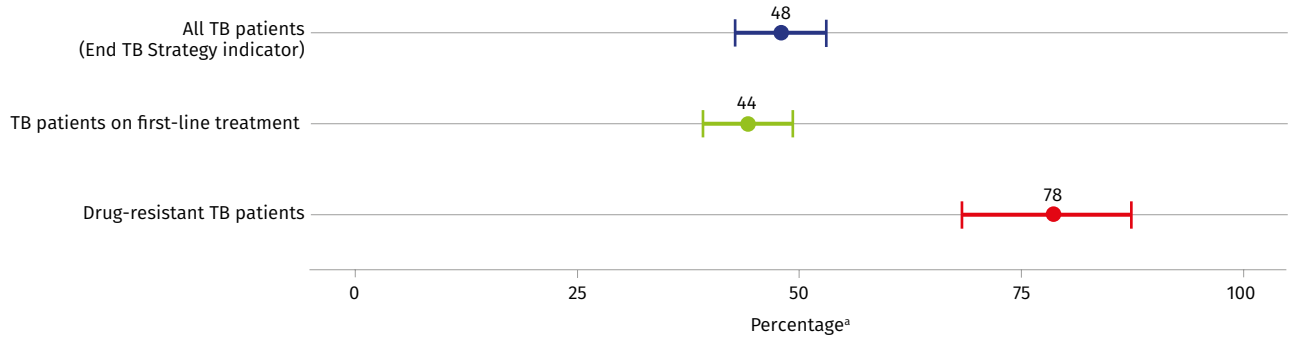
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2020.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	28	24–32	32	23–43	29	25–32
Sales of assets	6.7	4.9–8.8	15	6.8–27	7.6	5.6–9.9
Any of above	31	27–36	37	28–47	32	28–36
SOCIAL CONSEQUENCES						
Food insecurity	5.6	3.1–8.7	12	4.6–23	6.3	3.5–9.9
Divorce/separation	1.1	0.44–2.1	4.6	1.0–11	1.5	0.74–2.5
Job loss	22	17–27	28	18–38	22	18–27
Interrupted schooling	1.9	0.79–3.4	3.1	0.24–8.9	2.0	0.90–3.5
Social exclusion	37	32–42	51	39–63	39	33–44
Any of above	54	48–59	63	50–75	55	49–60
SOCIAL SUPPORT						
Sick leave	0.93	0.29–1.9	3.1	0.28–8.7	1.2	0.47–2.1
Social welfare	2.4	1.1–4.2	3.1	0.28–8.7	2.5	1.3–4.1
Other	20	15–27	23	14–33	21	15–27
Any of above	37	32–42	48	37–59	38	34–43

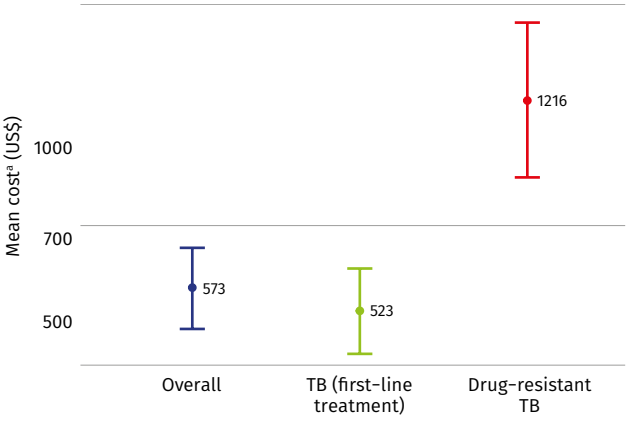
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2020 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

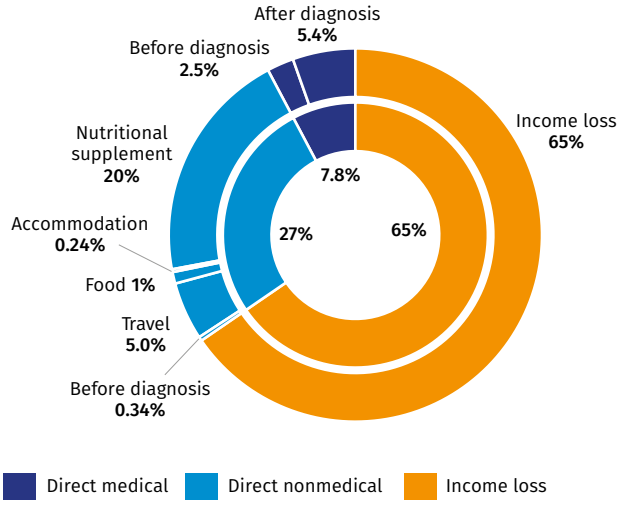
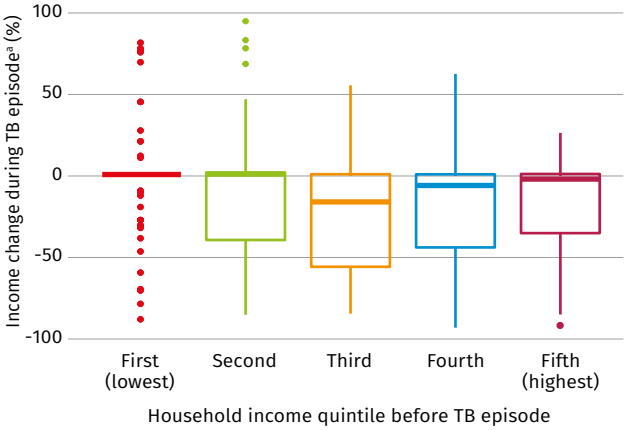
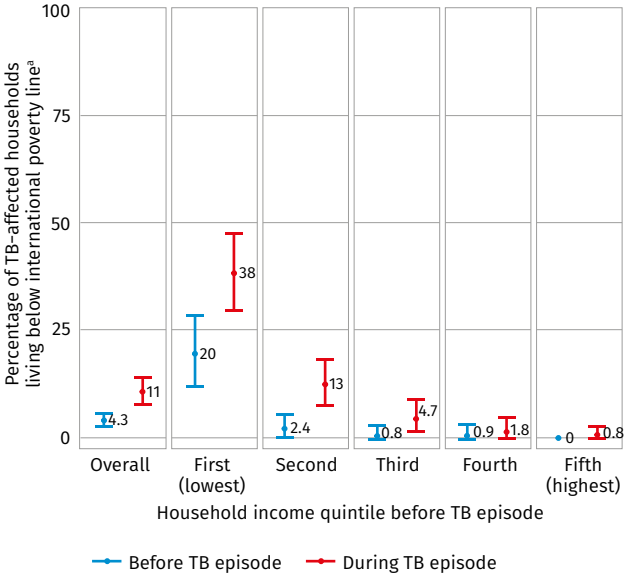


Fig. 4. Changes in distribution of monthly self-reported household income



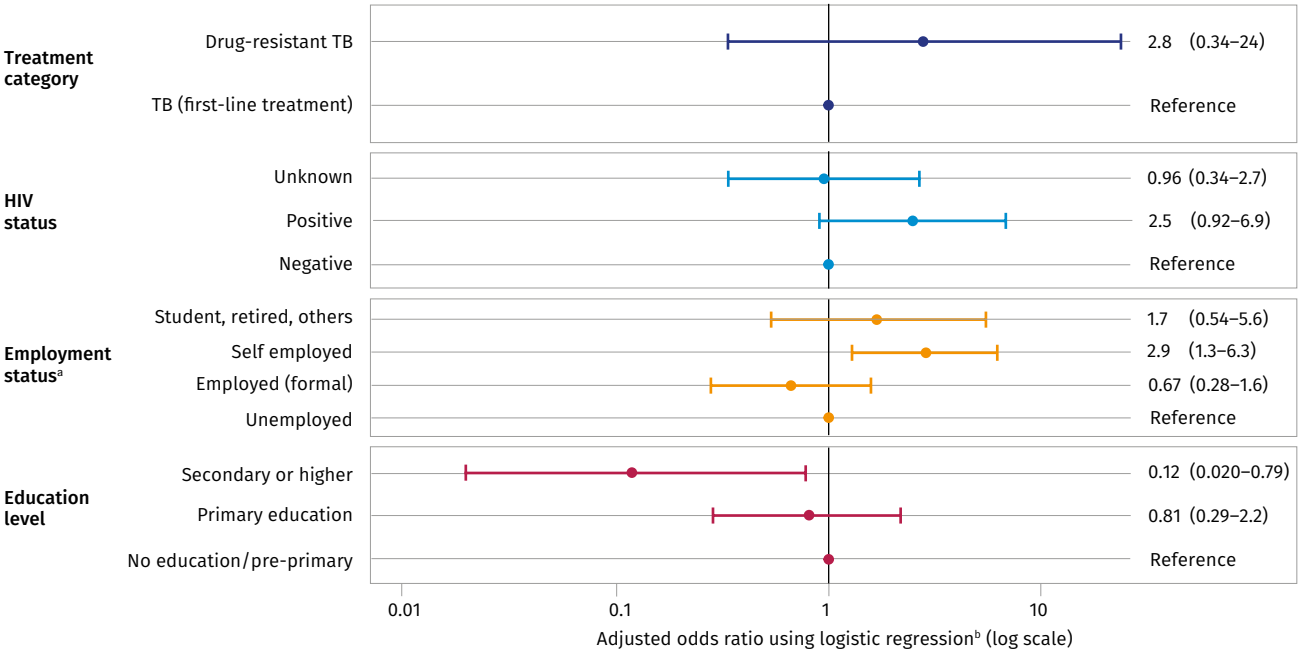
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



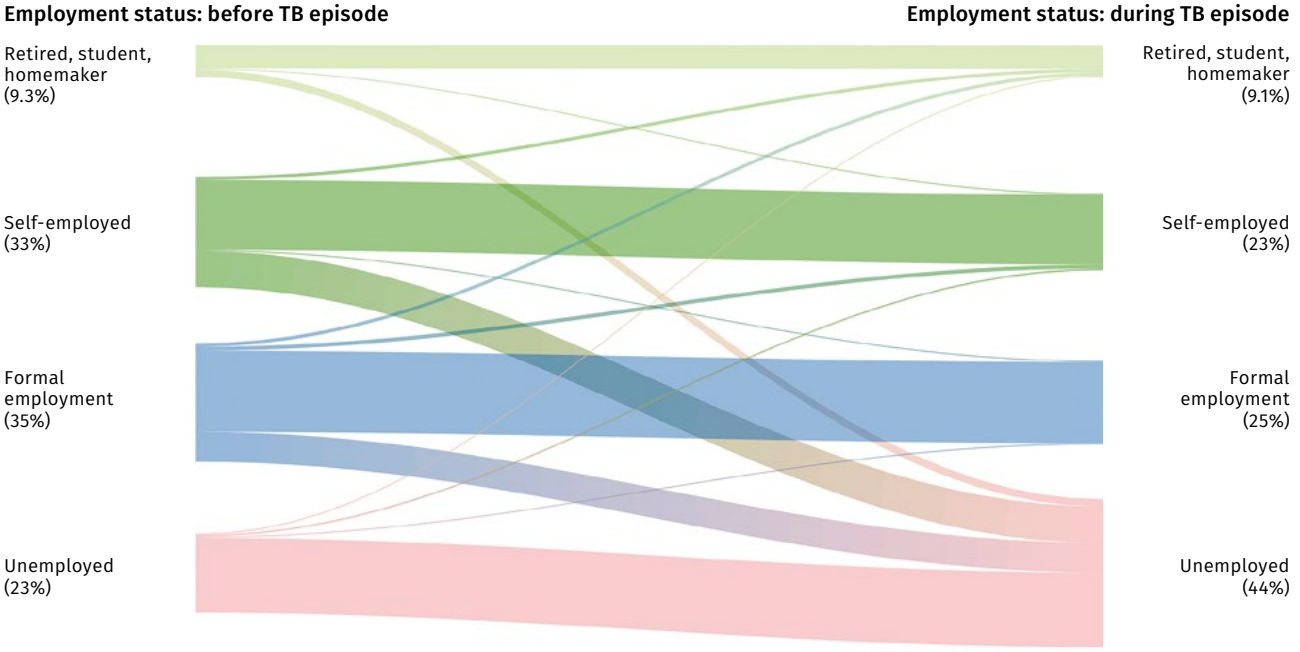
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



HIV: human immunodeficiency virus.
[a] Categories of employment status are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Improve access, quality and integrated work of HIV and TB programmes.	Direct medical and nonmedical expenditures
	Expand access to vitamin B6 (pyridoxine) to all those using ethambutol and isoniazid.	
	Expand the diagnosis and treatment of TB infection in people living with HIV.	
	Improve the quality of TB care and patient support.	Direct nonmedical expenditures and indirect costs
Wider health sector	Expand and improve TB services in primary health centres, including enhancing the capacity of health care professionals to diagnose and treat people with TB, and those living with HIV.	Direct medical and nonmedical expenditures
Non-health sector	Distribute food baskets and transportation vouchers to meet the specific needs of patients with TB.	Direct nonmedical expenditures and indirect costs
	Make TB an eligibility criterion (along with income) to allow more people to receive cash transfer benefits.	
	Expand national social insurance to include vulnerable TB patients – the SUS and SUAS currently apply conditionalities that limit access to these programmes.	
	Expand existing social protection interventions for patients with TB.	Indirect costs
	Strengthen the enforcement of legislation related to social protection and expand intersectoral collaborations to ensure that both the self-employed and employed are protected from job licensure or losses if affected by TB.	

HIV: human immunodeficiency virus; SUAS: National Social Assistance System; SUS: Unified Health System.

Dissemination

Event

- Presentation of the results of the First National tuberculosis (TB) patient cost survey to the entities involved in the study (i.e. Ministry of Health, World Health Organization, United States and Brazil Centers for Disease Control and Prevention, and the Universidade Federal do Espírito Santo) in Brazil, October 2021.
- *International seminar on tuberculosis and social determinants: facing the catastrophic costs to end TB*, organised by Secretaria de Vigilancia em Saude, Ministry of Health, Brazil, 29 March 2022.

Publication

- Maciel ELN, Negri LSA, Guidoni LM, Fregona GC, Sanchez MN, Moreira ASR et al. The economic burden of households affected by tuberculosis in Brazil: First National Survey Results, 2019–2021. PLoS One. In press, 2023.

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Burkina Faso

2020

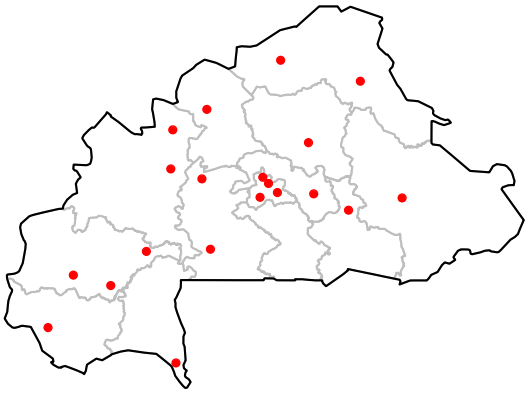
Summary statistics, national TB patient cost survey

Total number of survey participants	**465**
Number of participants by treatment category	
• TB (first-line treatment)	457
• Drug-resistant TB	8
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2020 US$[b] (95% CI)	**88 (69–111)**
• TB (first-line treatment)	87 (68–110)
• Drug-resistant TB	181 (97–338)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**54 (47–62)**
TB (first-line treatment)	54 (46–62)
Drug-resistant TB	50 (14–86)

CI: confidence interval; CFA: Communauté financière d'Afrique [African Financial Community]; XOF: CFA Franc (Burkina Faso).

[a] Geometric mean.

[b] The analysis of the survey used an exchange rate of US$ 1 = 585 XOF, which was the rate on 1 January 2020.



Distribution of surveyed clusters (N=20)

• Surveyed cluster

Survey timeline

Initiation of preparation	June 2018
Ethics approval	February 2019
Data collection	February–April 2020
Official dissemination event	October 2021
Publication of survey report	–

Key people

NAME	ROLE	ORGANIZATION
Adjima Combary	Primary investigator	NTP, Burkina Faso
Abdramane Berthe	Survey coordinator	INSP, Muraz Center, Burkina Faso
Adama Diallo	Data manager and analyst	NTP, Burkina Faso
Salifou Ouedraogo	Field team leader	NTP, Burkina Faso
Désiré Lucien Dahourou	Field team leader	IRSS, Burkina Faso
Hervé Jean-Louis Guéné	Field team leader	NISD, Burkina Faso
Richard Bakyono	National technical assistance	INSP, National Population Health Observatory, Burkina Faso
Laurent Moyenga	Technical assistance	WHO, Burkina Faso
Inés Garcia Baena	Technical assistance	WHO GTB
Samia Laokri	Technical assistance	WHO GTB
Peter Nguhiu	Technical assistance	WHO GTB
Andrea Pantoja	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; INSP: National Institute of Public Health; IRSS: Research Institute of Health Sciences; NISD: National Institute of Statistics and Demography; NTP: National Tuberculosis Programme; WHO: World Health Organization.

Organization and financing

Implementation agencies

The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund); World Health Organization (WHO) Country Office for Burkina Faso

Total budget: US$ 73 670

Funding sources

Global Fund; National Tuberculosis (TB) Programme, Ministry of Health, Burkina Faso; WHO Country Office for Burkina Faso

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	21	2020
GDP per capita (current US$)	858	2020
Life expectancy at birth (years)	62	2020
Cause and number of deaths (top 3 and TB)		2019
1. Neonatal condition	18 414	
2. Lower respiratory infections	16 807	
3. Malaria	14 602	
18. TB	1 968	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	34%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	62%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	14%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.10	2020
UHC service coverage index (worst 0–100 best)	43	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	3.1%	2014
Population with household spending on health >25% of total household budget	0.42%	2014

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	9 600 (6 200–14 000)	2020
HIV-positive	750 (480–1 100)	2020
TB incidence rate (new cases per 100 000 population per year)		
Total	46 (30–66)	2020
HIV-positive	3.6 (2.3–5.2)	2020
TB treatment coverage	59% (41–92%)	2020
TB notifications		
Total new and relapse cases notified	5 691	2020
Percentage of new cases with MDR/RR-TB	1.2 (0.85–1.6)	2020
Treatment success rate		
New and relapse cases	81%	2019
Previously treated cases	65%	2019
HIV-positive TB cases	67%	2019
MDR/RR-TB cases	72%	2018
National TB budget	US$ 6.6 million	2020

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		TB diagnostics (microscopy or Xpert MTB/RIF) are fully subsidized nationwide if undertaken before notification, with the exception at the reference center which charges 500 XOF (US$ 0.85[a])
Social support schemes for TB patients	Food	Available to	All drug-resistant TB patients
		Amount	44 500 XOF (US$ 76[a]) per month
		Duration	During treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	Necessary amount to transfer from patient's residence to a designated hospital
		Duration	At the time of hospitalization
Treatment support	Intensive phase		Facility based or community based per day
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		Based on severity of clinical presentation
	Duration		As needed
	Location		Designated general hospitals (central, regional and district hospitals nationwide)
Heath service use in 2020[c]	Typical number of facility visits		
	• TB (first-line treatment)		42 visits
	• Drug-resistant TB		75 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		8 days
	• Drug-resistant TB		31 days

CFA: Communauté financière d'Afrique [African Financial Community]; XOF: CFA Franc (Burkina Faso).

[a] Current value in 2020.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of basic management units at national level, with replacement of two facilities located in areas that are inaccessible because of conflict (Titao district in the North) and one facility that had no patients on TB treatment (Karangasso Vigue in Haut Bassins)
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions for sample size calculation	
Estimated proportion	60%
Absolute precision	6%
Design effect	2
Sample size	460
Clusters	
Number	20 clusters (zones)
Size	23 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and Ona (Ona Systems Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	R 4.0.2 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach based on reported income

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	457	100	8	100	465	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	122	27	5	63	127	27
Male	335	73	3	38	338	73
Age group (years)						
0–14	9	2	1	13	10	2.2
15–24	45	10	1	13	46	10
25–34	115	25	1	13	116	25
35–44	129	28	1	13	130	28
45–54	73	16	3	38	76	16
55–64	49	11	1	13	50	11
≥65	37	8.1	0	0	37	8
Education level						
No education	251	55	3	38	254	55
Primary education	98	21	3	38	101	22
Secondary or higher	108	24	2	25	110	24
Insurance status[b]						
None	453	99	8	100	461	99
With insurance	4	0.88	0	0	4	0.86
Household size, median (min–max)	4 (1–27)		6 (1–11)		4 (1–27)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	234	51	3	38	237	51
Continuation phase	223	49	5	63	228	49
HIV status						
Positive	21	4.6	0	0	21	4.5
Negative	327	72	4	50	331	71
Unknown	109	24	4	50	113	24
Type of TB						
Bacteriologically confirmed pulmonary TB	342	75	5	63	347	75
Clinically diagnosed pulmonary TB	84	18	1	13	85	18
Extrapulmonary TB	29	6.4	2	25	31	6.7
Diagnostic delay (>4 weeks)[c]	181	88	3	100	184	88
Treatment support						
Self-administered	145	32	0	0	145	31
Directly observed therapy	308	68	8	100	316	69

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in French) “Do you have health insurance?”. The options were “no” and “yes”.

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	50 (35–71)	78 (30–203)	50 (35–71)
Household	137 (100–187)	243 (189–313)	138 (102–188)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	16 (11–23)	25 (10–62)	16 (11–23)
Household	54 (36–81)	145 (120–176)	55 (37–81)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	48 (43–53)	75 (11–97)	49 (44–54)
Yes	51 (46–56)	25 (3.3–89)	51 (45–56)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	36 (26–47)	13 (1.0–54)	36 (26–47)
At the interview	47 (38–57)	38 (11–68)	47 (38–57)

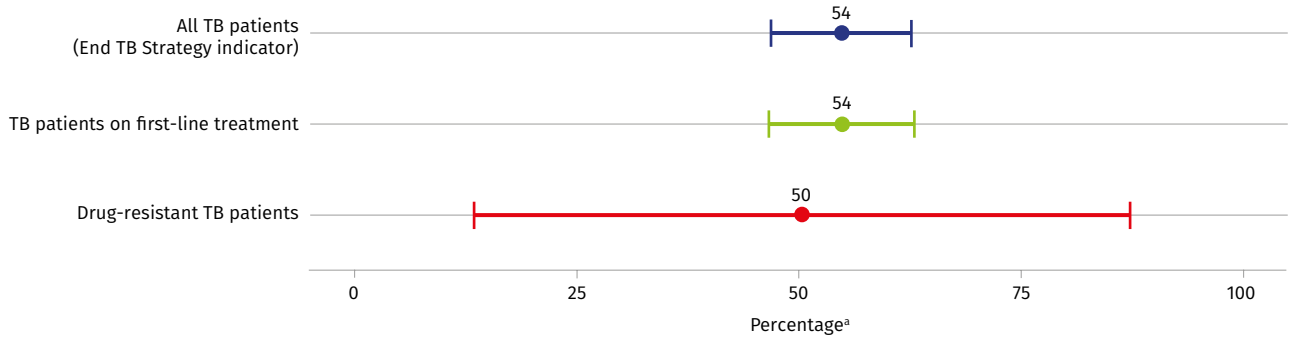
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2020.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	26	17–37	0	NA	26	17–36
Sales of assets	25	15–36	0	NA	24	15–35
Any of above	40	28–54	0	NA	40	27–53
SOCIAL CONSEQUENCES						
Food insecurity	20	9.3–34	12	1.0–54	20	9.3–34
Divorce/separation	2.4	0.70–5.1	0	NA	2.4	0.68–5.0
Job loss	29	18–41	12	1.0–54	28	18–40
Interrupted schooling	3.5	1.8–5.7	0	NA	3.4	1.8–5.6
Social exclusion	7.4	3.0–14	0	NA	7.3	2.9–14
Any of above	48	34–62	25	8.1–47	48	34–62
SOCIAL SUPPORT						
Sick leave	0.22	<0.01–0.92	0	NA	0.22	<0.01–0.91
Social welfare	0.22	<0.01–0.93	0	NA	0.22	<0.01–0.92
Other	2.0	0.16–5.8	0	NA	1.9	0.16–5.6
Any of above	2.6	0.55–6.2	0	NA	2.6	0.55–6.0

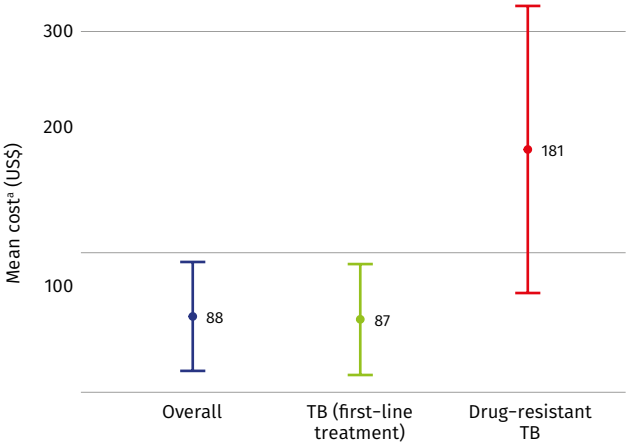
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2020 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

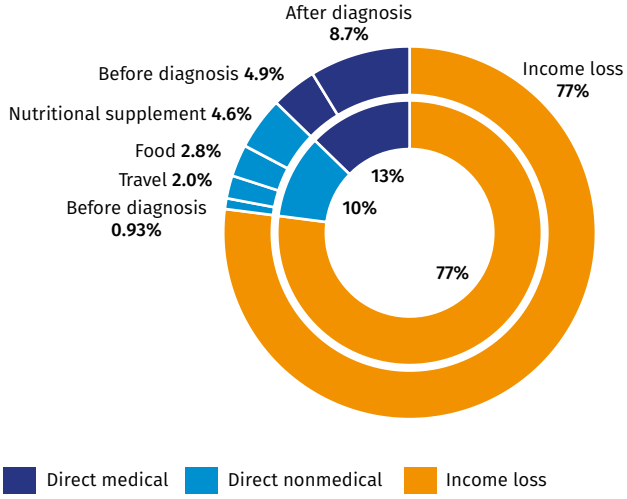
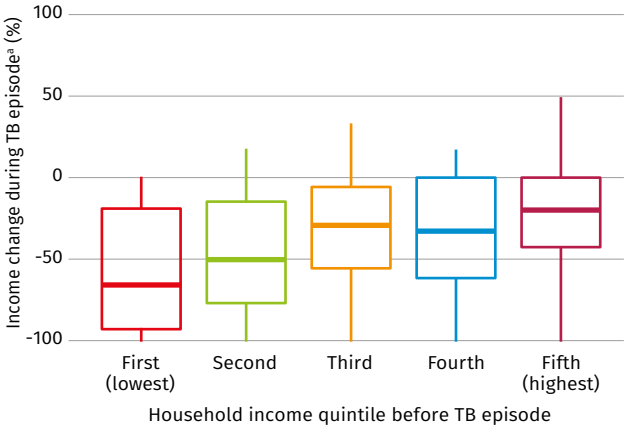
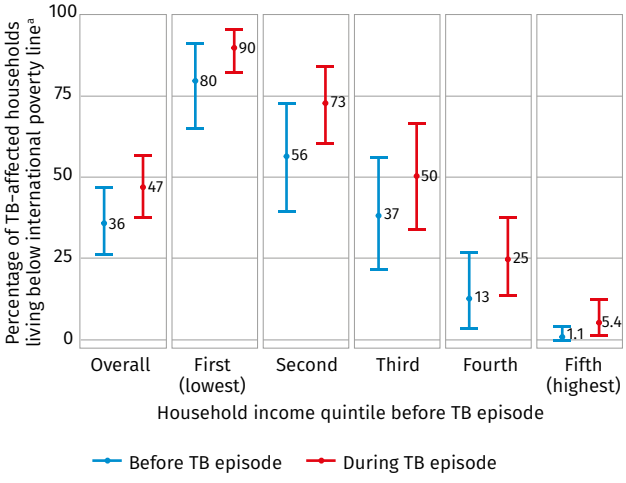


Fig. 4. Changes in distribution of monthly self-reported household income



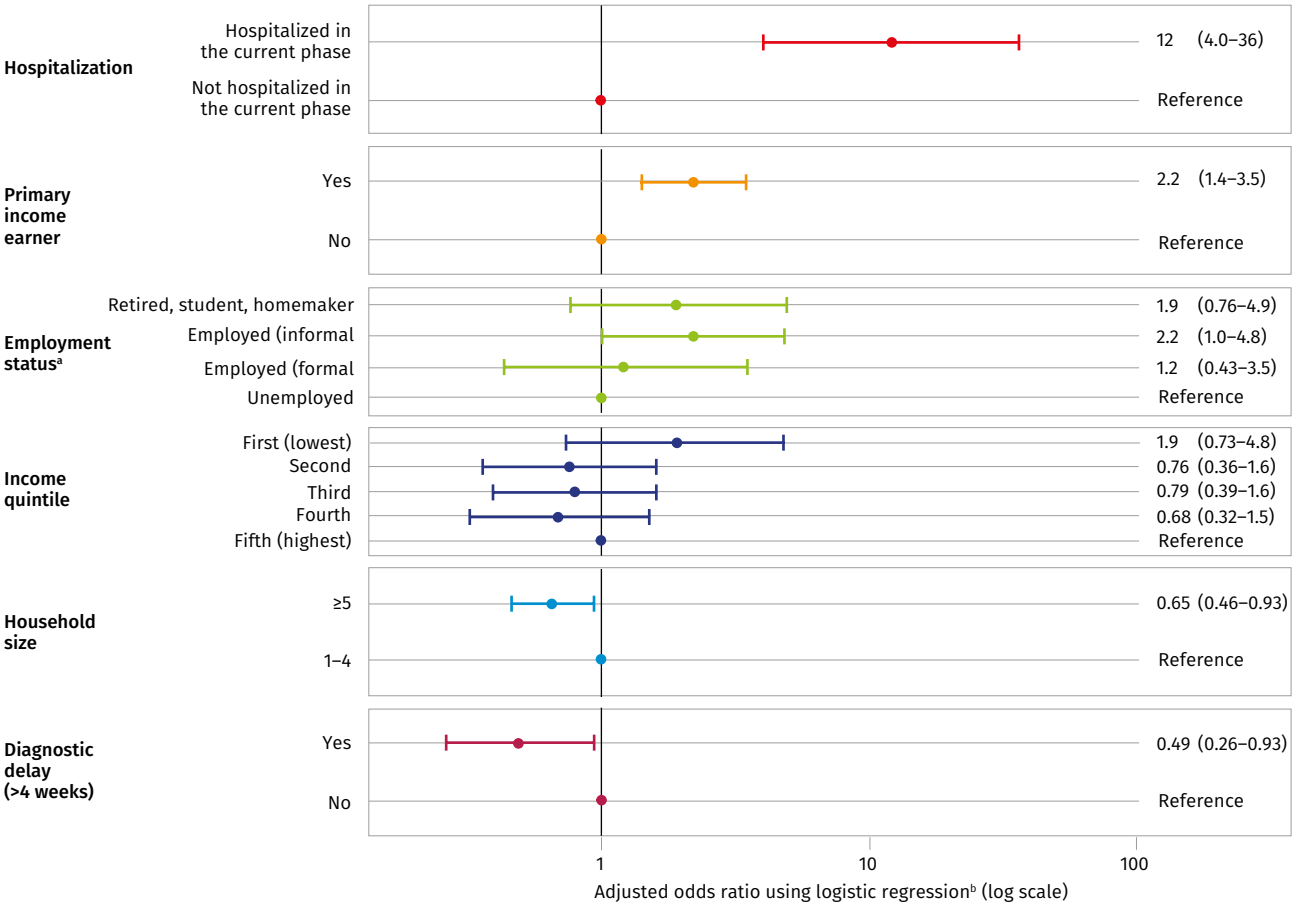
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

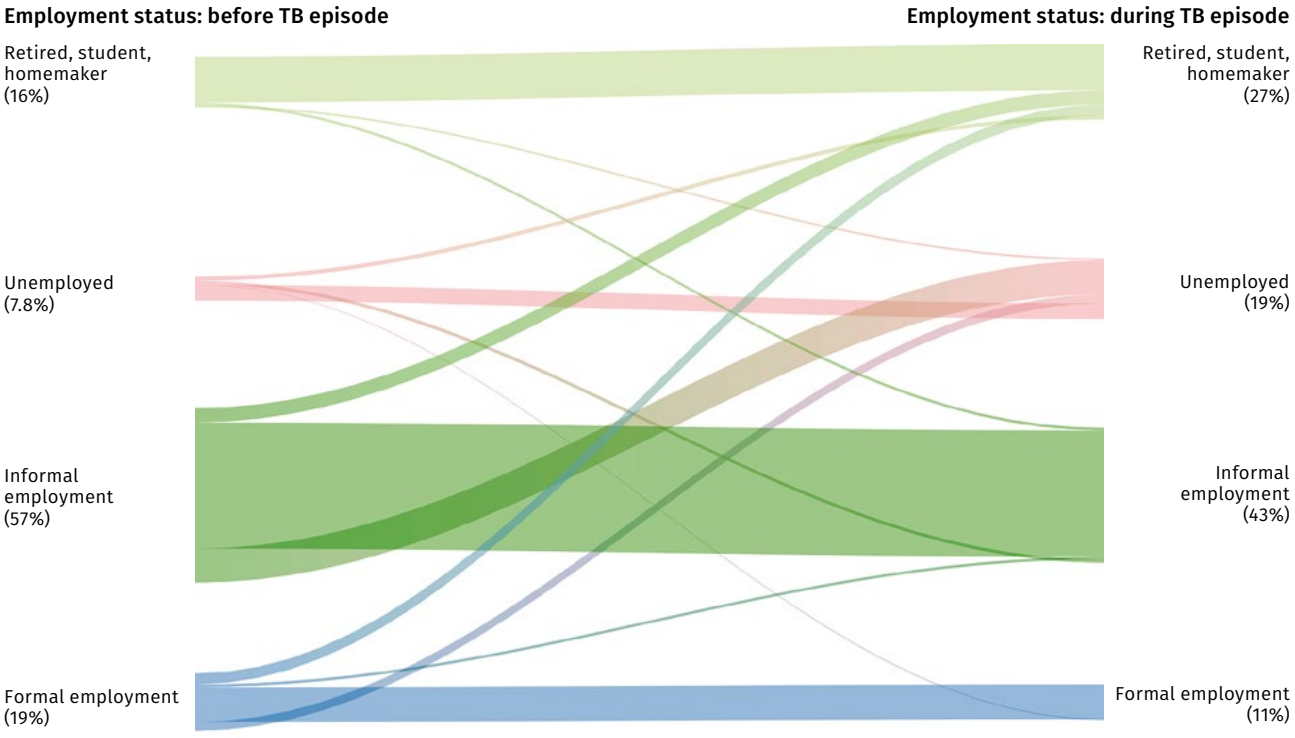
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

[b] Error bars represents 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Minimize diagnostic and treatment delays to ensure that patients are notified early in the course of their disease and that there is effective continuation of care.	Direct medical expenditures
	Expand and deliver effective financial protection for health (health system reform).	
	Expand free TB care to patients with presumptive TB to cover pre-diagnosis medical costs.	
	Review hospitalization policies to allow for care at lower-level facilities upon stabilization (e.g. patient-centred care and decentralization of TB services).	
	Expand patient support (including travel vouchers and food support) for patients with drug-resistant TB.	Direct nonmedical expenditures
	Implement patient support for all TB patients regardless of drug resistance status.	
Wider health sector	Operationalize the national health or social insurance systems.	Direct medical expenditures
Non-health sector	Advocate for a review of workplace policies and disability protection, to promote activities that generate income for people who are disabled.	Indirect costs
	Pilot and assess support beyond treatment (post-treatment socio-economic recovery) aimed at minimizing long-term undesired effects on TB-affected households and contributing to patients being able to return to employment.	

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey at the Union World Conference on Lung Health 2021, 9–22 October 2021 by Dr. Adama Diallo (https://wclh2021.abstractserver.com/eposter/#/viewer/551).

Publication

- Diallo A, Combary A, Bakyono R, Guene H, Ouedraogo S. A 2020 baseline assessment for the monitoring of the End TB indicator of catastrophic costs in Burkina Faso. Int J Tuberc Lung Dis. 2022;26(10):970–7 (https://pubmed.ncbi.nlm.nih.gov/36163665/).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Democratic Republic of the Congo

2019

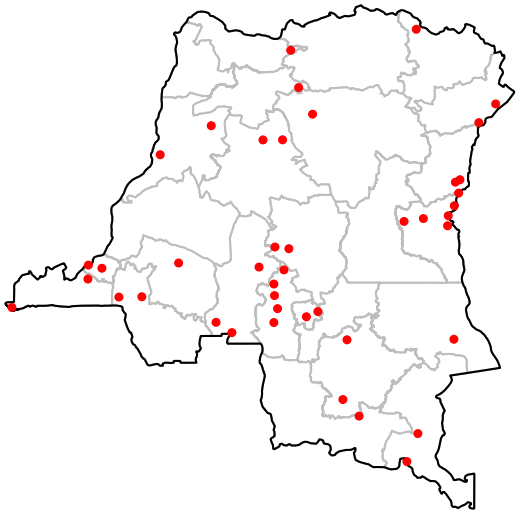
Summary statistics, national TB patient cost survey

Total number of survey participants	
Number of participants by treatment category	1108
• TB (first-line treatment)	911
• Drug-resistant TB	197
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2019 US$[b] (95% CI)	
Total cost by treatment category	231 (184–289)
• TB (first-line treatment)	181 (146–224)
• drug-resistant TB	700 (454–1079)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	56 (50–63)
• TB (first-line treatment)	51 (44–58)
• Drug-resistant TB	80 (67–91)

CDF: Congolese Franc (Democratic Republic of the Congo); CI: confidence interval.

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 1653 CDF, which was the average of the period from 23 August to 22 October 2019.



Distribution of surveyed clusters (N=43)

• Surveyed cluster

Survey timeline

Initiation of preparation	June 2018
Ethics approval	May 2019
Data collection	August–October 2019
Official dissemination event	March 2021
Publication of survey report	September 2020

Key people

NAME	ROLE	ORGANIZATION
Georges Minga	Principal investigator and survey coordinator	WHO, Democratic Republic of the Congo
Nicolas Nkiere	Supervisor and investigator	WHO, Democratic Republic of the Congo
Eloko Eya Matangelo	Investigator	PNCNS, Democratic Republic of the Congo
Alain Iyeti	Investigator	DOH, Democratic Republic of the Congo
Robin Miteo	Investigator	DOH, Democratic Republic of the Congo
Michel Kaswa	Investigator	PNLT, Democratic Republic of the Congo
Michel Mingiele	Field team leader	PNCNS, Democratic Republic of the Congo
Eddy Mongani Mpotongwe	Field team leader	PNCNS, Democratic Republic of the Congo
Judier Diala	Field team leader	PNLT, Democratic Republic of the Congo
Gertrude Lay Ofali	Field team leader	PNLT, Democratic Republic of the Congo
Fondacero Teto	Field team leader	PNLT, Democratic Republic of the Congo
Patrick Tshey	Field team leader	PNLT, Democratic Republic of the Congo
Mingiedi Boaz	Statistician	INS, Democratic Republic of the Congo
Inés Garcia Baena	Technical assistance	WHO GTB
Peter Nguhiu	Technical assistance	WHO GTB

DOH: Department of Health; GTB: Global Tuberculosis Programme; INS: National Institute of Statistics, Ministry of Planning; PNCNS: Ministry of Public Health, National Health Accounts Programme; PNLT: National Tuberculosis Programme; WHO: World Health Organization.

Organization and financing

Implementation agency

World Health Organization (WHO) Country Office for Democratic Republic of the Congo

Total budget: US$ 196 819

Funding sources

The Global Fund to Fight AIDS, Tuberculosis and Malaria; National Tuberculosis (TB) Programme, Democratic Republic of the Congo; WHO Country Office for Democratic Republic of the Congo

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	87	2019
GDP per capita (current US$)	581	2019
Life expectancy at birth (years)	61	2019
Cause and number of deaths (top 3 and TB)		2019
1. Neonatal condition	86 324	
2. Lower respiratory infections	73 546	
3. TB	43 759	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	77%	2012
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	91%	2012
SDG 2: Zero hunger		
Prevalence of undernourishment	42%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.21	2019
UHC service coverage index (worst 0–100 best)	39	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	4.8%	2012
Population with household spending on health >25% of total household budget	0.61%	2012

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	278 000 (180 000–397 000)	2019
HIV-positive	30 000 (19 000–42 000)	2019
TB incidence rate (new cases per 100 000 population per year)		
Total	320 (207–457)	2019
HIV-positive	34 (22–49)	2019
TB treatment coverage	64% (45–99%)	2019
TB notifications		
Total new and relapse cases cases notified	178 527	2019
Percentage of new cases with MDR/RR-TB	1.8 (1–3.2)	2017
Treatment success rate		
New and relapse cases	92%	2019
Previously treated cases	71%	2019
HIV-positive TB cases	63%	2019
MDR/RR-TB cases	84%	2018
National TB budget	US$ 44 million	2019

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • Hospitalization for drug-resistant TB patients		Initial TB diagnostics (microscopy, Xpert MTB/RIF) requires disbursements by patients
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	99 180 CDF (US$ 60[a]) monthly
		Duration	9 or 20 months, depending on the duration of second-line treatment (short or long regimen)
	Food	Available to	All drug-resistant TB patients after 2020
		Amount	45 590 CDF (US$ 30[a]) monthly
		Duration	During treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	Necessary amount to transfer from patient's residence to a designated hospital
		Duration	At the time of hospitalization
Treatment support	Intensive phase		Facility based, 2 months
	Continuation phase		Community based, 4 months
Hospitalization[b]	Eligibility		Drug-resistant TB patients
	Duration		30 days
	Location		Designated general hospitals (393 hospitals nationwide)
Health service use in 2019[c]	Typical number of facility visits		
	• TB (first-line treatment)		77 visits
	• Drug-resistant TB		150 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		30 days
	• Drug-resistant TB		120 days

CDF: Congolese Franc (Democratic Republic of the Congo).

[a] Current value in 2019.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of 516 districts at national level excluding 42 districts in conflict areas
Patient enrolment	• Consecutive enrolment of eligible patients on first-line drug treatment attending health facilities • All eligible patients with drug-resistant TB attending health facilities
Assumptions for sample size calculation	
Estimated proportion	30%
Absolute precision	5%
Design effect	2
Sample size	1118
Clusters	
Number	43 clusters (zones) in 21 different provinces
Size	26 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Mixed electronic (tablet-based), ODK collect app (Get ODK Inc.) and paper-based questionnaire
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 15.0 (StataCorp) and R 4.0.1 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported annual household consumption
Estimates for indirect costs	Human capital approach (based on lost time and hourly wage rate) Hourly wage: 814 CDF (US$ 0.49[a]) – national minimum wage[b]

CDF: Congolese Franc (Democratic Republic of the Congo).

[a] Current value in 2019.

[b] Data source: Kimona Bononge. Fédération des Entreprises du Congo [website] (http://www.fec-rdc.com/index.php/actualites/24-actualite1/218-communique-application-du-smig, accessed 2 March 2021).

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	911	100	197	100	1 108	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	373	40	75	38	448	40
Male	538	59	122	62	660	60
Age group (years)						
0–14	46	5.1	8	4.1	54	4.9
15–24	164	18	33	17	197	18
25–34	224	25	45	23	269	24
35–44	186	20	42	21	228	21
45–54	141	15	31	16	172	16
55–64	88	9.7	16	8.1	104	9.4
≥65	62	6.8	22	11	84	7.6
Education level						
No education	161	18	30	15	191	17
Primary education	291	32	52	26	343	31
Secondary or higher	459	50	115	58	574	52
Insurance status[b]						
None	850	93	185	94	1 035	93
Mutual Health Insurance (community-based)	31	3.4	6	3.1	37	3.3
Employer-based medical scheme	17	1.9	3	1.6	20	1.8
Civil servants' scheme	7	0.77	0	0	7	0.63
Other private insurance	1	0.11	2	1.0	3	0.27
Unknown	5	0.55	1	0.51	6	0.54
Household size, median (min–max)	6 (1–30)		6 (1–22)		6 (1–30)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	428	47	116	59	544	49
Continuation phase	483	53	81	41	564	51
HIV status						
Positive	56	6.1	33	17	89	8.0
Negative	657	72	140	71	797	72
Unknown	198	22	24	12	222	20
Type of TB						
Bacteriologically confirmed pulmonary TB	742	81	150	76	892	81
Clinically diagnosed pulmonary TB	105	12	27	14	132	12
Extra pulmonary TB	64	7.0	20	10	84	7.6
Diagnostic delay (>4 weeks)[c]	236	56	57	51	293	55
Treatment support						
Self-administered	435	48	74	38	509	46
Directly observed therapy	475	52	123	62	598	54

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in French) "Do you have any of the following health insurance types?". The options were "none", "mutual health insurance (community based)", "employer-based medical scheme", "civil servants scheme" and "other private insurance".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	16 (11–22)	21 (13–36)	17 (12–23)
Household	39 (27–55)	61 (41–92)	42 (30–59)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	8.0 (5.2–12)	10 (6.2–17)	8.4 (5.6–13)
Household	22 (14–35)	38 (25–58)	24 (16–37)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	50 (44–57)	44 (35–53)	49 (43–55)
Yes	50 (43–56)	56 (47–65)	51 (45–57)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW THE POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	84 (79–89)	79 (70–87)	83 (79–88)
At the interview	95 (93–97)	92 (87–97)	95 (92–97)

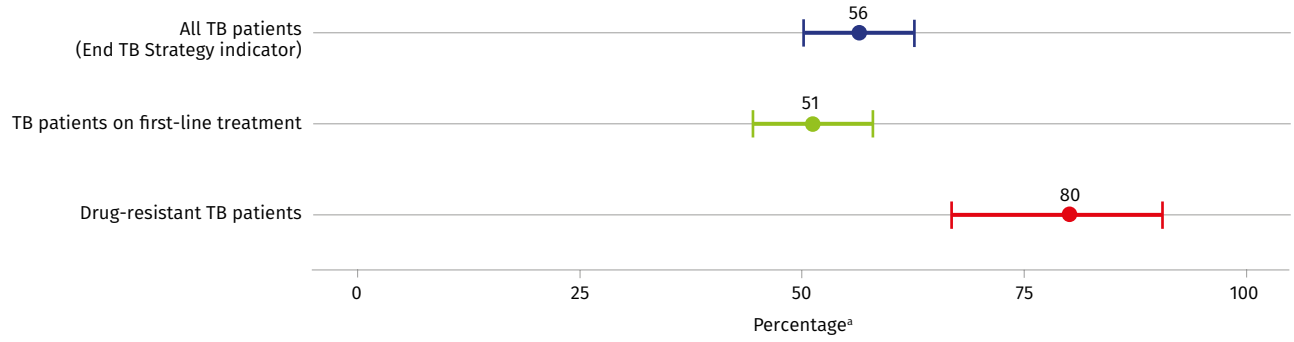
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2019.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	29	24–35	37	27–46	31	25–36
Sales of assets	19	15–23	15	9.0–23	18	15–22
Any of above	48	41–56	52	42–62	49	42–56
SOCIAL CONSEQUENCES						
Food insecurity	47	37–57	52	41–64	48	39–58
Divorce/separation	3.3	2.1–4.8	8.7	3.9–15	4.3	2.7–6.1
Job loss	23	15–32	24	15–33	23	16–31
Interrupted schooling	7.9	5.2–11	7.4	3.8–12	7.9	5.3–11
Social exclusion	13	8.4–19	12	6–21	13	8.4–19
Any of above	100	NA	100	NA	100	NA
SOCIAL SUPPORT						
Sick leave	0.55	0.12–1.3	0.49	<0.01–2.1	0.54	0.16–1.2
Social welfare	0.43	0.11–0.97	1.0	0.091–3.0	0.54	0.20–1.0
TB-specific support	0.56	0.061–1.6	0.51	<0.01–2.0	0.55	0.10–1.4
Other	1.2	0.42–2.3	1.0	0.089–3.0	1.2	0.44–2.2
Any of above	3.2	1.6–5.3	4.6	1.8–8.6	3.4	1.9–5.4

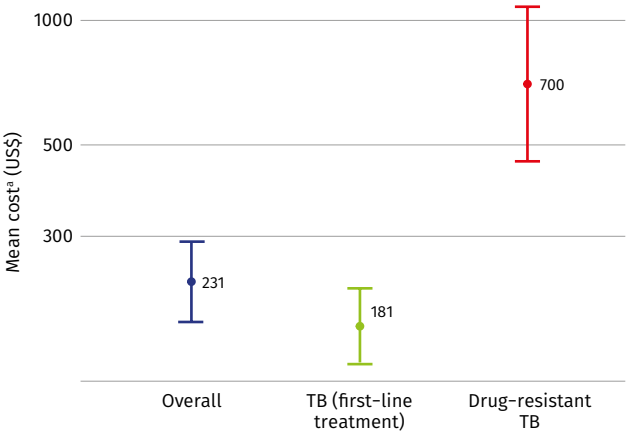
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2019 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

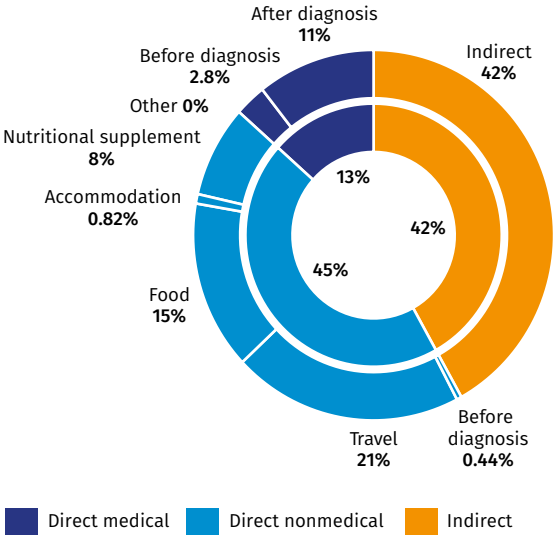
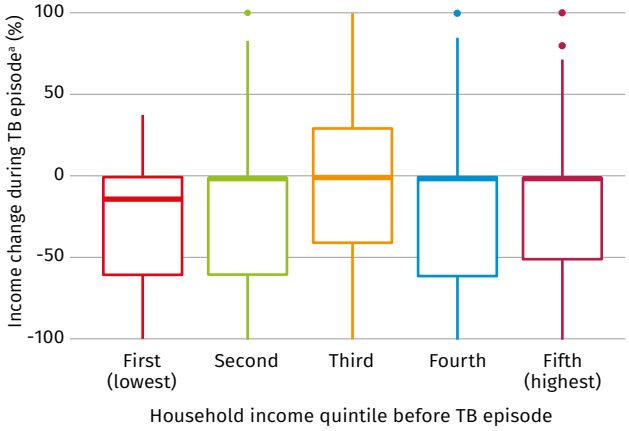
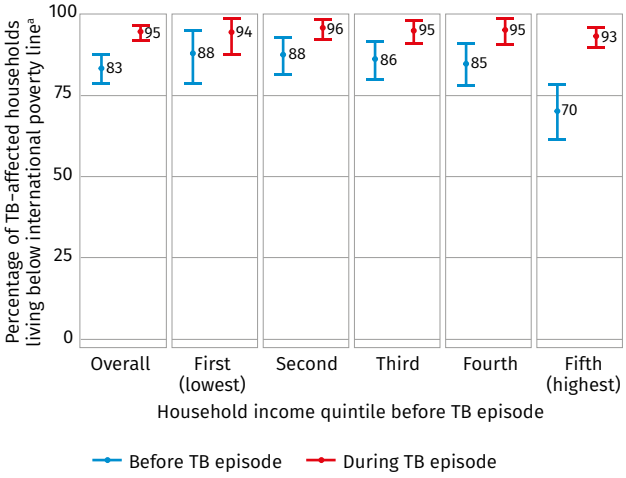


Fig. 4. Changes in distribution of monthly self-reported household income



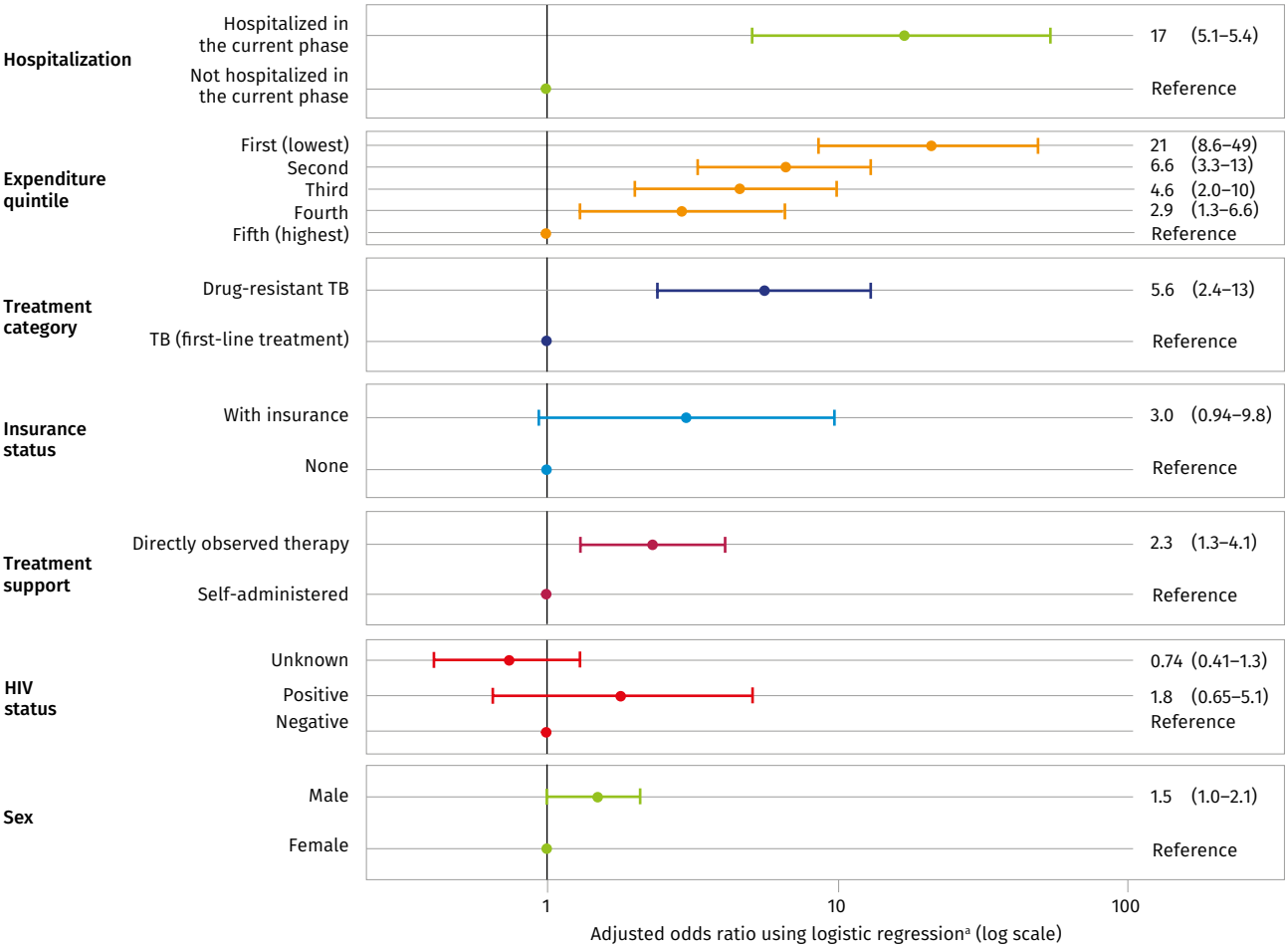
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

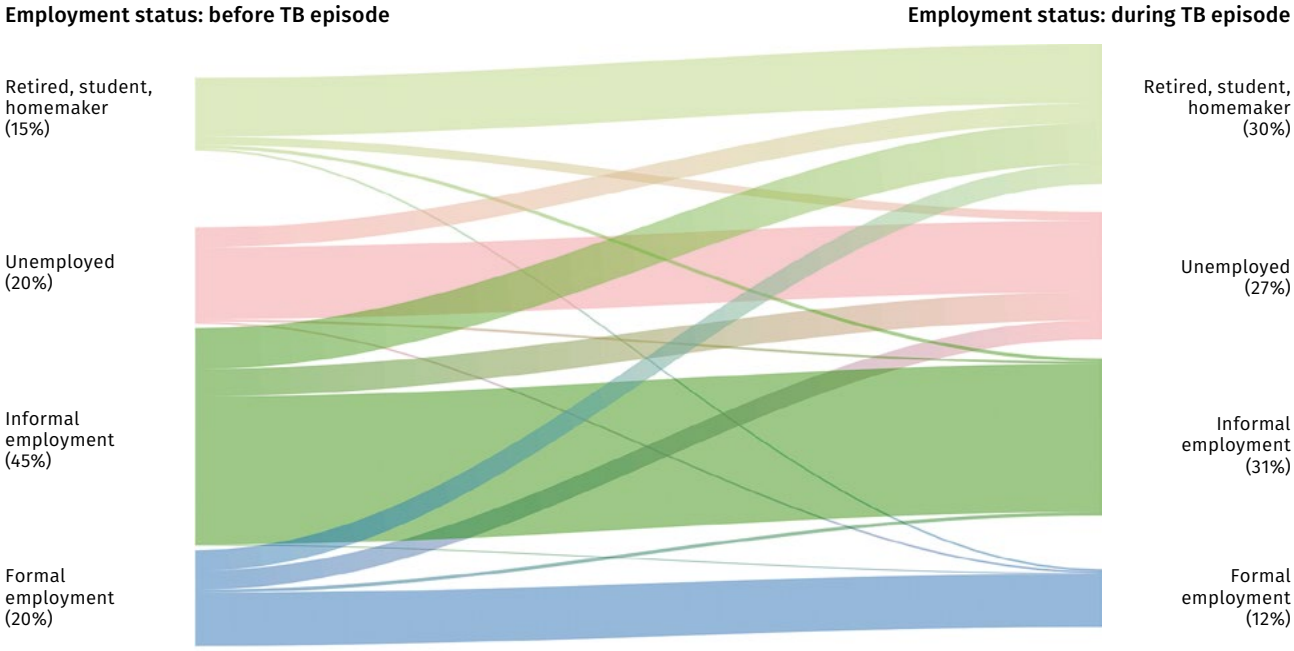
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



HIV: human immunodeficiency virus.

[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Minimize diagnostic delays and shorten patient journeys by expanding access to quality services for TB diagnosis; for example, by promoting rapid molecular testing and providing diagnostic services at the community level and in the workplace.	Direct nonmedical expenditures and indirect costs
	Minimize time spent for visits for treatment or collection of drugs by improving treatment support at community level and in the workplace.	
	Expand patient support (including travel vouchers and food support) beyond the 7.5% covered in the survey.	Direct nonmedical expenditures
Wider health sector	Establish a mechanism for simplified reimbursement for medical costs incurred by people with TB.	Direct medical expenditures
	Secure free health coverage for the most vulnerable TB-affected households.	
Non-health sector	Protect the employment of people with TB through legislation to prevent dismissals from work.	Indirect costs
	Facilitate access to sick leave for treatment.	
	Enhance collaboration with workers unions and businesses to improve workplace policies and services.	

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Democratic Republic of the Congo, 24 March 2021.

Publication

- Kaswa M, Minga G, Nkiere N, Mingedi B, Eloko G, Nguhiu P, Garcia Baena I. The economic burden of TB-affected households in Democratic Republic of the Congo: results of first national survey, 2019. Int J Tuberc Lung Dis. 2021;25(11):923–32 (https://doi.org/10.5588/ijtld.21.0182).
- Global TB report 2020. Geneva: World Health Organization; 2020: 154–5 (https://www.who.int/publications/i/item/9789240013131) – see the National surveys of costs faced by TB patients and their households in the Democratic Republic of the Congo (Box 8.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Fiji

2017

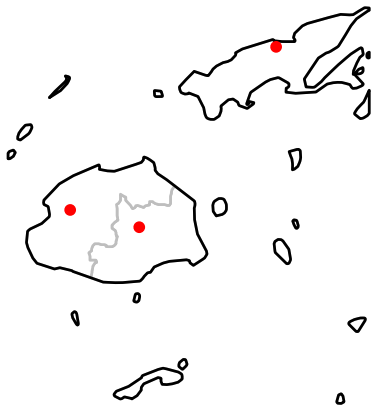
Summary statistics, national TB patient cost survey

Total number of survey participants	**227**
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2017 US$[b] (95% CI)	**311 (245–394)**
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**40 (33–46)**

CI: confidence interval; FJD: Fiji Dollar (Fiji).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 2.1 FJD, which was the average of the period from May to December 2017.



Distribution of surveyed clusters (N=3)

• Surveyed cluster

Survey timeline

Initiation of preparation	January 2017
Ethics approval	April 2017
Data collection	May–December 2017
Official dissemination event	July 2021
Publication of survey report	–

Key people

NAME	ROLE	ORGANIZATION
Eric Rafai	Principal investigator	Ministry of Health and Medical Services, Fiji
Frank Underwood	Principal investigator	Ministry of Health and Medical Services, Fiji
Mary Daulako	Associate investigator	Ministry of Health and Medical Services, Fiji
Mere Delai	Associate investigator	Ministry of Health and Medical Services, Fiji
Vasiti Nawadra-Taylor	Associate investigator	Ministry of Health and Medical Services, Fiji
Emmilia Tuiwawa	Associate investigator	Ministry of Health and Medical Services, Fiji
Subhash Yadav	Technical assistance	WHO, Pacific Division of Technical Support, Fiji
Fukushi Morishita	Technical assistance	WHO WPRO
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB
Kerri Viney	Technical assistance	Karolinska Institutet, Sweden

GTB: Global Tuberculosis Programme; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agency

National Tuberculosis (TB) Programme, Ministry of Health and Medical Services, Fiji

Total budget: US$ 44 094

Funding sources

The Global Fund to Fight AIDS, Tuberculosis and Malaria; Ministry of Health and Medical Services, Fiji; World Health Organization (WHO) Regional Office for the Western Pacific (WPRO)

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	0.88	2017
GDP per capita (current US$)	6 101	2017
Life expectancy at birth (years)	67	2017
Cause and number of deaths (top 3 and TB)		2019
1. Diabetes mellitus	1 628	
2. Ischaemic heart disease	1 481	
3. Stroke	583	
26. TB	39	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	2.6%	2019
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	18%	2019
SDG 2: Zero hunger		
Prevalence of undernourishment	6.3%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.14	2017
UHC service coverage index (worst 0–100 best)	59	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	0.78%	2008
Population with household spending on health >25% of total household budget	0.11%	2008

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	450 (360–540)	2017
HIV-positive	12 (5–22)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	51 (42–61)	2017
HIV-positive	1.4 (0.58–2.5)	2017
TB treatment coverage	80% (67–98%)	2017
TB notifications		
Total new and relapse cases notified	357	2017
Percentage of new cases with MDR/RR-TB	0 (0–2.6)	2017
Treatment success rate		
New and relapse cases	81%	2017
Previously treated cases	86%	2017
HIV-positive TB cases	89%	2017
MDR/RR-TB cases	100%	2017
National TB budget	US$ 0.65 million	2018

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for all TB patients		
Social support schemes for TB patients	Transportation	Available to	All TB patients who need the support
		Amount	In-kind support. Health staff arranges transportation according to the need of patients using buses and boat services organized by the government
		Duration	During treatment
Treatment support	Intensive phase		Facility based, at least once a week
	Continuation phase		Community based, at least once a month
Hospitalization[a]	Eligibility		Patients who have been referred and come from small and outer islands
	Duration		For the duration required for the local health post to arrange medicines and the patient to return home
	Location		The national referral hospital for TB and leprosy (Tamavua Twomey Hospital)
Health service use in 2017[b]	Typical number of facility visits		
	• TB (first-line treatment)		6 visits
	• Drug-resistant TB		23 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		30 days

[a] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[b] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Total sampling with allocation of sample size at each facility proportional to the TB notification
Stratification	None
Sampling frame	All health centres providing TB services (N=3) covering 4 administrative divisions
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions	
Estimated proportion	40%
Absolute precision	4%
Design effect	1
Sample size	226
Clusters	
Number	3
Size	Size allocated proportional to the TB notification (22, 68 and 136, for each cluster respectively)
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	R 3.4.4 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	ALL TB PATIENTS	
	N	%[a]
TOTAL	227	100
DEMOGRAPHIC CHARACTERISTICS		
Sex		
Female	91	40
Male	134	59
Unknown	2	0.88
Age group (years)		
0–14	35	15
15–24	36	16
25–34	43	19
35–44	28	12
45–54	36	16
55–64	23	10
≥65	23	10
Unknown	3	1.3
Education level		
No education	13	5.7
Primary school	72	32
High school	102	45
University or higher	34	15
Unknown	6	2.6
Insurance status[b]		
None	208	92
With insurance	16	7.1
Unknown	3	1.3
Household size, median (min–max)	5 (1–30)	
CLINICAL CHARACTERISTICS		
Treatment phase		
Intensive phase	73	32
Continuation phase	153	67
Unknown	1	0.44
Treatment category		
New	213	94
Relapse	2	0.88
Retreatment	1	0.44
Unknown	11	4.9
Type of TB		
Bacteriologically confirmed pulmonary TB	113	50
Clinically diagnosed pulmonary TB	47	21
Extrapulmonary TB	65	29
Unknown	2	0.88
Diagnostic delay (>4 weeks)[c]	15	31
Treatment support		
Self-administered	81	36
Community-based directly observed therapy	66	29
Family-based directly observed therapy	77	34
Unknown	3	1.3

min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have any of the following health insurance types?". The options were "reimbursement scheme", "family/community fund", "private health insurance", "none" and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)	
Individual patient	25 (18–36)
Household	30 (21–44)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)	
Individual patient	4.8 (3.5–6.7)
Household	11 (7.7–16)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)	
No	63 (56–69)
Yes	32 (26–38)
Equal contributor	5.3 (2.7–8.6)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)	
Before onset of TB symptoms	56 (50–63)
At the interview	69 (63–75)

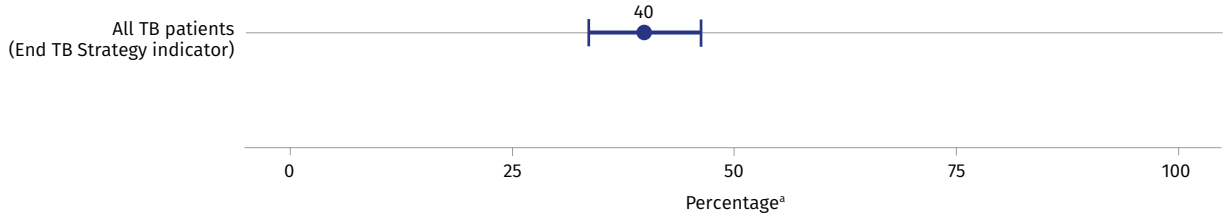
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2017.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	ALL TB PATIENTS	
	%	95% CI
COPING MECHANISMS		
Dissaving	28	23–34
Loan	11	7.6–16
Sales of assets	3.5	1.5–6.3
Any of above	34	28–41
SOCIAL CONSEQUENCES		
Food insecurity	5.3	2.7–8.6
Divorce/separation	0.44	<0.01–1.7
Job loss	2.2	0.69–4.5
Interrupted schooling	6.6	3.7–10
Social exclusion	3.5	1.5–6.3
Any of above	56	49–62
SOCIAL SUPPORT		
Sick leave	8.8	5.5–13
Vouchers	5.7	3.1–9.1

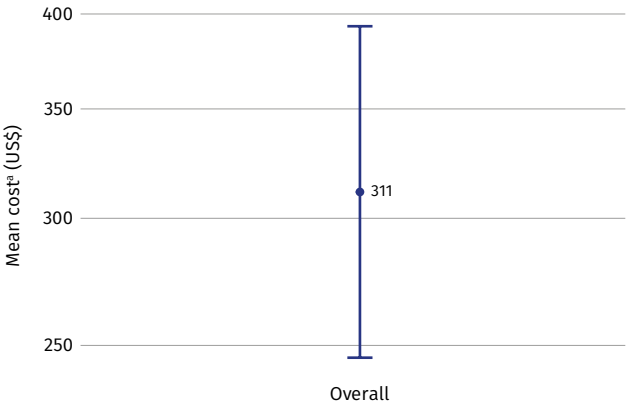
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2017 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

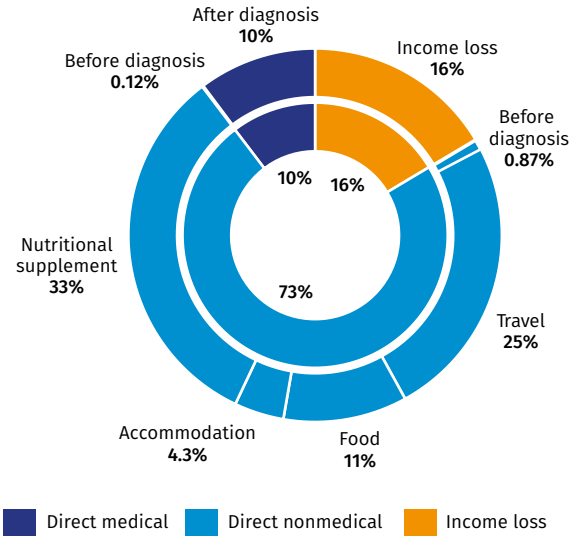
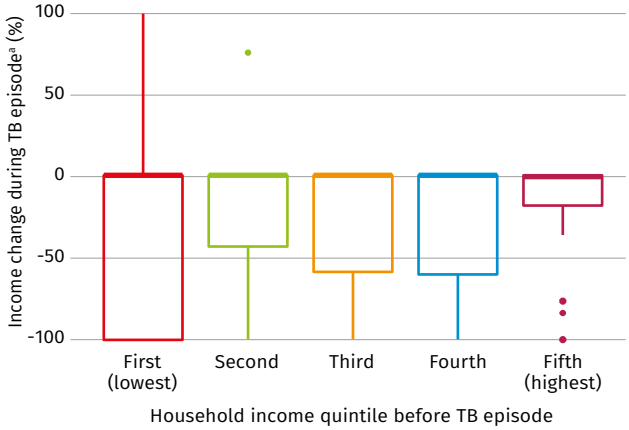
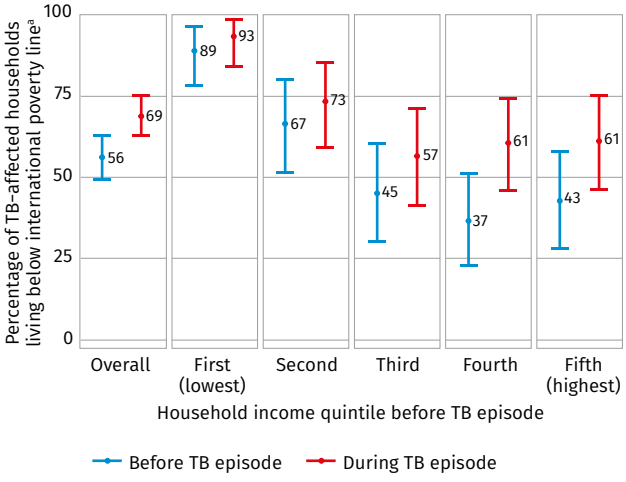


Fig. 4. Changes in distribution of monthly self-reported household income



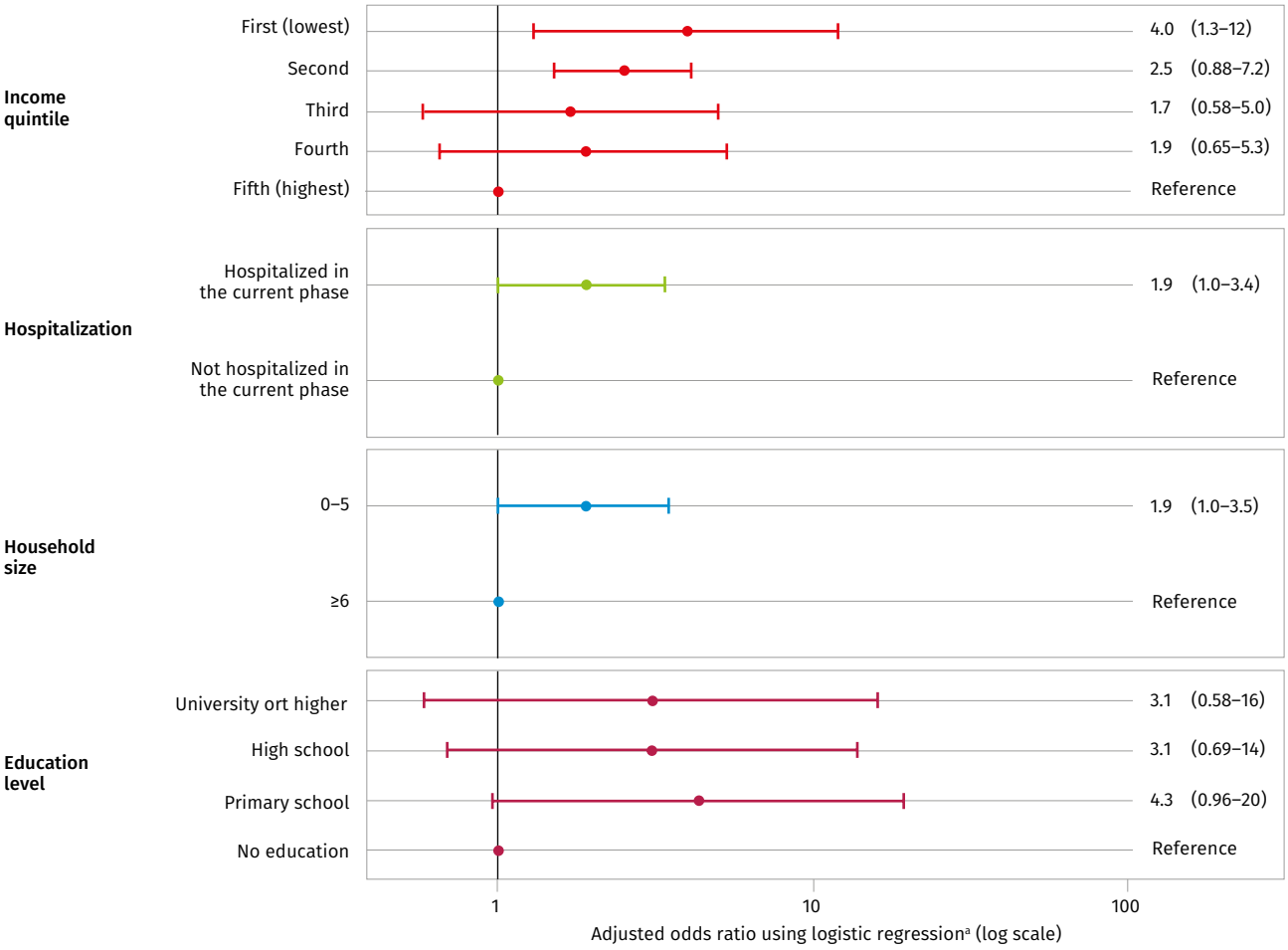
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



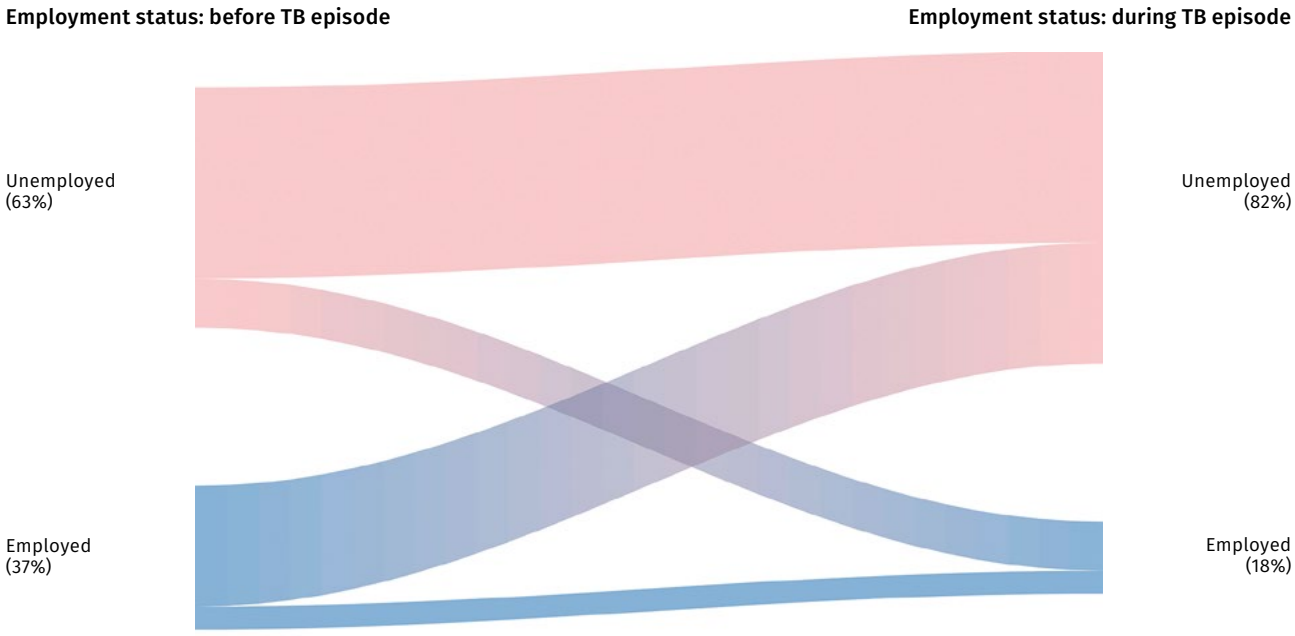
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Revisit criteria and duration of hospitalization for all TB patients (i.e. with drug-susceptible or drug-resistant TB) and promote community-based and home-based care to minimize hospitalization-related costs.	Direct medical and nonmedical expenditures
	Improve access to quality TB diagnostic services through the decentralization and streamlining of patient pathways at all levels, to minimize diagnostic delay and patient costs.	
Wider health sector	Conduct a systematic nutrition assessment, counselling, and therapeutic and supplementary feeding for those in need, to minimize costs for nutritional supplements.	Direct nonmedical expenditures
	Consider provision of TB-specific social support (e.g. an allowance, vouchers and food packages) to compensate for non-medical costs, particularly for patients with drug-resistant TB.	
Non-health sector	Work closely with the Ministry of Women, Children and Poverty Alleviation, including the Department of Social Welfare, to review criteria for their social assistance programmes in a way that covers families affected by TB.	Indirect costs
	Explore a possible collaboration with the Ministry for Employment, Productivity and Industrial Relations to improve workplace policies and services for TB patients, including a way to protect the employment of TB patients.	

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Fiji National TB Programme, Fiji, 29 and 30 July 2021.

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Ghana

2016

Summary statistics, national TB patient cost survey

Number of survey participants by treatment category	**691**
• TB (first-line treatment)	625
• Drug-resistant TB	66
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2016 US$[b] (95% CI)	**457 (384–545)**
• TB (first-line treatment)	430 (356–519)
• Drug-resistant TB	814 (561–1181)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**64 (58–69)**
• TB (first-line treatment)	63 (57–69)
• Drug-resistant TB	72 (59–84)

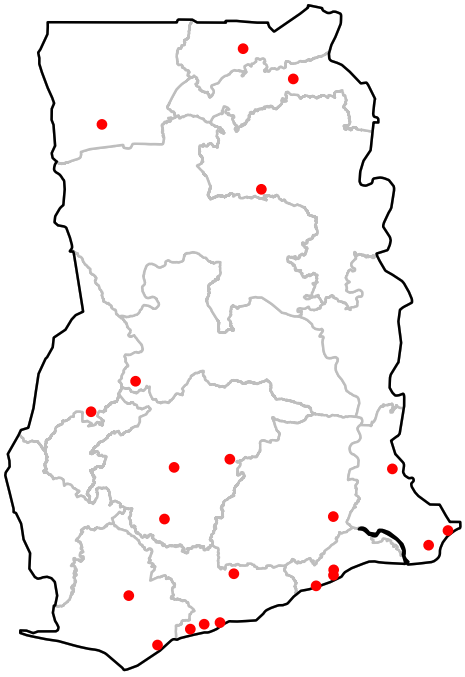
CI: confidence interval; GHS: Ghana Cedi (Ghana).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 4.2 GHS, which was the average of the period from November to December 2016.

Survey timeline

Initiation of preparation	October–December 2015
Ethics approval	October 2016
Data collection	November–December 2016
Official dissemination event	August 2018
Publication of national report	August 2018



Distribution of surveyed clusters (N=25)

• Surveyed cluster

Key people

Name	Role	Organization
Debora Pedrazzoli	Principal investigator	London School of Hygiene and Tropical Medicine
Yaw Adusi-Poku	Associate investigator	NTP, Ghana
Kwami Afutu	Associate investigator	NTP, Ghana
Zeleke Alebachew	Associate investigator	NTP, Ghana
Frank Bonsu	Associate investigator	NTP, Ghana
Nii Nortey Hanson	Associate investigator	NTP, Ghana
Margaret Gyapong	Data collection supervisor	Dodowa Health Research Centre, Ghana
Kenneth Nartey	Data collection coordinator	Dodowa Health Research Centre, Ghana
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB
Delia Boccia	Technical assistance	London School of Hygiene and Tropical Medicine
Josephine Borghi	Technical assistance	London School of Hygiene and Tropical Medicine
Rein Houben	Technical assistance	London School of Hygiene and Tropical Medicine

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Programme; WHO: World Health Organization.

Organization and financing

Implementation agency

London School of Hygiene and Tropical Medicine

Total budget: US$ 58 000

Funding source

United States Agency for International Development (USAID)

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	29	2016
GDP per capita (current US$)	1 931	2016
Life expectancy at birth (years)	63	2016
Cause and number of deaths (top 3 and TB)		2015
1. Neonatal conditions	18 738	
2. Lower respiratory infections	17 231	
3. Stroke	14 670	
7. TB	10 427	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	13%	2016
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	29%	2016
SDG 2: Zero hunger		
Prevalence of undernourishment	7.6%	2016
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.82	2016
UHC service coverage index (worst 0–100 best)	42	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	1.3%	2016
Population with household spending on health >25% of total household budget	0.11%	2016

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	44 000 (20 000–78 000)	2016
HIV-positive	10 000 (4 600–18 000)	2016
TB incidence rate (new cases per 100 000 population per year)		
Total	156 (70–275)	2016
HIV-positive	36 (16–64)	2016
TB treatment coverage	32% (18–71%)	2016
TB notifications		
Total new and relapse cases notified	14 167	2016
Percentage of new cases with MDR/RR-TB	1.5 (0.7–2.4)	2017
Treatment success rate		
New and relapse cases	85%	2016
Previously treated cases	76%	2016
HIV-positive TB cases	77%	2016
MDR/RR-TB cases	62%	2016
National TB budget	US$ 85 million	2016

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • Diagnostics and follow-up laboratory tests (chest X-ray, microscopy, Xpert MTB/RIF and culture, when applicable) • Follow-up visits • Hospitalization		• NHIA covers free premium for all confirmed TB cases • Hospitalization is fully covered by NHIS
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	500 GHS (US$ 119[a]) per month
		Duration	5 months
	Food	Available to	All TB patients
		Amount	28 sachets of fortified blended food
		Duration	2 months of intensive phase treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	100 GHS (US$ 24[a]) per month
		Duration	5 months
Treatment support	Intensive phase		Community based, daily
	Continuation phase		Community based, daily
Hospitalization[b]	Eligibility		Severely ill TB patients
	Duration		Depending on progress of the patient
	Location		In 2016 there is no admission facility for TB patients but a dedicated hospital for TB will be available
Health service utilization in 2016[c]	Typical number of facility visits		
	• TB (first-line treatment)		3 visits
	• Drug-resistant TB		22 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		90 days

GHS: Ghana Cedi (Ghana); NHIA: National Health Insurance Authority; NHIS: National Health Insurance Scheme.

[a] The US$ equivalent value presented in the table uses an exchange rate of US$ 1 = 4.2 GHS. However, the amount which was defined and agreed with the donor in 2019 applied an exchange rate of US$ 1 = 3.5 GHS.

[b] Refers to a policy that mandates/encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Single stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	216 districts across 10 regions (all regions)
Patient enrollment	Consecutive enrolment of eligible patients attending health facilities
Assumptions	
Estimated proportion	40%
Absolute precision	5%
Design effect	2
Sample size	725
Clusters	
Number	25 clusters
Size	29 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Open Data Kit (Get ODK Inc.)
Statistical software	Stata 13.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income with asset-based estimation for those who did not have any income and minimum reported income for those who reported only one asset
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	625	100	66	100	691	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	202	32	24	36	226	33
Male	423	68	42	64	465	67
Age group (years)						
0–14	26	4.2	2	3.0	28	4.1
15–24	79	13	9	14	88	13
25–34	125	20	11	17	136	20
35–44	136	22	17	26	153	22
45–54	131	21	16	24	147	21
55–64	67	11	5	7.6	72	10
≥65	60	9.6	6	9.1	66	10
Unknown	1	0.16	0	0	1	0.14
Education level						
No education	123	20	10	15	133	19
Primary school	122	20	8	12	130	19
Junior secondary	197	32	24	36	221	32
Senior secondary or above	183	29	24	36	207	30
Insurance status[b]						
None	121	19	9	14	130	19
With insurance	504	81	57	86	561	81
Household size, median (min–max)	6 (1–58)		4 (1–53)		6 (1–58)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	210	34	22	33	232	34
Continuation phase	415	66	44	67	459	66
Treatment category						
New	560	90	55	83	615	89
Relapse	32	5.1	5	7.6	37	5.4
Retreatment	28	4.5	6	9.1	34	4.9
Other	5	0.80	0	0	5	0.72
HIV status						
Positive	121	19	8	12	129	19
Negative	431	69	32	48	463	67
Unknown	73	12	26	39	99	14
Type of TB						
Bacteriologically confirmed pulmonary TB	515	82	61	92	576	83
Clinically diagnosed pulmonary TB	71	11	0	0	71	10
Extrapulmonary TB	37	5.9	5	7.6	42	6.1
Other	2	0.32	0	0	2	0.29
Diagnostic delay (>4 weeks)[c]	80	44	10	53	90	45
Treatment support						
Self-administered	310	50	39	59	349	51
Directly observed therapy	312	50	27	41	339	49
Other	3	0.48	0	0	3	0.43

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have any of the following health insurance types?". The options were "national health insurance scheme (NHIS)", "private health insurance", "reimbursement scheme/medical allowance", "family/community fund" and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	85 (74–98)	107 (88–130)	87 (76–100)
Household	133 (114–155)	158 (131–189)	135 (117–156)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	7.1 (4.4–12)	15 (8.9–27)	7.7 (4.8–12)
Household	14 (7.6–25)	26 (13–50)	15 (8.3–26)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	48 (43–53)	41 (22–61)	47 (42–52)
Yes	45 (40–50)	52 (33–70)	46 (40–51)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	43 (37–50)	30 (22–40)	42 (36–48)
At the interview	75 (68–82)	59 (47–71)	74 (67–80)

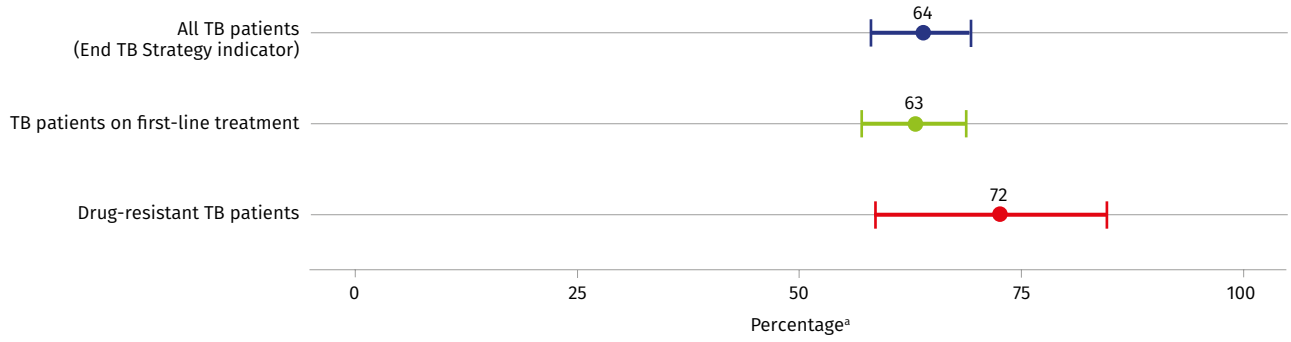
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2016.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	29	23–36	16	7.2–29	28	22–34
Loan	27	22–33	30	15–48	27	22–33
Sales of assets	11	7.3–15	16	5.4–30	11	7.7–15
Any of above	52	45–59	46	27–67	51	45–58
SOCIAL CONSEQUENCES						
Food insecurity	17	11–23	9.2	2.0–21	16	11–22
Divorce/separation	2.7	1.4–4.5	4.6	0.30–14	2.9	1.6–4.6
Job loss	42	37–47	33	19–50	41	36–46
Interrupted schooling	6.3	4.4–8.6	6.2	1.6–13	6.3	4.6–8.3
Social exclusion	44	36–52	36	23–50	43	35–51
Any of above	76	70–81	52	33–70	74	69–78
SOCIAL SUPPORT						
Social assistance	1.8	0.86–3.1	1.4	<0.01–6.0	1.8	0.97–2.8
Vouchers	27	19–36	22	5.9–45	27	18–36

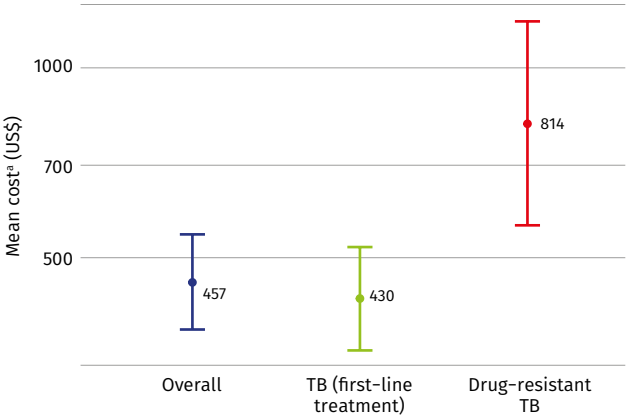
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2016 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

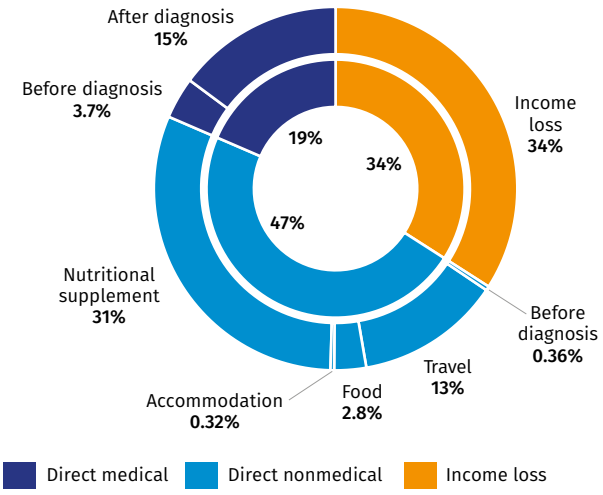
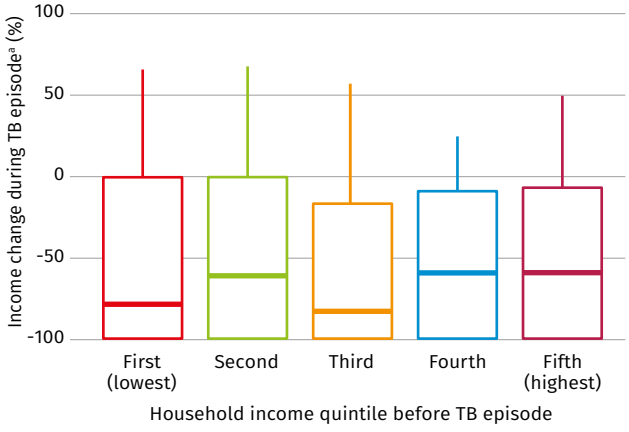
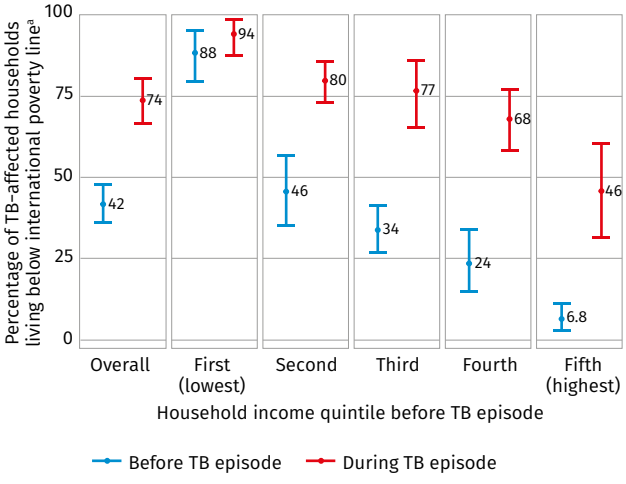


Fig. 4. Changes in distribution of monthly self-reported household income



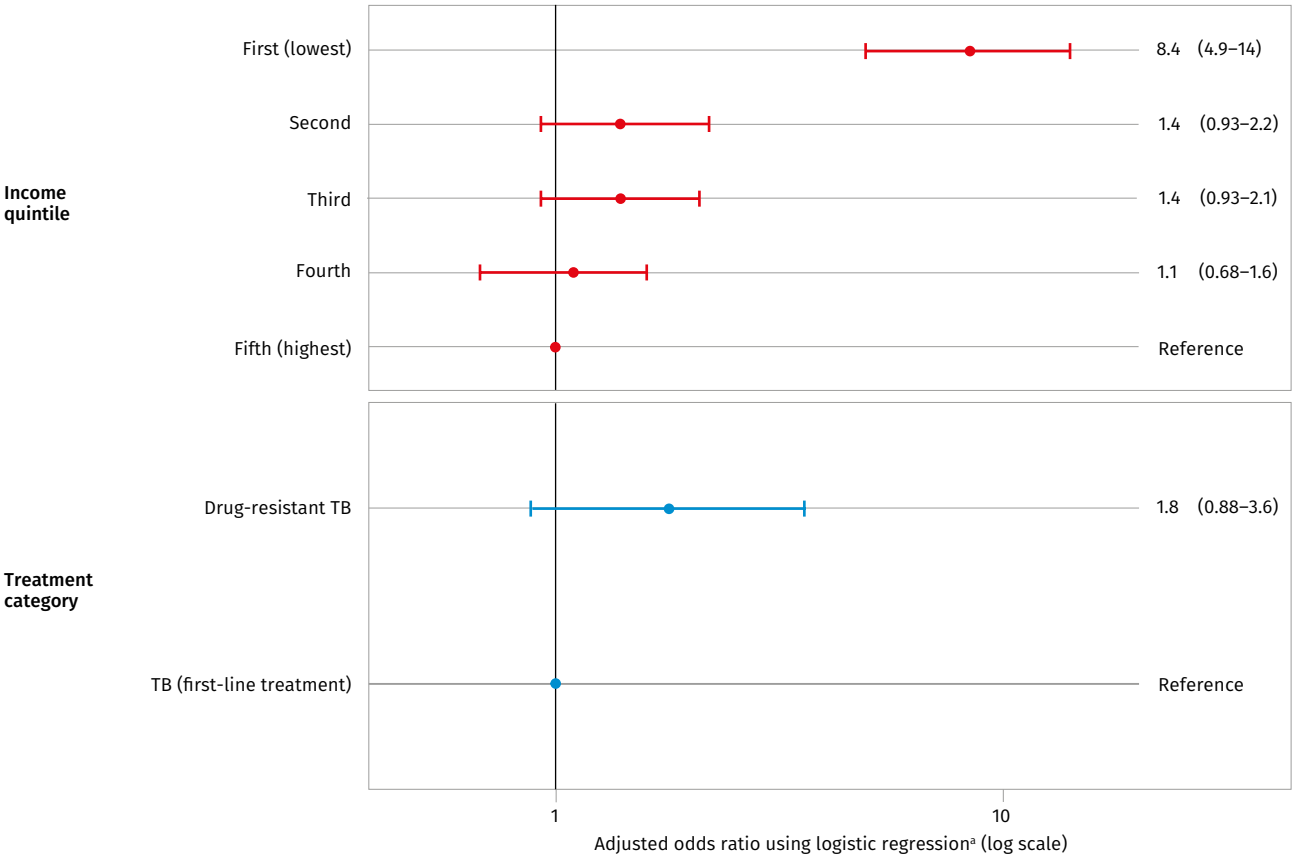
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



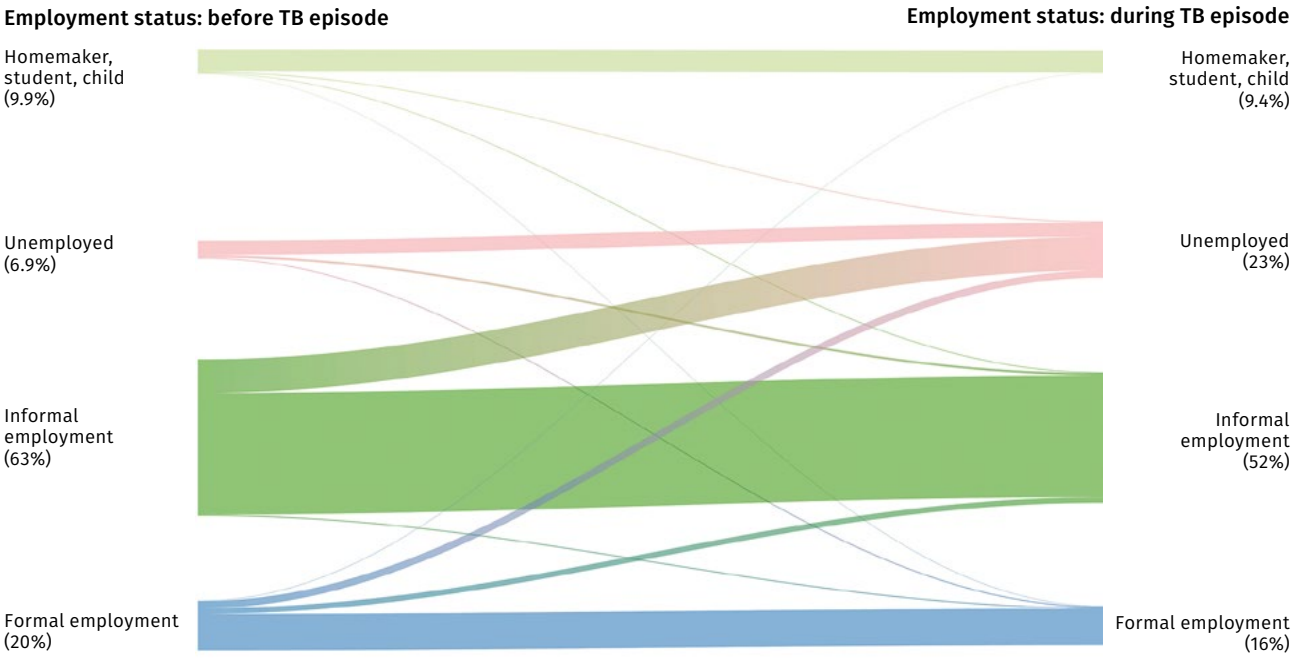
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the ILO classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Enhancing community-based TB services by linking with the community health workers programme.	Direct nonmedical expenditures
	Designing a service or benefit package to support the specific needs of people with TB.	
	Decentralizing access to diagnosis, including sputum transportation.	Direct nonmedical expenditures and indirect costs
Wider health sector	Providing premium-free, fast-track enrolment in the National Health Insurance Scheme to all people with TB.	Direct medical expenditures
Non-health sector	Expanding existing social protection interventions to people with TB by making TB an eligibility criterion for the LEAP programme.	Indirect costs
	Protecting the rights of people with TB in the workplace, to ensure job security.	

LEAP: Livelihood Empowerment Against Poverty (https://www.mogcsp.gov.gh/projects/livelyhood-empowerment-against-poverty-leap/).

Dissemination

Event

- *Ghana's first TB patient cost survey: Launch of survey findings and policy dialogue*, organised by the Ministry of Health, Republic of Ghana, 14 August 2018.

Media coverage

- Abakwan NQ, Appiah J. Financial burden cripples tuberculosis patients – survey. The Finder. 15 August 2018 (https://www.thefinderonline.com/news/item/13931-financial-burden-cripples-tuberculosis-patients-survey).
- Okertchiri JA. Cost of treatment for TB rising high. Modern Ghana. 15 August 2018 (https://www.modernghana.com/news/876071/cost-of-treatment-for-tb-rising-high.html).

Publication

- Pedrazzoli D, Siroka A, Boccia D, Bonsu F, Nartey K, Houben R, Borghi J. How affordable is TB care? Findings from a nationwide TB patient cost survey in Ghana. Trop Med Int Health. 2018;23(8):870–8 (https://pubmed.ncbi.nlm.nih.gov/29851223/).
- Pedrazzoli D, Carter DJ, Borghi J, Laokri S, Boccia D, Houben RM. Does Ghana's National Health Insurance Scheme provide financial protection to tuberculosis patients and their households? Soc Sci Med. 2021;277:113875 (https://pubmed.ncbi.nlm.nih.gov/33848718/).
- Global TB report 2018. Geneva: World Health Organization; 2018: 141 (https://www.who.int/publications/i/item/9789241565646) – see the National surveys of costs faced by TB patients and their households in Ghana: results and policy translation (Box 7.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Indonesia

2020

Summary statistics, national TB patient cost survey

Number of survey participants by treatment category	**1168**
• TB (first-line treatment)	990
• Drug-resistant TB	178
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2020 US$[b] (95% CI)	**166 (135–205)**
• TB (first-line treatment)	160 (129–198)
• Drug-resistant TB	1046 (852–1283)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**38 (33–44)**
• TB (first-line treatment)	38 (32–44)
• Drug-resistant TB	81 (74–86)

CI: confidence interval; IDR: Indonesian rupiah (Indonesia).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 14 507 IDR, which was the average of the period from October to December 2020.

Distribution of surveyed clusters (N=25)

• Surveyed cluster

Survey timeline

Initiation of preparation	March 2019
Ethics approval	May 2020
Data collection	September–December 2020
Official dissemination event	September 2021
Publication of survey report	March 2022

Key people

NAME	ROLE	ORGANIZATION
Riris Andono Ahmad	Principal investigator	Center for Tropical Medicine, UGM
Ari N Probandari	Survey coordinator	Center for Tropical Medicine, UGM
Novalia Indriasari	Survey coordinator	National TB Programme, Ministry of Health of Indonesia
Tiffani Tiara Pakasi	Survey coordinator	National TB Programme, Ministry of Health of Indonesia
Bagoes Widjanarko	Team leader	Universitas Diponegoro
Chatarina Umbul Wahyuni	Team leader	Universitas Airlangga
Ratih Puspita Febrinasari	Team leader	Universitas Sebelas Maret
Christa Dewi	Project Manager	Center for Tropical Medicine, UGM
Firdaus Hafidz As Shidieq	Data analyst	Center for Tropical Medicine, UGM
Agus Kuntarto	Data manager	Center for Tropical Medicine, UGM
Annisa Satriani	Research assistant	Center for Tropical Medicine, UGM
Maria Regina Christian	Technical assistance	WHO, Indonesia
Jonathan Marshall Mangihut Tua Marbun	Technical assistance	WHO, Indonesia
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; UGM: Universitas Gadjah Mada; WHO: World Health Organization.

Organization and financing

Implementation agency

Center for Tropical Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia

Total budget: US$ 298 286

Funding source

The Global Fund to Fight AIDS, Tuberculosis and Malaria

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	271	2019
GDP per capita (current US$)	4 136	2019
Life expectancy at birth (years)	72	2020
Cause and number of deaths (top 3 and TB)		2019
1. Stroke	357 183	
2. Ischaemic heart disease	259 297	
3. Diabetes mellitus	110 513	
4. TB	90 077	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	2.3%	2020
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	19%	2020
SDG 2: Zero hunger		
Prevalence of undernourishment	6.5%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.10	2020
UHC service coverage index (worst 0–100 best)	59	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	4.5%	2017
Population with household spending on health >25% of total household budget	0.87%	2017

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	824 000 (755 000–897 000)	2020
HIV-positive	18 000 (7 700–32 000)	2020
TB incidence rate (new cases per 100 000 population per year)		
Total	301 (276–328)	2020
HIV-positive	6.5 (2.8–12)	2020
TB treatment coverage	47% (43–51%)	2020
TB notifications		
Total new and relapse cases notified	384 025	2020
Percentage of new cases with MDR/RR-TB	2.4 (1.8–3.3)	2018
Treatment success rate		
New and relapse cases	83%	2019
Previously treated cases	74%	2019
HIV-positive TB cases	70%	2019
MDR/RR-TB cases	47%	2018
National TB budget	US$ 429 million	2020

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Regular monitoring test and examination based on guidelines for TB and drug-resistant TB • Hospitalization and adverse event management for drug-resistant TB patients		• Hospitalization for drug-resistant TB patients is covered by the national health insurance programme (BPJS) or National TB Programme (through Global Fund funding)
Social support schemes for TB patients	Transportation	Available to	All drug-resistant TB patients enrolled and on treatment
		Amount	600 000 IDR (US$ 41[a]) per month
		Duration	During treatment
Treatment support	Intensive phase	TB patients on first line treatment	Community based, fortnightly
		Drug-resistant TB patients	Facility based or community based, daily
	Continuation phase	TB patients on first line treatment	Community based, once a month
		Drug-resistant TB patients	Facility based or community based, daily
Hospitalization[b]	Eligibility		Drug-resistant TB patients who are referred for hospitalization based on the decision of a clinical expert team
	Duration		As needed
	Location		Public hospital
Health service utilization in 2020[c]	Typical number of facility visits		
	• TB (first-line treatment)		8 visits
	• Drug-resistant TB		29 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		0 days
	• Drug-resistant TB		5 days

Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; IDR: Indonesian rupiah (Indonesia).

[a] Current value in 2020.

[b] Refers to a policy that mandates/encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY		
Sampling design	Stratified single stage cluster sampling using probability proportional to size	
Stratification	TB (first-line treatment) in public health facilities	Drug-resistant TB
Sampling frame	List of health facilities providing first line treatment	List of health facilities providing second line treatment
Patient enrolment	Random sampling from registered patients on treatment	Random sampling from registered patients on treatment
Assumptions for sample size calculation		
Estimated proportion	30%	80%
Absolute precision	5%	5%
Design effect	3	3
Stratum size	1000	200
Clusters		
Number	25 clusters	10 clusters
Size	40 patients	20 patients
DATA COLLECTION AND ANALYSIS		
Field data collection tool	Electronic (tablet-based) questionnaire and KoBoToolbox (Harvard Humanitarian Initiative)	
Database	None	
Statistical software	Stata 15.0 (StataCorp)	
METHODOLOGY FOR KEY METRICS		
Measurement for ability to pay	Self-reported household income	
Estimates for indirect costs	Output approach (difference in household income before and during TB)	

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	990	100	178	100	1 168	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	418	42	64	36	482	41
Male	572	58	114	64	686	59
Age group (years)						
0–14	57	5.8	3	1.7	60	5.1
15–24	175	18	26	15	201	17
25–34	172	17	41	23	213	18
35–44	167	17	37	21	204	17
45–54	183	18	36	20	219	19
55–64	150	15	28	16	178	15
≥65	86	8.7	7	3.9	93	8.0
Education level						
No education	60	6.1	0	0	60	5.1
Pre/Primary school	260	26	37	21	297	25
Secondary school or above	670	68	141	79	811	69
Insurance status[b]						
None	185	19	11	6	196	17
With insurance	805	81	167	94	972	83
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	258	26	44	25	302	26
Continuation phase	732	74	134	75	866	74
Treatment category						
New	889	90	74	42	963	82
Relapse	62	6.3	59	33	121	10
Retreatment	39	3.9	45	25	84	7.2
HIV status						
Positive	17	1.7	3	1.7	20	1.7
Negative	696	70	152	85	848	73
Unknown	277	28	23	13	300	26
Type of TB						
Bacteriologically confirmed pulmonary TB	751	76	163	92	914	78
Clinically diagnosed pulmonary TB	177	18	8	4.5	185	16
Extrapulmonary TB	62	6.3	7	3.9	69	5.9
Diagnostic delay (>4weeks)[c]	55	22	19	43	74	25
Treatment support						
Self-administered	241	24	25	14	266	23
With treatment observer	749	76	153	86	902	77
Body mass index						
<18.5	456	46	69	39	525	45
≥18.5	534	54	109	61	643	55

HIV: human immunodeficiency virus.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in Bahasa Indonesia) "Do you have any of the following health insurance types?". The options were "national health insurance – member contribution", "national health insurance - government subsidy", "private insurance", "covered by employer" and "others".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	85 (75–95)	93 (75–114)	85 (75–95)
Household	123 (103–148)	114 (78–168)	123 (103–147)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	8.3 (6.9–10)	4.6 (3.7–5.8)	8.2 (6.8–9.9)
Household	97 (80–118)	65 (45–93)	97 (80–117)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	60 (56–64)	63 (53–73)	60 (56–64)
Yes	40 (36–44)	37 (27–47)	40 (36–44)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	26 (20–34)	25 (16–36)	26 (20–33)
At the interview	33 (25–41)	37 (26–49)	33 (26–40)

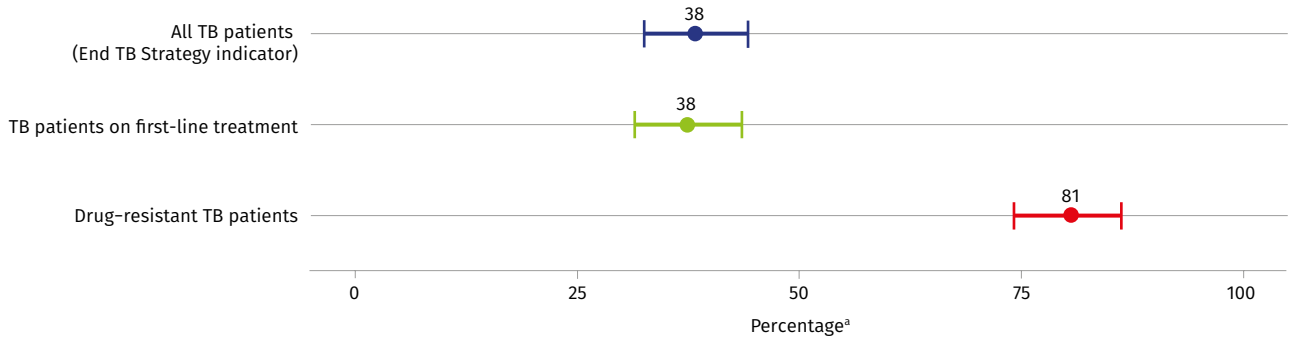
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2020.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	18	13–24	43	29–57	19	14–25
Loan	15	11–19	42	30–54	15	12–19
Sales of assets	8.0	5.9–10	28	19–38	8.4	6.4–11
Any of above	32	26–38	71	57–84	33	27–39
SOCIAL CONSEQUENCES						
Food insecurity	10	5.0–17	13	5.7–23	10	5.2–17
Divorce/separation	0.53	0.18–1.1	0	NA	0.52	0.18–1.0
Job loss	14	9.6–19	33	19–49	14	10–19
Interrupted schooling	0.30	0.055–0.74	0.55	<0.01–2.5	0.31	0.064–0.73
Social exclusion	5.8	2.4–11	9.4	3.0–19	5.9	2.5–10
Interrupted schooling	36	29–44	56	33–77	37	29–44
Any of above	58	51–65	84	73–92	58	52–65
SOCIAL SUPPORT						
Social assistance	32	25–39	48	34–62	32	26–39
Vouchers from NTP	6.8	1.2–17	66	44–85	8.0	2.1–17

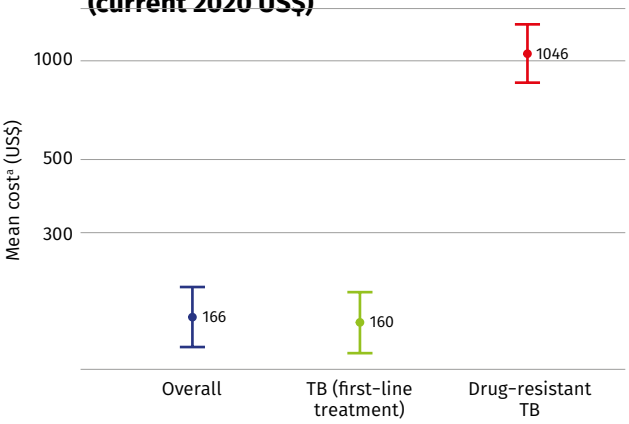
CI: confidence interval; NA: not applicable; NTP: National TB Programme.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2020 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

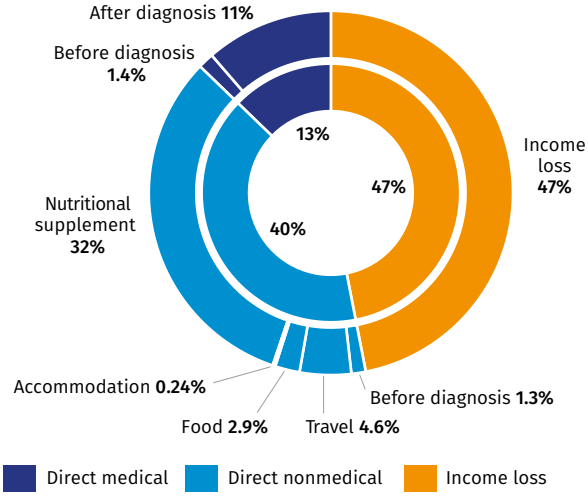
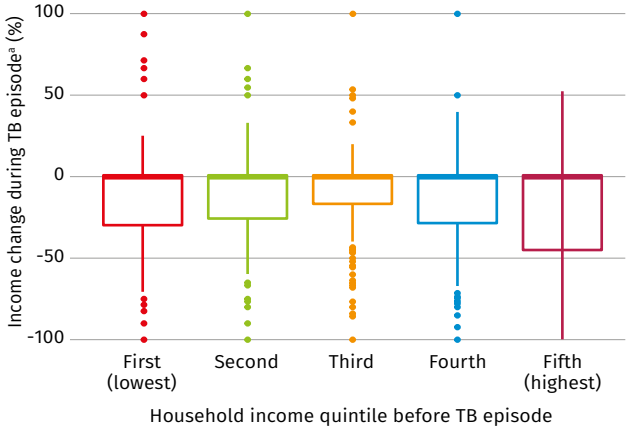
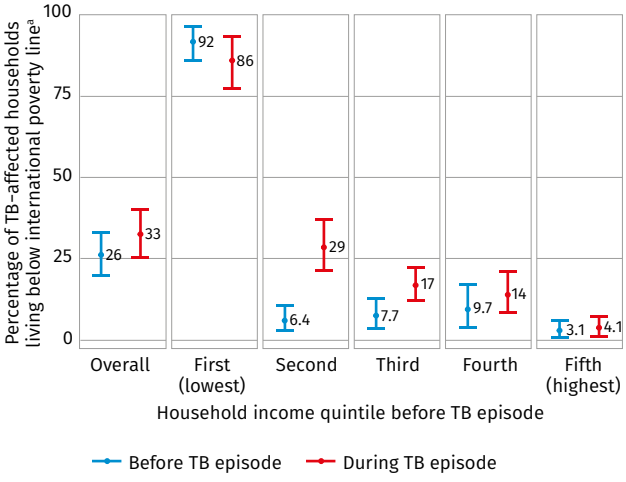


Fig. 4. Changes in distribution of monthly self-reported household income



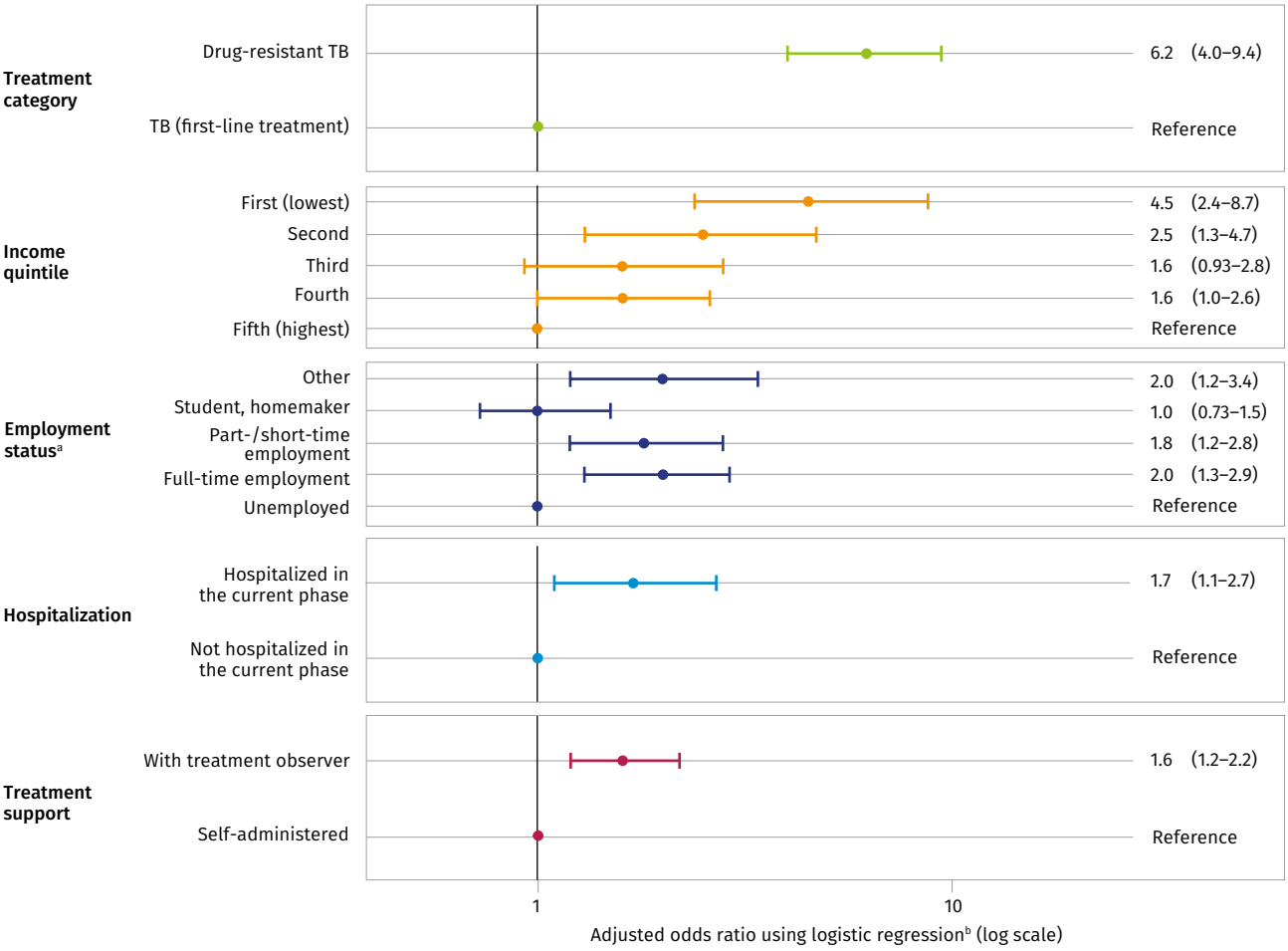
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

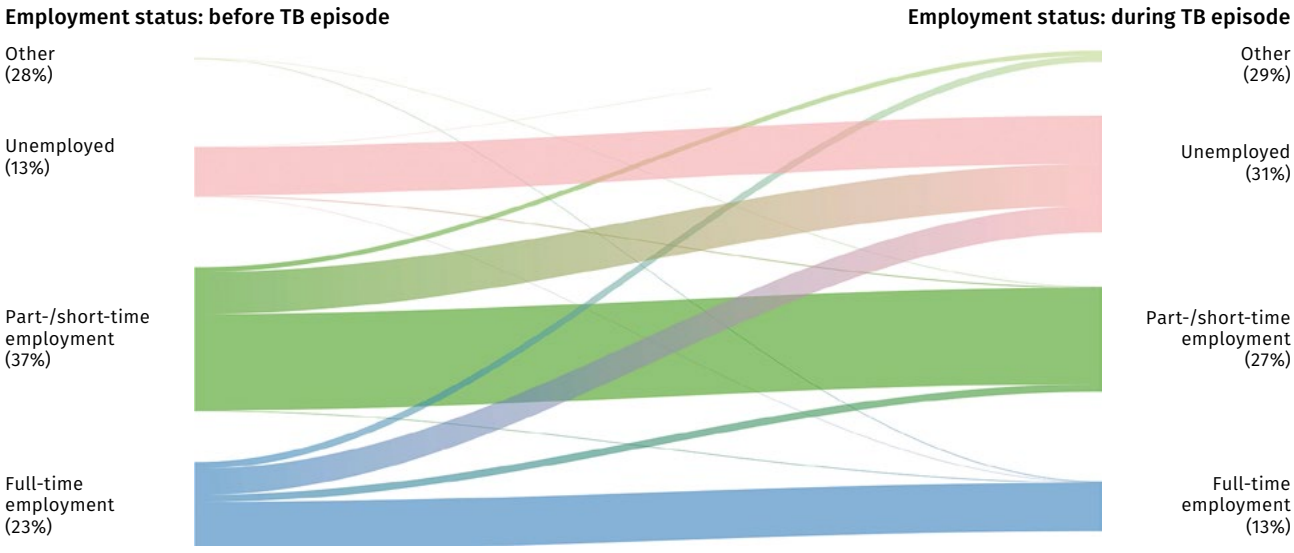
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

[b] Error bars represent 95% confidence interval

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Develop a screening tool to identify TB-affected households at risk of facing catastrophic costs because of TB.	Direct nonmedical expenditures and indirect costs
	Improve the quality of nutritional advice by health care providers, to prevent irrational use of supplements or vitamins.	Direct nonmedical expenditures
	Increase the coverage of current social protection vouchers for patients with drug-resistant-TB.	
Wider health sector	Expand the provision of social protection vouchers, to cover all patients with TB in public health care facilities and selected vulnerable patients in the private sector.	Direct nonmedical expenditures and indirect costs
	Introduce nutritional interventions as part of the standard TB care package (including the provision of nutritional food or supplements) and undertake further research to determine the most suitable interventions.	Direct nonmedical expenditures
Non-health sector	Collaborate with a national social protection programme, Program Keluarga Harapan (PKH), to ensure that the programme covers TB-affected households at risk of facing catastrophic costs.	Direct nonmedical expenditures and indirect costs
	Ensure job security for people affected by TB.	Indirect costs

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Republic of Indonesia, 30 September 2021.

Publication

- *Indonesia tuberculosis patient cost survey 2020*, national report. Jakarta: Center for Tropical Medicine, Faculty of Medicine, Public Health and Nursing, Gadjah Mada University and National Tuberculosis Programme, Ministry of Health of the Republic of Indonesia; 2022.

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Kenya

2017

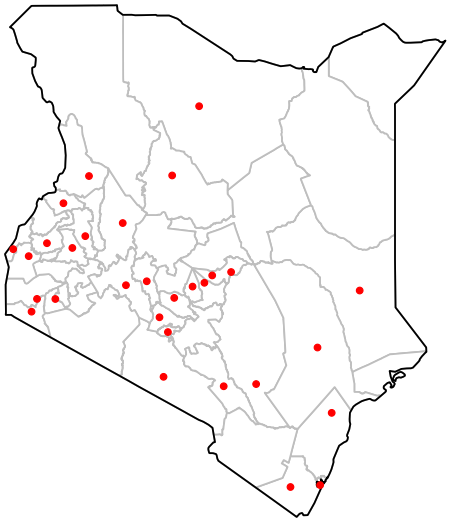
Summary statistics, national TB patient cost survey

Total number of survey participants	1353
Number of participants by treatment category	
• TB (first-line treatment)	1071
• Drug-resistant TB	282
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2017 US$[b] (95% CI)	**105 (79–140)**
• TB (first-line treatment)	104 (78–139)
• Drug-resistant TB	605 (481–762)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**27 (21–32)**
• TB (first-line treatment)	26 (20–32)
• Drug-resistant TB	86 (79–94)

CI: confidence interval; KES: Kenyan Shilling (Kenya); SDG: Sustainable Development Goal.

[a] Geometric mean.

[b] The analysis of the survey used an exchange rate of US$ 1 = 103 KES, which was the average for July 2017.



Distribution of surveyed clusters (N=30)

• Surveyed cluster

Survey timeline

Initiation of preparation	February 2017
Ethics approval	May 2017
Data collection	May–June 2017
Official dissemination event	July 2018
Publication of survey report	July 2018

Key people

NAME	ROLE	ORGANIZATION
Enos Masini	Primary investigator	WHO Kenya
Jane Ong'ang'o	Epidemiologist	CRDR, KEMRI, Kenya
Eunice Mailu	Study coordinator	NTLD, Kenya
Edwine Barasa	Health economist	HERU, KEMRI Wellcome Trust, Kenya
Peter Nguhiu	Data analyst	HERU, KEMRI Wellcome Trust, Kenya
Richard Kiplimo	Data analyst	NTLD, Kenya
Dickson Kirathe	Data manager	NTLD, Kenya
Maureen Kamene	Co-investigator	NTLD, Kenya
Immaculate Kathure	Co-investigator	NTLD, Kenya
Richard Muthoka	Co-investigator	NTLD, Kenya
Faith Ngari	Co-investigator	NTLD, Kenya
Newton Omale	Co-investigator	NTLD, Kenya
Rose Wambu	Co-investigator	Nutrition Unit, Division of Child Health, MoH, Kenya
Rose Muthee	Co-investigator	Monitoring and Evaluation Unit, MoH, Kenya
Ines Garcia Baena	Technical assistance	WHO GTB

CRDR: Centre for Respiratory Disease Research; GTB: Global Tuberculosis Programme; HERU: Health Economics Research Unit; LSHTM: London School of Hygiene and Tropical Medicine; MoH: Ministry of Health; NTLD: National Tuberculosis, Leprosy and Lung Disease Program; WHO: World Health Organization.

Organization and financing

Implementation agencies

National Tuberculosis, Leprosy and Lung Disease Program, Ministry of Health, Kenya; KEMRI Wellcome Trust, Health Economics Research Unit, Nairobi, Kenya

Total budget: US$ 168 574

Funding sources

World Health Organization Country Office for Kenya; United States Agency for International Development (USAID); Ministry of Health, Kenya

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	50	2017
GDP per capita (current US$)	1 572	2017
Life expectancy at birth (years)	66	2017
Cause and number of deaths (top 3 and TB)		2015
1. HIV/AIDS	32 628	
2. TB	30 585	
3. Neonatal conditions	27 232	

AIDS: acquired immunodeficiency syndrome; GDP: gross domestic product; HIV: human immunodeficiency virus.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	37%	2015
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	67%	2015
SDG 2: Zero hunger		
Prevalence of undernourishment	25%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.93	2017
UHC service coverage index (worst 0–100 best)	54	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	5.1%	2015
Population with household spending on health >25% of total household budget	1.3%	2015

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	160 000 (88 000–245 000)	2017
HIV-positive	46 000 (25 000–73 000)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	319 (175–505)	2017
HIV-positive	91 (50–145)	2017
TB treatment coverage	52% (33–95%)	2017
TB notifications		
Total new and relapse cases notified	83 599	2017
Percentage of new cases with MDR/RR-TB	0.87 (0.77–0.98)	2020
Treatment success rate		
New and relapse cases	83%	2017
Previously treated cases	72%	2017
HIV-positive TB cases	78%	2017
MDR/RR-TB cases	70%	2017
National TB budget	US$ 21 million	2017

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		• In public facilities, all TB diagnostic services are provided free of charge, regardless of whether they occur before or after notification • In private facilities, patients pay for TB diagnostic services, including administrative fees – this contributes to patient costs prediagnosis, but where the NTLD is providing diagnostics equipment or reagents, this cost is subsidized
Social support schemes for TB patients	Food and transportation	Available to	All drug-resistant TB patients
		Amount	6000 KES (US$ 58.5[a]) per month
		Duration	During treatment
Treatment support	Intensive phase		• For patients on first-line TB treatment: community or household based • For patients on drug-resistant TB treatment: facility based, community based or isolation admission
	Continuation phase		• For patients on first-line TB treatment: self-administered • For patients on drug-resistant TB treatment: facility based or community based
Hospitalization[b]	Eligibility		Based on severity of clinical presentation
	Duration		As needed
	Location		Designated hospitals nationwide (central, regional and district)
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		10 visits
	• Drug-resistant TB		600 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		20 days
	• Drug-resistant TB		60 days

KES: Kenyan Shilling (Kenya); NTLD: National Tuberculosis, Leprosy and Lung Disease Program.

[a] Current value in 2017.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY		
Sampling design	Single-stage cluster sampling using probability proportional to size	
Stratification[a]	TB (first-line treatment)	Drug-resistant TB (DR-TB)
Sampling frame	List of TB treatment facilities at national level excluding two counties (Wajir and Mandera) due to insecurity	List of DR-TB treatment facilities at national level excluding two counties (Wajir and Mandera) due to insecurity
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities	Total sampling from all registered patients on treatment for DR-TB
Assumptions for sample size calculation		
Estimated proportion	6.2%	
Relative precision	30%	
Design effect	3	
Sample size	1200	
Clusters		
Number	30 clusters (sub-counties)	
Size	40 patients	
DATA COLLECTION AND ANALYSIS		
Field data collection tool	Electronic (tablet-based) questionnaire (ODK with X-Forms)	
Database	PostGre SQL Server	
Statistical software	Stata 13.0 (StataCorp)	
METHODOLOGY FOR KEY METRICS		
Measurement for ability to pay	Self-reported household expenditure	
Estimates for indirect costs	Human capital approach (based on lost time and monthly wage rate) Monthly wage: 13 953 KES (US$ 135[b]) for rural and 15 980 KES (US$ 155[b]) for urban areas – national minimum wage[c]	

KES: Kenyan Shilling (Kenya).

[a] Post-hoc allocation of sample size into first-line treatment and drug-resistant TB groups after the overall sample size was defined.

[b] Current value in 2017.

[c] Data source: Economic survey 2017. Nairobi: Kenya National Bureau of Statistics; 2017 (http://www.devolutionplanning.go.ke/images/hb/Economic%20Survey%202017.pdf).

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	1 071	100	282	100	1 353	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	406	38	107	38	513	38
Male	665	62	175	62	840	62
Age group (years)						
0–14	161	15	9	3.2	170	13
15–24	201	19	38	13	239	18
25–34	286	27	74	26	360	27
35–44	217	20	87	31	304	22
45–54	112	10	50	18	162	12
55–64	56	5.2	16	5.7	72	5.3
≥65	38	3.6	8	2.8	46	3.4
Education level						
No education	127	12	28	10	155	11
Primary education	547	51	162	57	709	52
Secondary or higher	397	37	92	33	489	36
Insurance status[b]						
None	905	85	241	85	1 146	85
National health insurance (NHIF)	148	14	36	13	184	14
Medical allowance	0	0	2	0.71	2	0.15
Private	18	1.7	3	1.1	21	1.6
Household size, median (min–max)	4 (1–20)		4 (1–19)		4 (1–20)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	542	51	153	54	695	51
Continuation phase	529	49	129	46	658	49
HIV status						
Positive	278	26	126	45	404	30
Negative	769	72	153	54	922	68
Unknown	24	2.2	3	1.1	27	2.0
Type of TB						
Bacteriologically confirmed pulmonary TB	807	75	271	96	1 079	80
Clinically diagnosed pulmonary TB	76	7.1	0	0	76	5.6
Extrapulmonary TB	188	18	10	3.6	198	15
Diagnostic delay (>4 weeks)[c]	180	17	28	10	208	15
Treatment support						
Self-administered	826	77	54	19	880	65
Directly observed therapy	245	23	228	81	473	35

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have any of the following health insurance types?". The options were "none", "national health insurance fund (NHIF)", "medical allowance", "community-based health insurance (CBHI)", "private health insurance" and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	52 (42–64)	45 (35–59)	52 (42–64)
Household	93 (74–117)	96 (70–132)	93 (74–117)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	7.1 (5.5–9.1)	3.5 (2.5–4.9)	7.0 (5.5–9.0)
Household	13 (9.2–17)	17 (12–23)	13 (9.2–17)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	40 (35–45)	32 (26–39)	40 (35–45)
Yes	60 (55–65)	68 (61–74)	60 (55–65)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	47 (40–54)	49 (41–57)	47 (40–54)
At the interview	51 (44–58)	65 (59–71)	51 (44–58)

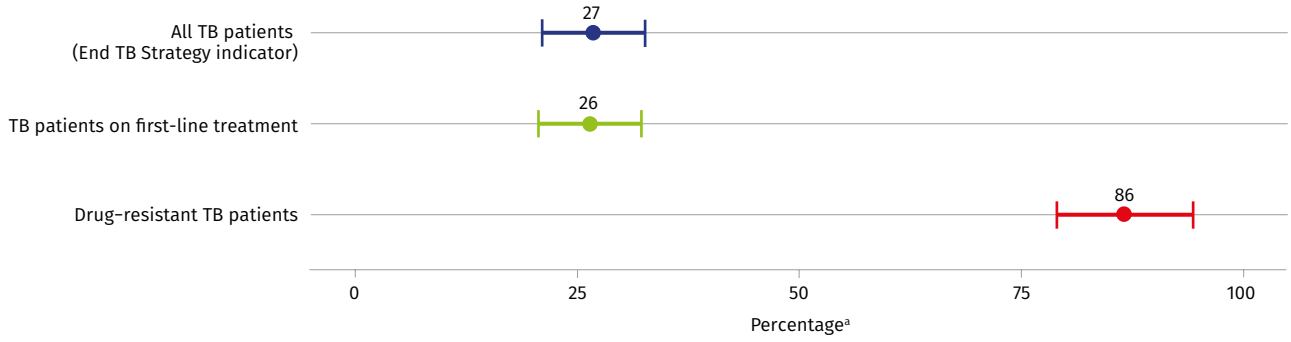
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2017.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	25	19–31	15	8.7–22	25	19–31
Loan	4.7	2.4–7.8	3.6	1.2–7.1	4.7	2.4–7.7
Sales of assets	2.0	0.78–3.9	1.2	0.16–3.1	2.0	0.8–3.8
Any of above	28	22–35	18	10–26	28	22–35
SOCIAL CONSEQUENCES						
Food insecurity	22	13–32	47	35–58	22	13–32
Divorce/separation	24	15–34	52	40–63	24	16–34
Job loss	34	28–41	57	47–67	34	28–41
Interrupted schooling	7.6	5.2–10	12	7.6–17	7.6	5.3–10
Social exclusion	31	24–39	46	34–58	31	24–39
Any of above	68	60–75	87	79–94	68	61–75
SOCIAL SUPPORT						
Sick leave	4.0	2.1–6.5	3.3	1.3–6.2	4.0	2.1–6.4
Social welfare	0.44	0.13–0.92	60	49–71	0.80	0.44–1.3
Other	26	16–36	53	39–66	26	17–36
Any of above	29	20–39	81	74–87	29	29–39

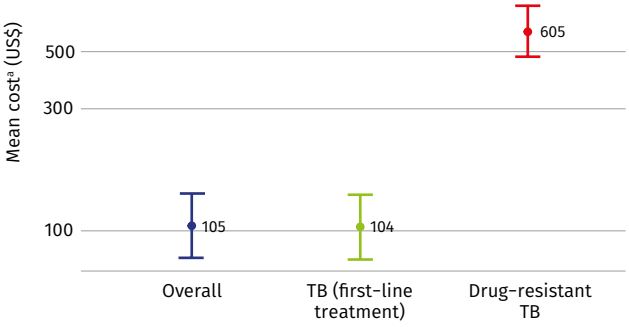
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2017 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

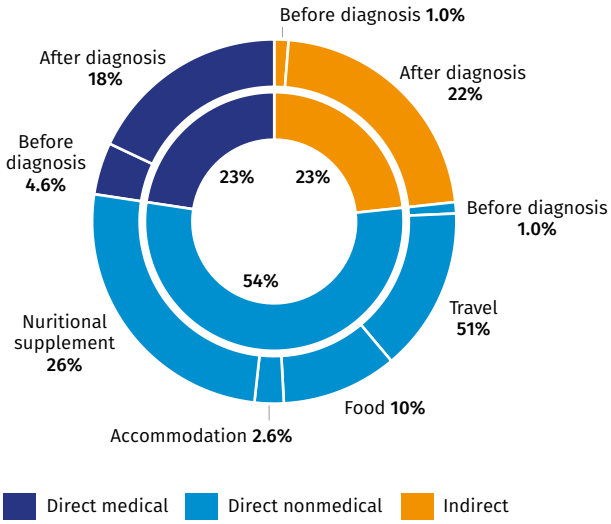
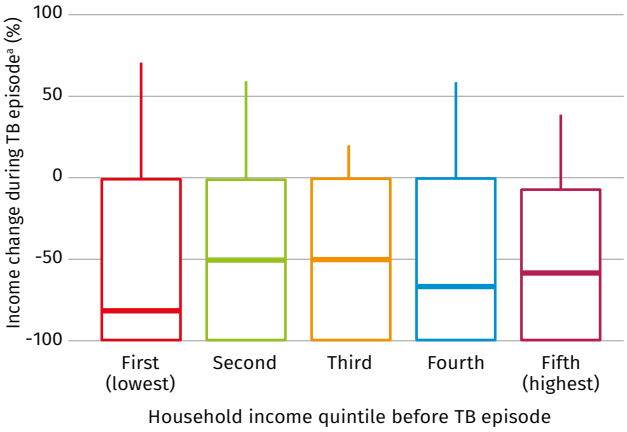
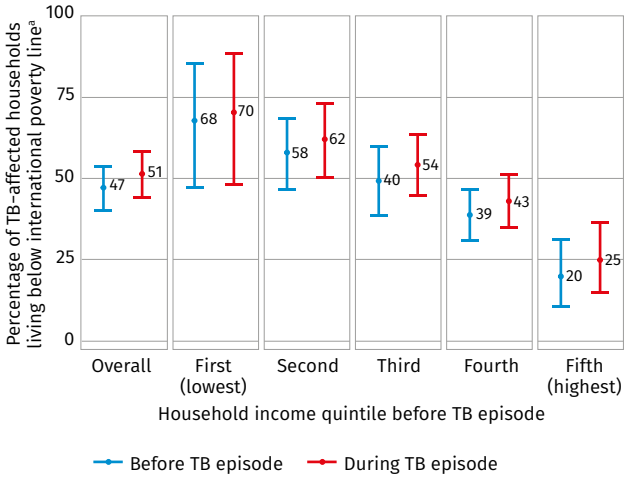


Fig. 4. Changes in distribution of monthly self-reported household income



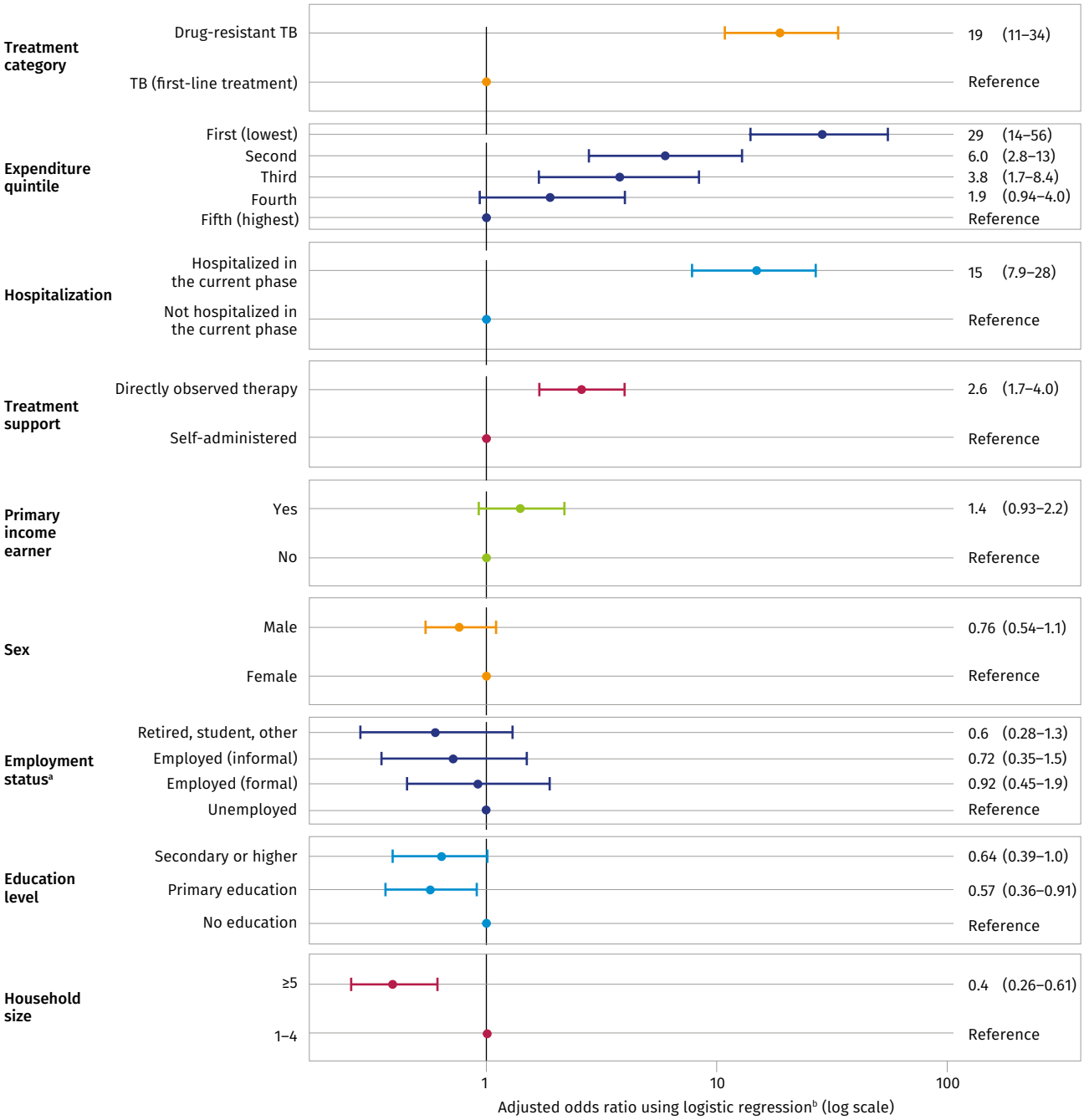
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



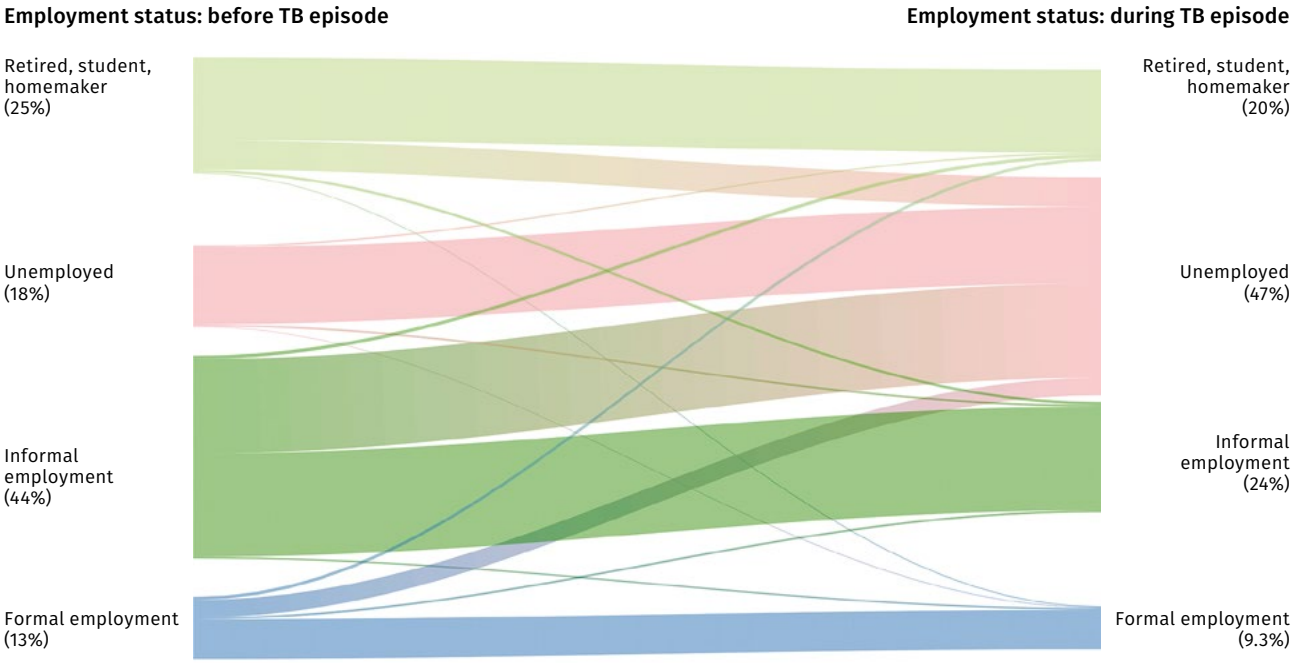
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Address the cost of TB services, both direct and indirect, in high burden TB settings (e.g. informal settlements) because these are a barrier to early diagnosis; include support for community-based intensive case finding in highly endemic zones (e.g. urban slums)	Direct medical expenditures and indirect costs
	Integrate TB and nutrition programme services, including bi-directional screening for both conditions and provision of nutritional interventions and food support	Direct medical and nonmedical expenditures
	Provide people-centred holistic health education, psychosocial support and counselling to all patients with TB, families and communities, including workplaces	Indirect costs
Wider health sector	Policy dialogue for the enrolment of all TB patients under the National Health Insurance Scheme, to cushion them against direct medical costs	Direct medical expenditures
	Improved case finding processes as part of general outpatient services	
Non-health sector	In collaboration with ILO, implement the national TB workplace policy in Kenya, to provide a conducive working environment during and after treatment, and protect patients with TB from losing their job	Indirect costs

ILO: International Labour Organization

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Kenya, 4 July 2018 (https://www.health.go.ke/tb-survey/).

Media Coverage

- Kenya Broadcasting Corporation. Kenya among countries with higher Tuberculosis prevalence [video]. 5 July 2018 (https://www.youtube.com/watch?v=sMP1r1gMmeg).

Publication

- *The first Kenya tuberculosis patient cost survey 2017*, national report. Nairobi: National Tuberculosis, Leprosy and Lung Disease Program, Ministry of Health, Kenya; 2018 (https://www.chskenya.org/wp-content/uploads/2018/07/TB-Patient-Cost-Survey-2018.pdf).
- Beatrice K, Jane O, Peter N, Knut L, Aiban R, Kristi Sa. Determinants of household catastrophic costs for drug sensitive tuberculosis patients in Kenya. *Infect Dis Poverty* 10, 95 (2021) (https://idpjournal.biomedcentral.com/articles/10.1186/s40249-021-00879-4).
- Global TB report 2018. Geneva: World Health Organization; 2018: 152–3 (https://www.who.int/publications/i/item/9789241565646) – see the National surveys of costs faced by TB patients and their households in Kenya (Box 7.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Lao People's Democratic Republic

2018–2019

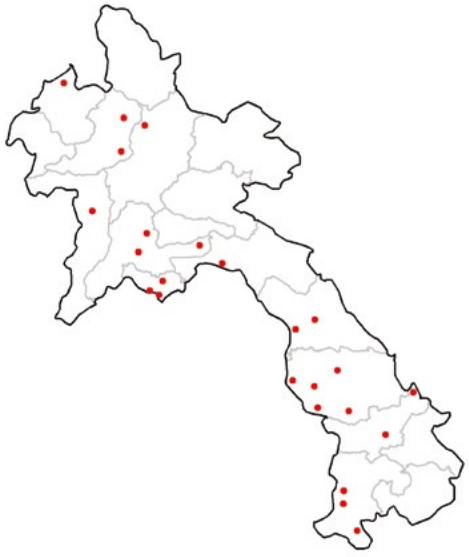
Summary statistics, national TB patient cost surve

Total number of survey participants	**725**
Number of participants by treatment category	
• TB (first-line treatment)	717
• Drug-resistant TB	8
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2018 US$[b] (95% CI)	**716 (610–839)**
• TB (first-line treatment)	709 (605–831)
• Drug-resistant TB	1670 (967–2883)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**63 (58–67)**
• TB (first-line treatment)	62 (58–67)
• Drug-resistant TB	87 (35–96)

CI: confidence interval; LAK= Kip (Lao People's Democratic Republic).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 8495 LAK, which was the average for 2018.



Distribution of surveyed clusters (N=25)

• Surveyed cluster

Survey timeline

Initiation of preparation	June 2018
Ethics approval	October 2018
Data collection	November 2018–January 2019
Official dissemination event	December 2019
Publication of survey report	December 2019

Key people

NAME	ROLE	ORGANIZATION
Phonenaly Chittamany	Principal investigator	NTC, Lao People's Democratic Republic
Sakhone Suthepmany	Survey coordinator	NTC, Lao People's Democratic Republic
Phouthasak Chanpasith	Field team leader	NTC, Lao People's Democratic Republic
Vongkham Inthavong	Field team leader	NTC, Lao People's Democratic Republic
Phonesavanh Kommanivanh	Field team leader	NTC, Lao People's Democratic Republic
Phitsada Siphanthong	Field team leader	NTC, Lao People's Democratic Republic
Thepphouthone Sorsavanh	Field team leader	NTC, Lao People's Democratic Republic
Jacques Sebert	Technical assistance	NTC, Lao People's Democratic Republic
Kiyohiko Izumi	Technical assistance	WHO, Lao People's Democratic Republic
Moeko Nagai	Technical assistance	WHO, Lao People's Democratic Republic
Vilath Seevisay	Technical assistance	WHO, Lao People's Democratic Republic
Thipphasone Vixaysouk	Technical assistance	WHO, Lao People's Democratic Republic
Fukushi Morishita	Technical assistance	WHO WPRO
Takuya Yamanaka	Technical assistance	WHO WPRO
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB
Kerri Viney	Technical assistance	Karolinska Institutet, Sweden

GTB: Global Tuberculosis Programme; NTC: National Tuberculosis Centre; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agency

National Tuberculosis (TB) Centre, Ministry of Health, Lao People's Democratic Republic

Total budget: US$ 78 947

Funding sources

World Health Organization (WHO) Regional Office for the Western Pacific (WPRO); Special Programme for Research and Training in Tropical Diseases, WHO; Ministry of Health, Lao People's Democratic Republic

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	7.1	2018
GDP per capita (current US$)	2 542	2018
Life expectancy at birth (years)	68	2018
Cause and number of deaths (top 3 and TB)		2019
1. Stroke	5 769	
2. Ischaemic heart disease	5 190	
3. Neonatal condition	3 078	
5. TB	1 949	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	10%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	37%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	5.4%	2018
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.14	2018
UHC service coverage index (worst 0–100 best)	50	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	3.0%	2007
Population with household spending on health >25% of total household budget	0.26%	2007

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	11 000 (7 200–17 000)	2018
HIV-positive	720 (450–1 100)	2018
TB incidence rate (new cases per 100 000 population per year)		
Total	162 (103–234)	2018
HIV-positive	10 (6.4–15)	2018
TB treatment coverage	57% (40–90%)	2018
TB notifications		
Total new and relapse cases notified	6 548	2018
Percentage of new cases with MDR/RR-TB	1.2 (0.5–2)	2018
Treatment success rate		
New and relapse cases	88%	2018
Previously treated cases	88%	2018
HIV-positive TB cases	67%	2018
MDR/RR-TB cases	84%	2018
National TB budget	US$ 3.7 million	2018

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for drug-resistant TB patients		
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	40 000 LAK (US$ 4.7[a]) per day
		Duration	During treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	Necessary amount to transfer from patient's residence to a designated hospital
		Duration	At the time of hospitalization
Treatment support	Intensive phase		Facility based, at least once a week
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		Drug-resistant TB patients
	Duration		Entire duration of TB treatment
	Location		Designated central or provincial hospitals (3 hospitals nationwide in 2019)
Health service use in 2018[c]	Typical number of facility visits		
	• TB (first-line treatment)		64 visits
	• Drug-resistant TB		270 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		15 days
	• Drug-resistant TB		270 days

WHO: World Health Organization. LAK: Kip (Lao People's Democratic Republic).

[a] Current value in 2018.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Random sampling from registered patients on treatment
Assumptions for sample size calculation	
Estimated proportion	50%
Absolute precision	5%
Design effect	2
Sample size	725
Clusters	
Number	25 clusters
Size	29 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 14.2 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	717	100	8	100	725	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	291	41	1	13	292	40
Male	426	59	7	88	433	60
Age group (years)						
0–14	6	0.84	0	0	6	0.83
15–24	48	6.7	1	13	49	6.8
25–34	87	12	2	25	89	12
35–44	98	14	2	25	100	14
45–54	163	23	1	13	164	23
55–64	160	22	2	25	162	22
≥65	155	22	0	0	155	21
Education level						
No education	265	37	2	25	267	37
Primary education	177	25	0	0	177	24
Secondary or higher	275	38	6	75	281	39
Insurance status[b]						
None	543	76	7	88	550	76
National health insurance	32	4.5	0	0	32	4.4
Other public insurance	132	18	1	13	133	18
Private insurance	10	1.4	0	0	10	1.4
Household size, median (min–max)	5 (1–25)		4 (3–6)		5 (1–25)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	265	37	5	63	270	37
Continuation phase	452	63	3	38	455	63
Treatment category						
New	702	98	8	100	710	98
Relapse	12	1.7	0	0	12	1.7
Retreatment	2	0.28	0	0	2	0.28
Unknown	1	0.14	0	0	1	0.14
HIV status						
Positive	19	2.7	0	0	19	2.6
Negative	466	65	8	100	474	65
Unknown	232	32	0	0	232	32
Type of TB						
Bacteriologically confirmed pulmonary TB	488	68	7	88	495	68
Clinically diagnosed pulmonary TB	191	27	1	13	192	26
Extrapulmonary TB	38	5.3	0	0	38	5.2
Diagnostic delay (>4 weeks)[c]	95	13	3	38	98	14
Treatment support						
Self-administered	704	98	4	50	708	98
Directly observed therapy	13	1.8	4	50	17	2.3

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have any of the following health insurance types?". The options were "none", "national health insurance (NHI) scheme", "community-based health insurance (CBHI)", "health equity fund (HEF)", "social security organization (SSO) for salaried private-sector employees", "state authority for social security (SASS) for civil servants", "private health insurance", and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	42 (29–60)	81 (40–162)	42 (29–60)
Household	201 (151–269)	207 (161–265)	201 (152–268)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	12 (8.7–17)	4.1 (0.46–37)	12 (8.6–17)
Household	143 (105–193)	37 (12–117)	140 (104–190)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	53 (47–58)	12 (<0.01–44)	52 (47–58)
Yes	33 (29–37)	76 (23–100)	33 (29–38)
Equal contributor	14 (10–19)	12 (<0.01–44)	14 (10–19)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW THE POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	27 (18–38)	24 (0.16–77)	27 (18–38)
At the interview	35 (24–46)	75 (46–95)	35 (25–46)

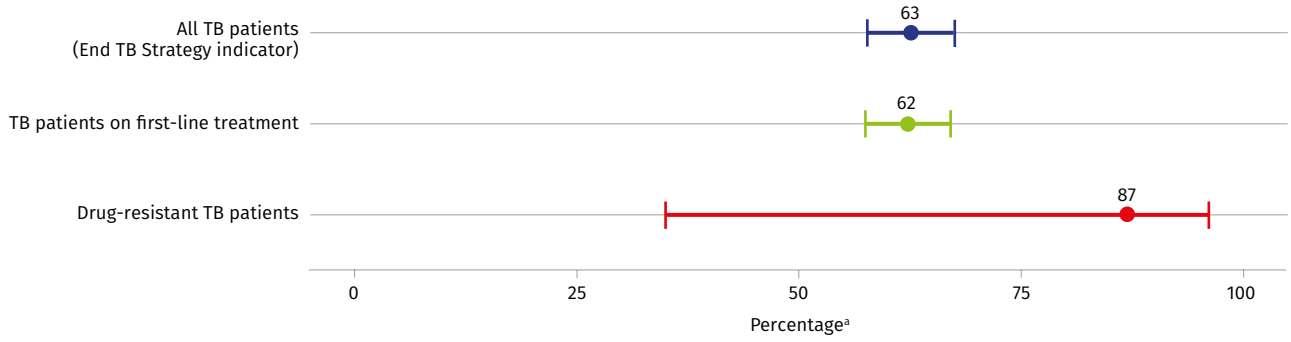
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2018.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	22	16–28	36	2.3–83	22	16–28
Loan	27	21–32	25	0.50–69	27	21–32
Sales of assets	19	13–25	12	<0.01–44	18	13–25
Any of above	51	42–59	50	7.0–92	51	42–59
SOCIAL CONSEQUENCES						
Food insecurity	21	15–26	12	<0.01–44	20	15–26
Divorce/separation	2.0	0.51–4.5	12	<0.01–44	2.1	0.61–4.5
Job loss	29	26–33	24	0.57–67	29	26–33
Interrupted schooling	1.4	0.46–2.8	12	<0.01–44	1.5	0.53–3.0
Social exclusion	9.9	5.8–15	24	0.57–67	10	5.9–15
Any of above	58	54–63	74	2.6–89	58	54–63
SOCIAL SUPPORT						
Sick leave	0.11	<0.01–0.43	0	NA	0.10	<0.01–0.43
Social welfare	0.54	0.14–1.2	0	NA	0.54	0.14–1.2
TB-specific support	0.23	<0.01–0.94	13	7.8–73	0.37	0.025–1.1
Other	0.66	0.065–1.9	0	NA	0.65	0.066–1.8
Vouchers	2.7	1.1–5.2	0	NA	2.7	1.1–5.1

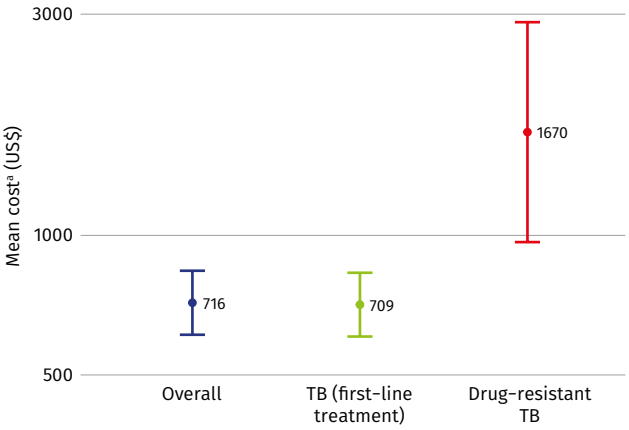
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2018 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

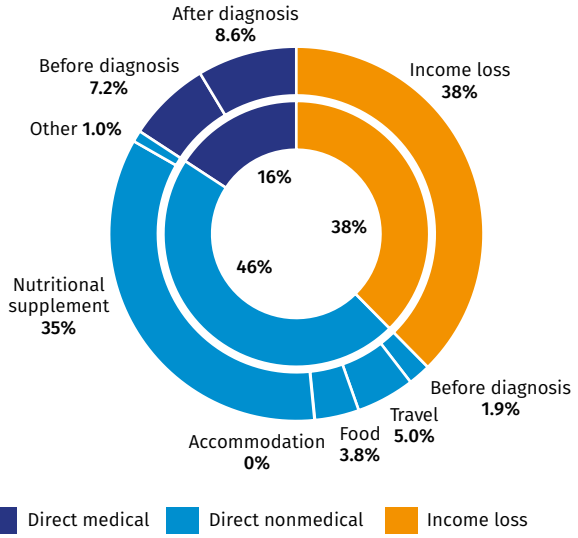
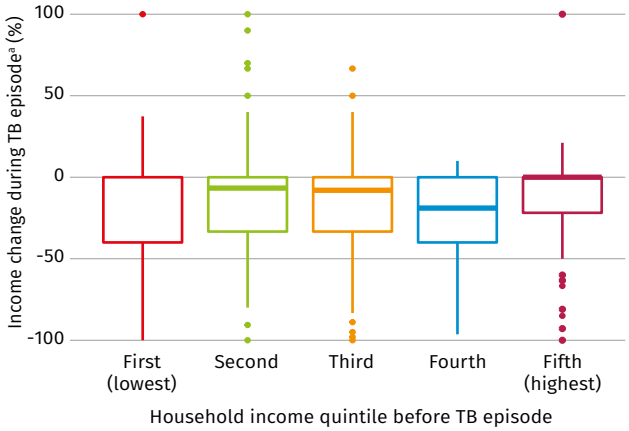
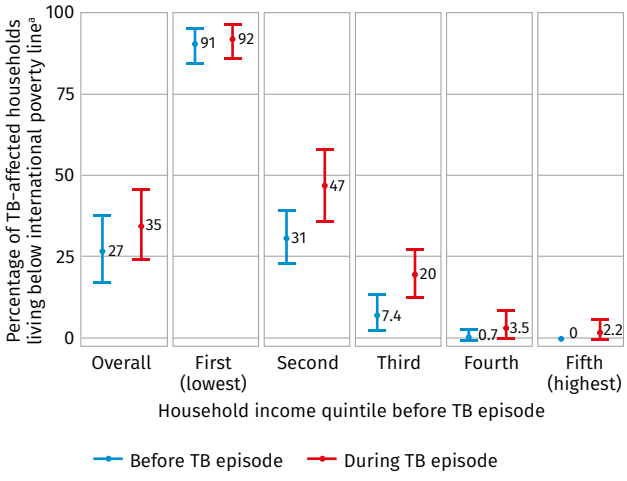


Fig. 4. Changes in distribution of monthly self-reported household income



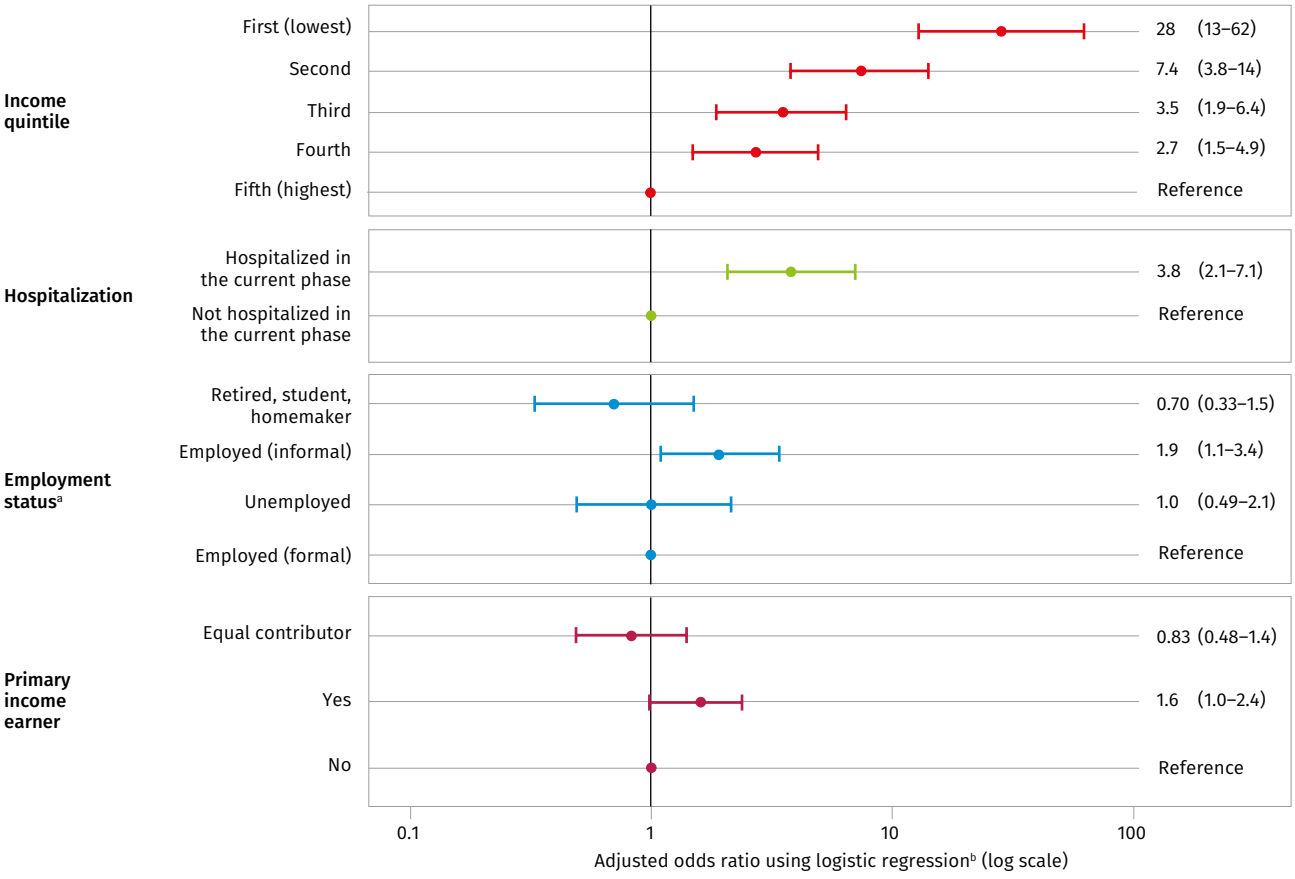
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



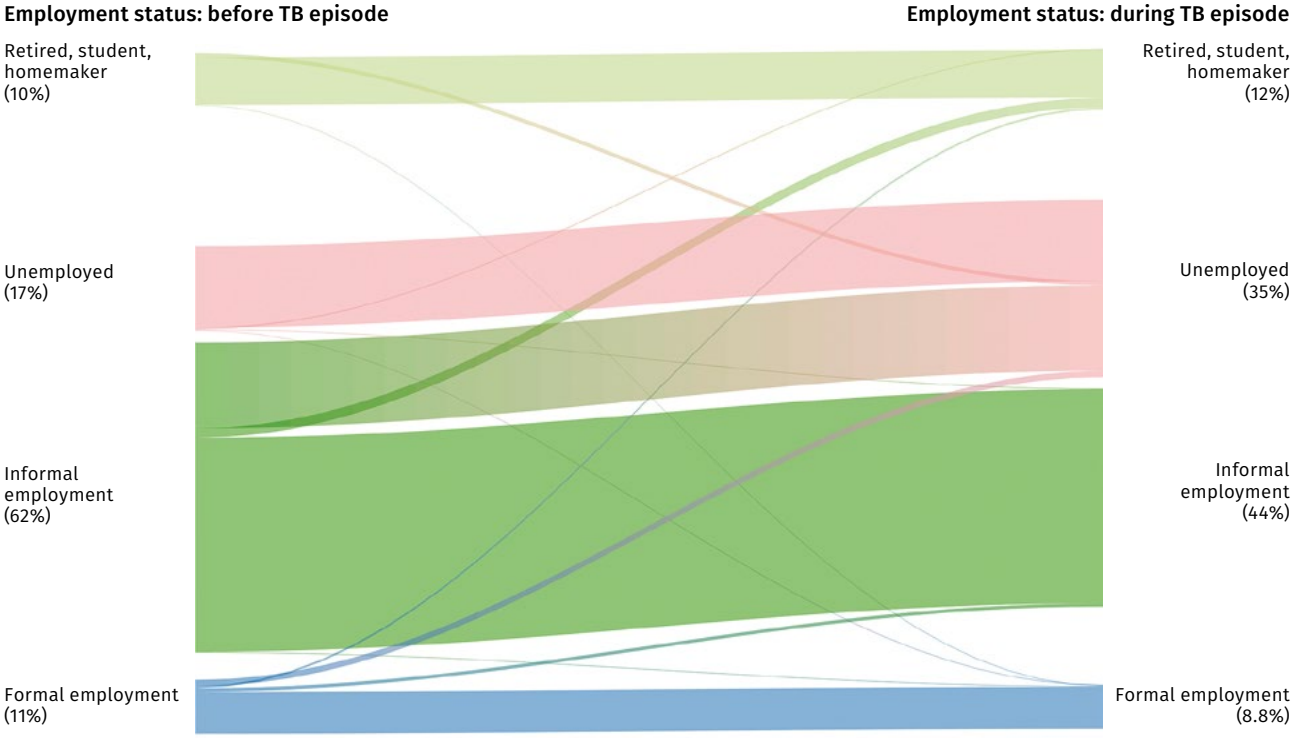
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Improve access to quality TB diagnostic services through the decentralization and streamlining of patient pathways at all levels to minimize diagnostic delay and patient costs in collaboration with local government authorities.	Direct nonmedical expenditures and indirect costs
Wider health sector	Undertake systematic nutrition assessment, counselling, and therapeutic and supplementary feeding for those in need, in coordination with the national nutrition centre, in line with the National Nutrition Strategy.	Direct nonmedical expenditures
	Actively engage in the discussion on the integration of TB services under the national health insurance scheme including TB benefit package design and its costing.	Direct medical expenditures
Non-health sector	Establish a streamlined claim mechanism for TB patients to have access to sickness and unemployment benefits, in collaboration with the National Social Security Fund.	Indirect costs
	Explore a possible collaboration with the labour and corporate sectors, to improve workplace policies and services for TB patients, including a way to protect the employment of TB patients.	

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Lao People's Democratic Republic, December 2019.

Publication

- *Lao PDR first national TB patient cost survey: an assessment of the financial burden faced by TB affected households in Lao PDR*, national report. Vientiane: National TB Control Programme, Ministry of Health, Lao People's Democratic Republic; 2019.
- Chittamany P, Yamanaka T, Suthepmany S, Sorsavanh T, Siphanthong P, Sebert J et al. First national tuberculosis patient cost survey in Lao People's Democratic Republic: assessment of the financial burden faced by TB-affected households and the comparisons by drug-resistance and HIV status. PLOS One. 2020;15(11):e0241862 (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0241862).
- Global TB report 2020. Geneva: World Health Organization; 2020: 154–6 (https://www.who.int/publications/i/item/9789240013131) – see the National surveys of costs faced by TB patients and their households in the Lao People's Democratic Republic (Box 8.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Mali

2021

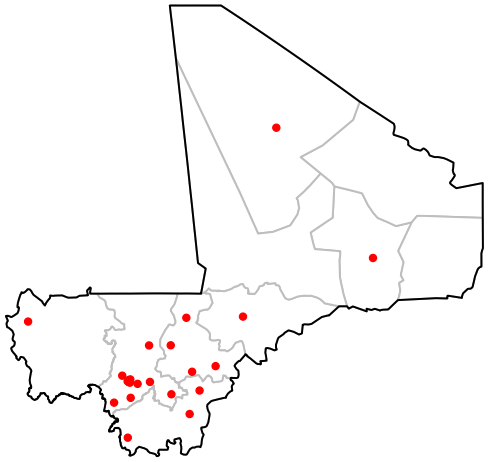
Summary statistics, national TB patient cost survey

Total number of survey participants	**453**
Number of participants by treatment category	
• TB (first-line treatment)	439
• Drug-resistant TB	14
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2021 US$[b] (95% CI)	**596 (497–714)**
• TB (first-line treatment)	575 (483–684)
• Drug-resistant TB	1838 (1152–2932)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**49 (41–58)**
• TB (first-line treatment)	48 (39–56)
• Drug-resistant TB	100 (81–100)

CFA: Communauté financière d'Afrique [African Financial Community]; CI: confidence interval; XOF: CFA Franc (Mali).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 537.3 XOF, which was the average of the period from 1 July to 31 August 2021.



Distribution of surveyed clusters (N=453)

• Surveyed cluster

Survey timeline

Initiation of preparation	October 2019
Ethics approval	March 2021 (CNESS) February 2021 (WHO AFRO)
Data collection	July 2021–August 2021
Official dissemination event	–
Publication of survey report	–

AFRO: WHO Regional Office for Africa; CNESS: Comité National d'Ethique pour la santé et les sciences de la vie; WHO: World Health Organization.

Key people

NAME	ROLE	ORGANIZATION
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Zima Jean Diallo	Co-investigator	MHSD, NTP, CSLS-TBH, Bamako, Mali
MaNiagalé Dieffaga	Co-investigator	MHSD, NTP, CSLS-TBH, Bamako, Mali
Nouhoum Telly	Co-investigator	MHSD, NTP, CSLS-TBH, Bamako, Mali
Sory Traore	Co-investigator	MHSD, NTP, CSLS-TBH, Bamako, Mali
Youssouf Diallo	Study coordinator	MHSD, NTP, CSLS-TBH, Bamako, Mali
Nayé Bah	Administration	WHO, Mali
Inés Garcia Baena	Technical assistance	WHO GTB
Samia Laokri	Technical assistance	WHO GTB
Peter Nguhiu	Technical assistance	WHO GTB

CSLS-TBH: Cellule Sectorielle de lutte Contre le VIH/Sida, la Tuberculose et les Hépatites Virales; GTB: Global Tuberculosis Programme; INSP: Institut National de Santé Publique; MHSD: Ministry of Health and Social Development; NRL: National Reference Laboratory; NTP: National Tuberculosis Programme; WHO: World Health Organization.

Organization and financing

Implementation agency

National Tuberculosis Programme, Ministry of Health and Social Development, Mali

Total budget: US$ 84 758

Funding source

The Global Fund to Fight AIDS, Tuberculosis and Malaria

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	20	2020
GDP per capita (current US$)	862	2020
Life expectancy at birth (years)	59	2019
Cause and number of deaths (top 3 and TB)		
1. Neonatal disorders	23 169	2019
2. Lower respiratory infections	14 885	2019
3. Diarrhoeal diseases	13 419	2019
18. TB	1 491	2019

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	16%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	50%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	10%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.27	2020
UHC service coverage index (worst 0–100 best)	42	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	2.1%	2018
Population with household spending on health >25% of total household budget	0.090%	2018

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	11 000 (6 900–15 000)	2020
HIV-positive	990 (640–1400)	2020
TB incidence rate (new cases per 100 000 population per year)		
Total	52 (34–74)	2020
HIV-positive	4.9 (3.2–6.9)	2020
TB treatment coverage	66% (46–100%)	2020
TB notifications		
Total new and relapse cases notified	6 922	2020
Percentage of new cases with MDR/RR-TB	0.9 (0.5–1.6)	2019
Treatment success rate		
New and relapse cases	82%	2019
Previously treated cases	70%	2019
HIV-positive TB cases	75%	2019
MDR/RR-TB cases	73%	2018
National TB budget	US$ 6.8 million	2021

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment • Tests for treatment follow-up (e.g. ECG, acoumetry and audiometry)		• Use of FDCs for improved adherence, and reduced supply-chain costs; medicines for management of side effects are not covered • Free diagnosis (microscopy, Xpert MTB/RIF and culture) in public facilities and in private facilities that are part of the NTP network[a] • Excluded examinations are radiology and other image-related tests, lumbar puncture (free for children only) and biopsies • Private non-engaged facilities charge a fee for TB-related diagnostics • Tests for adverse event reactions are not free of charge
Social support schemes for TB patients	Food	Available to	• Nutritional supplement (RUTF, provided by UNICEF) available for children aged under 5 years, patients on first-line TB treatment and patients coinfected with HIV, after nutritional evaluation; this support is delivered only in ambulatory care settings (not in hospitals) • Patients with drug-resistant TB are excluded from the nutritional supplement programme during the intensive phase, because they are hospitalized, and food is provided in hospital
		Amount	5000 XOF (US$ 9.3[b]) per day for hospitalized patients, plus in-kind supplementation with RUTF
		Duration	6–8 weeks for the treatment of severe malnutrition
	Transportation	Available to	All drug-resistant TB patients
		Amount	10 000 XOF (US$ 19[b]) per month
		Duration	Continuation phase (5 months)
Treatment support	Intensive phase		Ambulatory, 1 facility visit per week for 2 months for patients with TB on first-line treatment; hospitalized through the intensive phase (4 months) for patients with drug-resistant TB
	Continuation phase		Ambulatory, 1 visit every fortnight for 4 months for patients with TB on first-line treatment; ambulatory, 1 visit every week for 5 months for patients with drug-resistant TB
Hospitalization[c]	Eligibility		Those with Grade III (severe) – V (engaging) side effects (for the duration of symptom management) for patients with TB on first-line treatment; hospitalized through the intensive phase (4 months) for patients with drug-resistant TB
	Duration		15 days or more if required
	Location		Secondary or tertiary referral hospitals
Health service use in 2020[d]	Typical number of facility visits		
	• TB (first-line treatment)		12 visits
	• Drug-resistant TB		20 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		0 days
	• Drug-resistant TB		120 days

CFA: Communauté financière d'Afrique [African Financial Community]; ECG: electrocardiography; FDC: fixed-dose combination; HIV: human immunodeficiency virus; NTP: National Tuberculosis Programme; RUTF: ready-to-use therapeutic food; UNICEF: United Nations Children's Fund; XOF: CFA Franc (Mali).

[a] The centres where diagnostic tests are free are the Centre de Santé de Réference and the Centre de Santé Communautaire. Private engaged facilities are linked with the Cellule Sectorielle de Lutte contre le VIH/Sida, la Tuberculose et les Hépatites virales (CSLS-TBH).

[b] Current value in 2021.

[c] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[d] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of 70 diagnostic and treatment units (CDT) and 6909 notified patients (2019) at national level
Patient enrolment	Random sampling from registered patients on treatment
Assumptions for sample size calculation	
Estimated proportion	50%
Absolute precision	7%
Design effect	2
Sample size	450
Clusters	
Number	31 clusters (1 cluster was purposively selected to include a centre [CHU Point G] treating MDR/RR patients) Two districts were excluded due to insecurity (Bankas was replaced with Kati; Koro was replaced with Yanfolila)
Size	15 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and Ona (Ona Systems Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 14.0 (StataCorp) and R 4.0.2 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Human capital approach (based on lost time and hourly wage rate) Hourly wage: 247.11 XOF (US$ 0.46[a]) – national minimum wage[b]

CFA: Communauté financière d'Afrique [African Financial Community]; MDR/RR: multidrug-resistant or rifampicin-resistant TB; XOF: CFA Franc (Mali).

[a] Current value in 2021.

[b] Data source: Décret n°2015-0073/P-RM du 13 février 2015 fixant les intérims des membres du Gouvernement statuant en conseil des ministres. Article 1er (http://www.ilo.int/dyn/natlex/docs/ELECTRONIC/103437/125643/F-1903060536/MLI-103437.pdf).

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	439	100	14	100	453	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	167	38	3	21	170	38
Male	272	62	11	79	283	62
Age group (years)						
0–14	14	3.2	0	0	14	3.1
15–24	80	18	2	14	82	18
25–34	107	24	6	43	113	25
35–44	93	21	5	36	98	22
45–54	64	15	0	0	64	14
55–64	45	10	1	7.1	46	10
≥65	36	8.2	0	0	36	8.0
Education level						
No education	200	46	5	36	205	45
Primary education	135	31	7	50	142	31
Secondary or higher	104	24	2	14	106	23
Insurance status[b]						
None	409	93	14	100	423	93
Any health insurance	30	6.8	0	0	30	6.6
Household size, median (min–max)	8 (1–29)		7 (3–28)		8 (1–29)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	163	37	7	50	170	38
Continuation phase	276	63	7	50	283	62
HIV status						
Positive	46	10	0	0	46	10
Negative	337	77	14	100	351	77
Unknown	56	13	0	0	56	12
Type of TB	313	71	14	100	327	72
Pulmonary TB	45	10	0	0	45	10
Extrapulmonary TB	81	18	0	0	81	18
Diagnostic delay (>4 weeks)[c]	143	92	7	100	150	92
Treatment support						
Self-administered	417	95	14	100	431	95
Facility-based directly observed therapy	10	2.3	0	0	10	2.2
Community-based directly observed therapy	12	2.7	0	0	12	2.7

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in French) "Do you have any of the following health insurance types?". The options were "none", "reimbursement scheme (government staff)", "medical allowance", "funder/donor subsidy", "family emergency funds", "private health insurance", "mutual health insurance (community fund)", "free of charge and other exemption mechanisms for the indigent", "social protection (permanent employees of private enterprises and state-owned enterprises)", "compulsory scheme for civil servants and non-civil servants".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG RESISTANT TB[d]	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	103 (81–131)	136 (77–240)	104 (83–131)
Household	271 (231–319)	227 (150–342)	270 (230–315)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	12 (7.2–19)	1.5 (0.70–3.2)	11 (6.8–18)
Household	83 (59–117)	15 (4.1–54)	79 (56–111)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	66 (61–71)	93 (58–99)	67 (61–72)
Yes	34 (29–39)	7.1 (0.81–42)	33 (28–39)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	26 (20–34)	21 (6.3–53)	26 (20–33)
At the interview	51 (43–58)	93 (58–99)	52 (44–60)

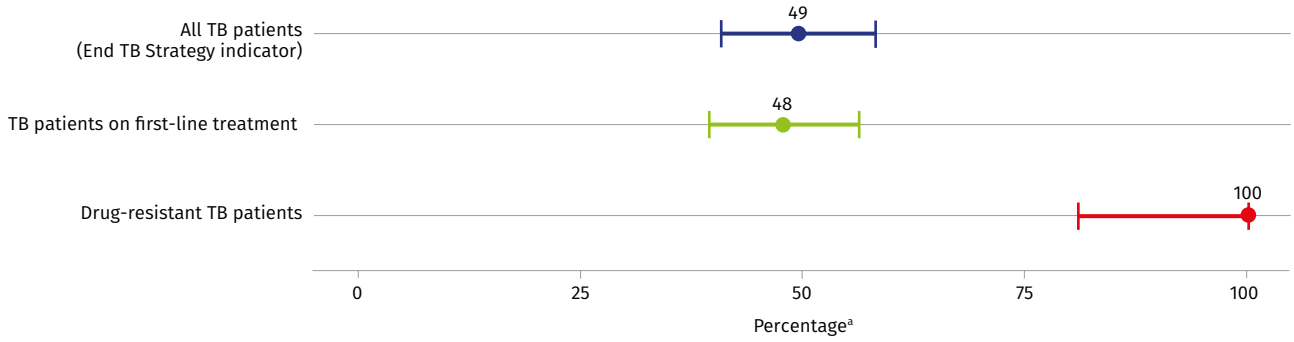
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2021.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	38	31–46	43	19–71	38	31–46
Sales of assets	35	28–43	21	6.3–53	35	28–42
Any of above	59	54–63	50	24–76	58	54–63
SOCIAL CONSEQUENCES						
Food insecurity	17	11–25	29	10–59	18	12–25
Divorce/separation	3.6	2.0–6.6	0	NA	3.5	1.9–6.4
Job loss	40	32–49	93	58–99	42	33–51
Interrupted schooling	5.9	3.7–9.5	7.1	0.81–42	6.0	3.7–9.4
Social exclusion	14	7.8–23	0	NA	13	7.6–22
Any of above	66	54–76	93	58–99	67	55–76
SOCIAL SUPPORT						
Sick leave	0.68	0.21–2.2	0	NA	0.66	0.21–2.1
Social welfare	0.68	0.23–2.1	0	NA	0.66	0.22–2.0
Other	1.4	0.42–4.4	0	NA	1.3	0.41–4.2
Any of above	3.4	1.9–6.2	0	NA	3.3	1.8–6.6

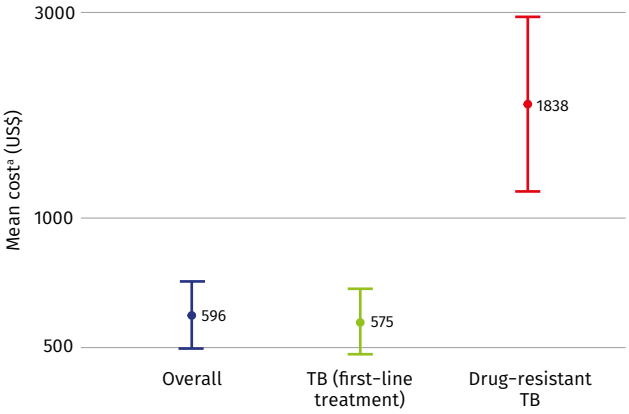
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2021 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

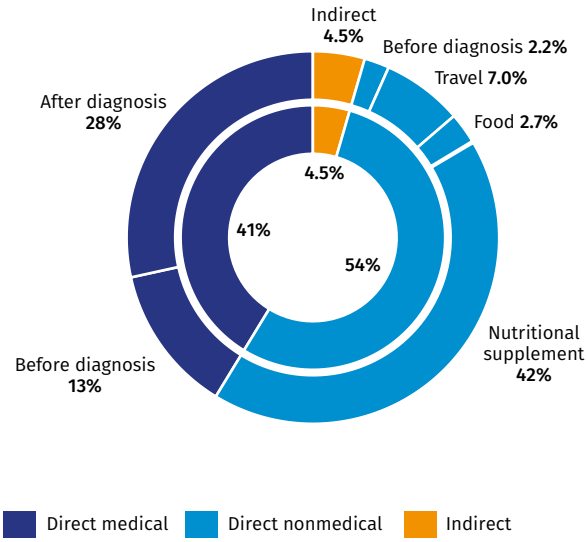
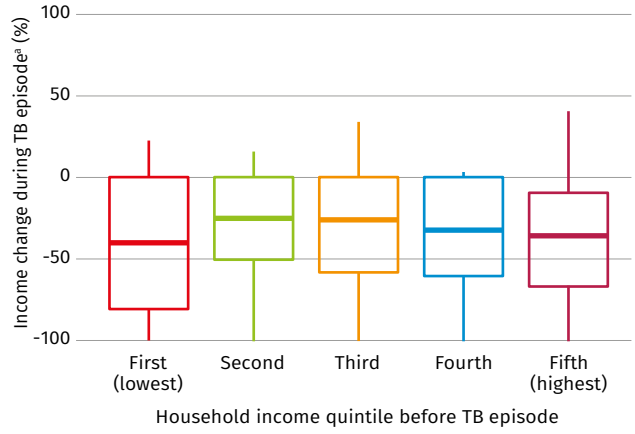
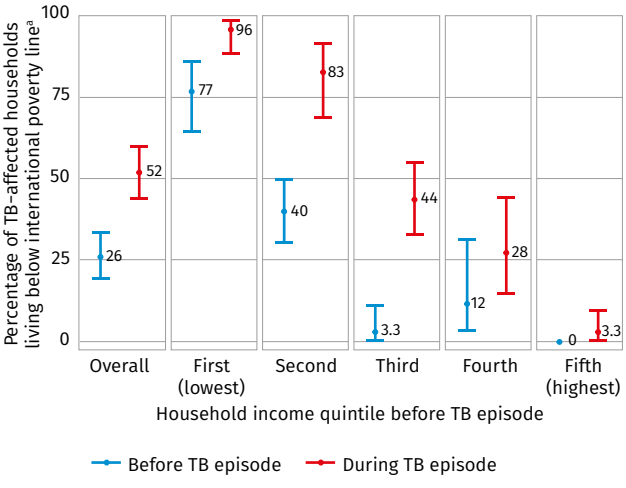


Fig. 4. Changes in distribution of monthly self-reported household income



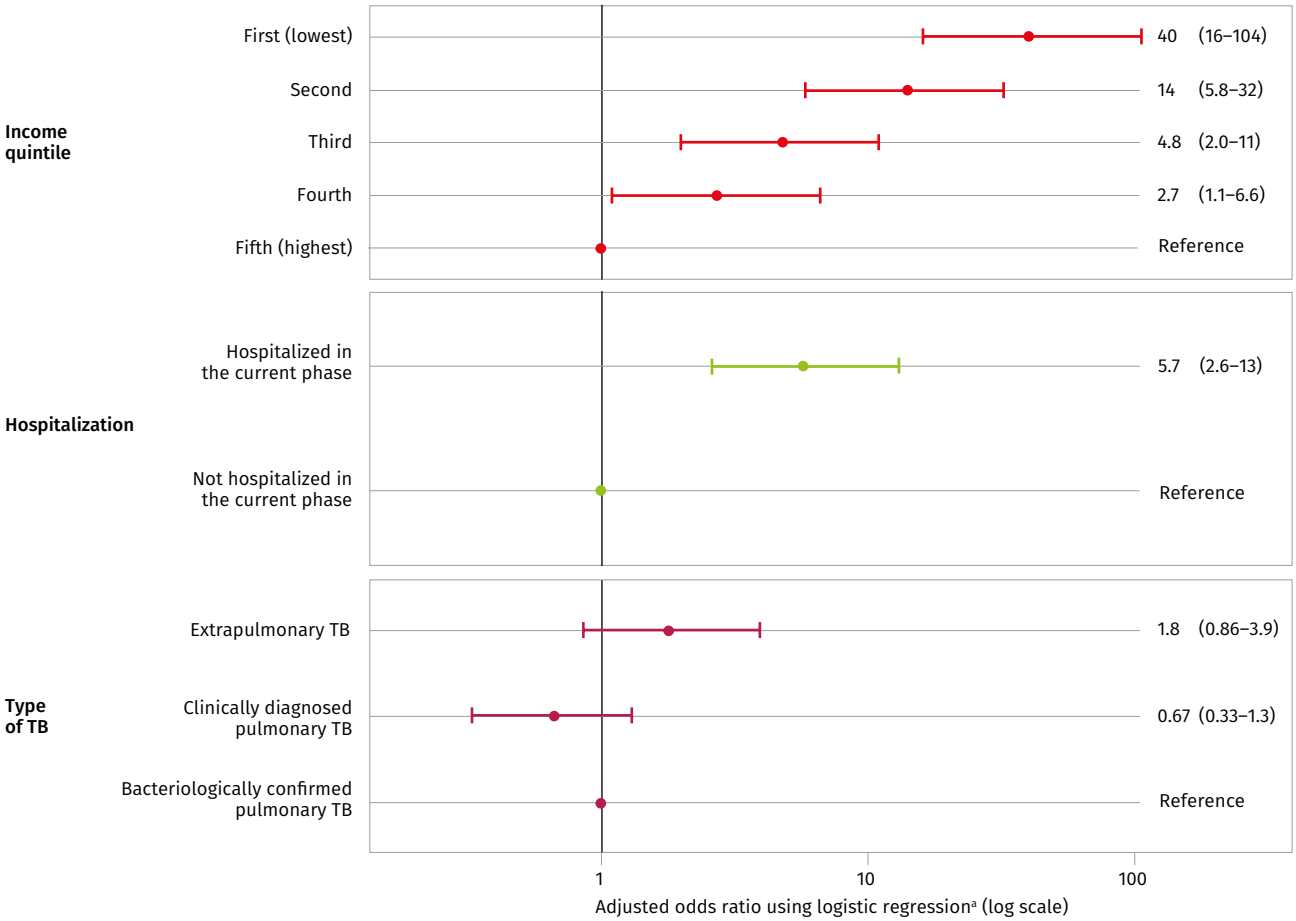
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

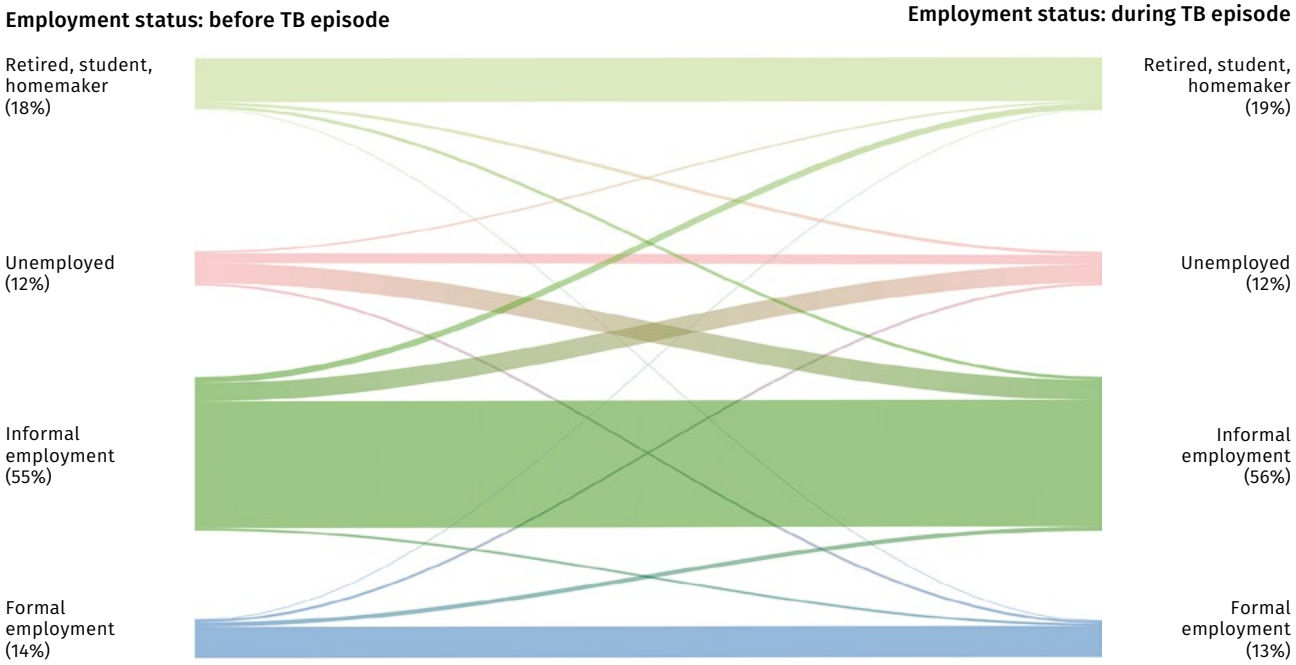
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



HIV: human immunodeficiency virus.

[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Extend the reach of the community response (implementing the NSP for community health 2021–25, setting up an operational framework for CHW–facility collaboration) to reduce the frequency of facility visits while maintaining facility linkage; this requires additional funding.	Direct nonmedical expenditures
	Develop and implement a public–private collaboration policy to improve the availability of TB services.	Direct medical and nonmedical expenditures
Wider health sector	Advocate for the coalition and organization of civil society and community-based groups, to strengthen their voices and accountability.	Direct medical and nonmedical expenditures
	Strengthen the supervisory, monitoring and evaluation roles of public authorities in decentralized settings (e.g. through creation of coordinating structures and committees).	Direct medical expenditures
	Revitalize the office of the CAMM for effective coordination and ressource mobilization.	
Non-health sector	Advocate for an increase in government, local (decentralized) authorities and non-state financial allocations to TB service delivery, to ensure a constant supply of TB drugs and other supplies.	Direct medical expenditures
	Increase public authorities' accountability and domestic funding allocations (including at local community level) to end TB.	Direct medical expenditures, direct nonmedical expenditures and indirect costs

CAMM: Comité de lutte contre la Tuberculose et les Maladies respiratoires du Mali; CHW: community health worker; NSP: national strategic plan.

Dissemination

Publication

- *Rapport de l'enquête d'évaluation des couts supportés par les patients atteints de tuberculose et leurs ménages en 2019 au Mali*. Bamako: National TB Programme, Ministry of Health and Social Development, Mali; 2022.
- Traore M, Nguhiu P, Telly N, Traore S, Toloba Y, Camara F et al. The high costs facing TB-affected households in Mali, 2021. Int J Tuberc Lung Dis. 2022;26(11):1071–3 (https://pubmed.ncbi.nlm.nih.gov/36281038/).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Mongolia

2017

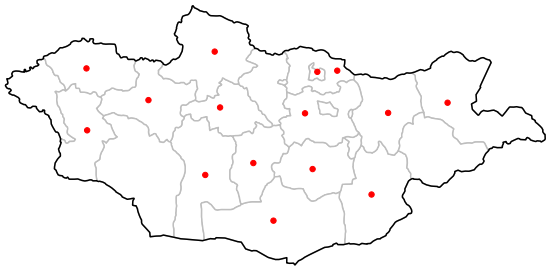
Summary statistics, national TB patient cost survey

Total number of survey participants	**739**
Number of participants by treatment category	
• TB (first-line treatment)	546
• Drug-resistant TB	193
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2018 US$[b] (95% CI)	**1028 (862–1227)**
• TB (first-line treatment)	807 (654–996)
• Drug-resistant TB	2003 (1686–2378)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**69 (64–74)**
• TB (first-line treatment)	63 (57–70)
• Drug-resistant TB	85 (79–90)

CI: confidence interval; MNT: Tugrik (Mongolia).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 2391 MNT, which was the average for 2018.



Distribution of surveyed clusters (N=22)

• Surveyed cluster

Survey timeline

Initiation of preparation	October 2015
Ethics approval	July 2016
Data collection	April 2017–August 2017
Official dissemination event	November 2018
Publication of survey report	–

Key people

NAME	ROLE	ORGANIZATION
Narantuya Jadambaa	Principal investigator	WHO, Mongolia
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Naranzul Dambaa	Field team leader	NTP, Mongolia
Munkhjargal Dorjravdan	Field team leader	NTP, Mongolia
Nasanjargal Purev	Field team leader	NTP, Mongolia
Enkhtamir Purevsuren	Field team leader	NTP, Mongolia
Yanjindulam Purevsuren	Field team leader	NTP, Mongolia
Boldoo Tsolmon	Field team leader	NTP, Mongolia
Fukushi Morishita	Technical assistance	WHO WPRO
Andrew Siroka	Technical assistance	WHO GTB
Davaalkham Dambadarjaa	Technical assistance	MNUMS
Munkh-erdene Luvsan	Technical assistance	MNUMS
Yuka Jinnai	Technical assistance	WHO, Mongolia
Nicole Rendell	Technical assistance	Australian Volunteer for International Development

GTB: Global Tuberculosis Programme; MNUMS: Mongolian National University of Medical Sciences; NTP: National Tuberculosis Programme; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agency

National Tuberculosis (TB) Programme, Ministry of Health, National Centre for Communicable Diseases, Mongolia

Total budget: US$ 25 300

Funding sources

World Health Organization (WHO) Regional Office for the Western Pacific (WPRO); Special Programme for Research and Training in Tropical Diseases, WHO

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	3.1	2017
GDP per capita (current US$)	3 669	2017
Life expectancy at birth (years)	70	2017
Cause and number of deaths (top 3 and TB)		2015
1. Ischaemic heart disease	4 278	
2. Stroke	3 808	
3. Liver cancer	1 627	
12. TB	331	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	0.50%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	5.0%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	6.3%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.01	2017
UHC service coverage index (worst 0–100 best)	63	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	7.2%	2018
Population with household spending on health >25% of total household budget	1.3%	2018

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	13 000 (6 900–22 000)	2017
HIV-positive	25 (7.0–55)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	428 (220–703)	2017
HIV-positive	0.79 (0.21–1.8)	2017
TB treatment coverage	32% (19–61%)	2017
TB notifications		
Total new and relapse cases notified	4 220	2017
Percentage of new cases with MDR/RR-TB	5.5 (4.2–6.9)	2016
Treatment success rate		
New and relapse cases	91%	2017
Previously treated cases	78%	2017
HIV-positive TB cases	86%	2017
MDR/RR-TB cases	56%	2017
National TB budget	US$ 6.1 million	2018

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for TB patients		
Social support schemes for TB patients	Cash transfer	Available to	All patients with drug-resistant TB or severe TB disease (disability benefits)
		Amount	160 000–250 000 MNT (US$ 67–105[a]) per month
		Duration	During treatment
	Food	Available to	TB patients who met the criteria for poor (household income less than 166 580 MNT [US$ 70[a]] per month[b])
		Amount	47 820 MNT (US$ 20[a]) per month
		Duration	During treatment
Treatment support	Intensive phase		Facility based, daily
	Continuation phase		Community based, at least once a week
Hospitalization[c]	Eligibility		TB patients
	Duration		Intensive phase
	Location		National and subnational levels of TB hospitals
Heath service use in 2018[d]	Typical number of facility visits		
	• TB (first-line treatment)		146 visits
	• Drug-resistant TB		393 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		35 days
	• Drug-resistant TB		86 days

MNT: Tugrik (Mongolia). WHO: World Health Organization.

[a] Current value in 2018.

[b] Data source: Mongolia poverty update 2018: main report of "Household socio-economic survey 2018". Ulanbaatar: National Statistics Office of Mongolia and The World Bank; 2020 (http://1212.mn/BookLibraryDownload.ashx?url=Poverty_report_2018_ENG.pdf&ln=En).

[c] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[d] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY		
Sampling design	Two-stage cluster sampling using probability proportional to size	
Stratification	TB (first-line treatment)	Drug-resistant TB
Sampling frame	List of TB basic management units	
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities	Total sampling from registered patients on treatment for drug-resistant TB
Assumptions for sample size calculation		
Estimated proportion	20%	
Absolute precision	4%	
Design effect	2	
Sample size	720	
Stratum size	504 (70% of sample size)	216 (30% of sample size)
Clusters		
Number	20 clusters	
Size	36 patients	
DATA COLLECTION AND ANALYSIS		
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)	
Database	Ona (Ona Systems Inc.)	
Statistical software	Stata 14.0 (StataCorp)	
METHODOLOGY FOR KEY METRICS		
Measurement for ability to pay	Self-reported household income	
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)	

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	546	100	193	100	739	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	229	42	92	48	321	43
Male	316	58	101	52	417	56
Unknown	1	0.18	0	0	1	0.14
Age group (years)						
0–14	38	7.0	10	5.2	48	6.5
15–24	122	22	50	26	172	23
25–34	133	24	54	28	187	25
35–44	99	18	34	18	133	18
45–54	76	14	29	15	105	14
55–64	48	8.8	13	6.7	61	8.3
≥65	30	5.5	3	1.6	33	4.5
Education level						
No education	22	4.0	14	7.3	36	4.9
Primary education	32	5.9	5	2.6	37	5.0
Incomplete secondary	117	21	31	16	148	20
Complete secondary or higher	372	68	143	74	515	70
Unknown	3	0.55	0	0	3	0.41
Insurance status[b]						
None	37	6.8	8	4.2	10	6.1
With insurance	509	93	184	95	10	94
Unknown	0	0	1	0.52	10	0.14
Household size, median (min–max)	4 (1–16)		4 (1–9)		4 (1–16)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	288	53	51	26	339	46
Continuation phase	258	47	142	74	400	54
Treatment category						
New	450	82	126	65	576	78
Retreatment	96	18	67	35	163	22
HIV status						
Positive	2	0.37	0	0	2	0.27
Negative	430	79	138	72	568	77
Unknown	114	21	55	29	169	23
Type of TB						
Bacteriologically confirmed pulmonary TB	314	58	167	87	481	65
Clinically diagnosed pulmonary TB	83	15	8	4.2	91	12
Extra pulmonary TB	149	27	18	9.3	167	23
Diagnostic delay (>4 weeks)[c]	143	64	17	63	160	63
Treatment support						
Self-administered	155	28	71	37	226	31
Directly observed therapy	371	68	117	61	488	66
Unknown	20	3.7	5	2.6	25	3.4

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?". The options were "no" and "yes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	43 (35–53)	46 (33–65)	44 (37–52)
Household	207 (178–241)	266 (238–296)	221 (197–249)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	7.8 (6.4–9.6)	17 (12–22)	9.6 (8.0–11)
Household	96 (82–112)	123 (103–148)	102 (90–116)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	61 (55–66)	58 (51–66)	60 (55–64)
Yes	39 (34–45)	42 (34–49)	40 (36–45)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	10 (7.0–14)	5.3 (2.8–8.5)	8.9 (6.4–12)
At the interview	22 (19–26)	15 (11–19)	20 (17–23)

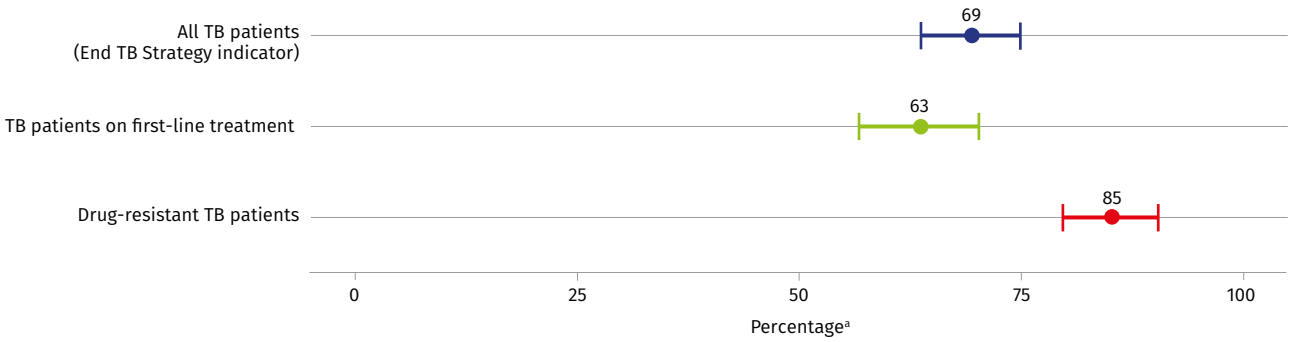
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2018.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	20	16–24	23	16–30	20	17–24
Loan	37	33–42	39	32–46	38	34–42
Sales of assets	4.3	2.8–6.2	14	9.1–20	6.9	5.0–9.0
Any of above	51	47–56	54	47–62	52	48–56
SOCIAL CONSEQUENCES						
Food insecurity	11	7.8–15	18	12–24	13	9.9–16
Divorce/separation	1.2	0.44–2.4	3.6	1.8–6.2	1.9	1.1–2.9
Job loss	41	35–48	58	49–66	46	40–51
Interrupted schooling	14	10–18	15	9.8–20	14	11–17
Social exclusion	24	20–27	39	31–47	28	24–31
Any of above	71	66–76	85	79–91	75	71–79
SOCIAL SUPPORT						
Social support/welfare	11	8.1–14	43	34–52	19	16–23
Vouchers	2.4	1.2–3.9	28	21–36	9.3	6.3–13

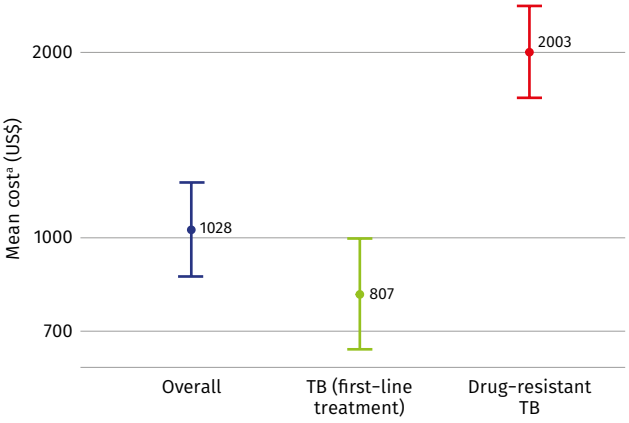
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2018 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

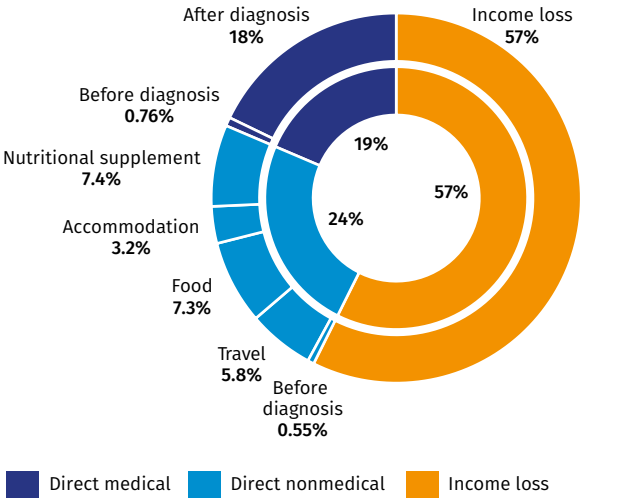
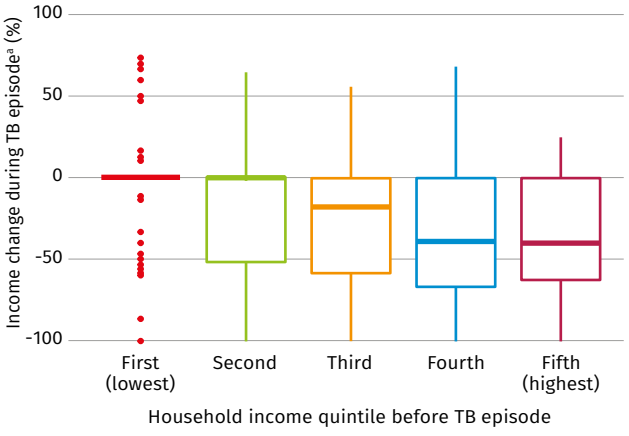
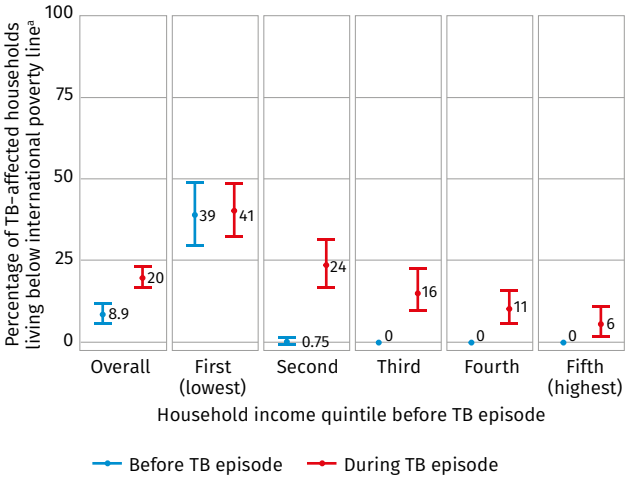


Fig. 4. Changes in distribution of monthly self-reported household income



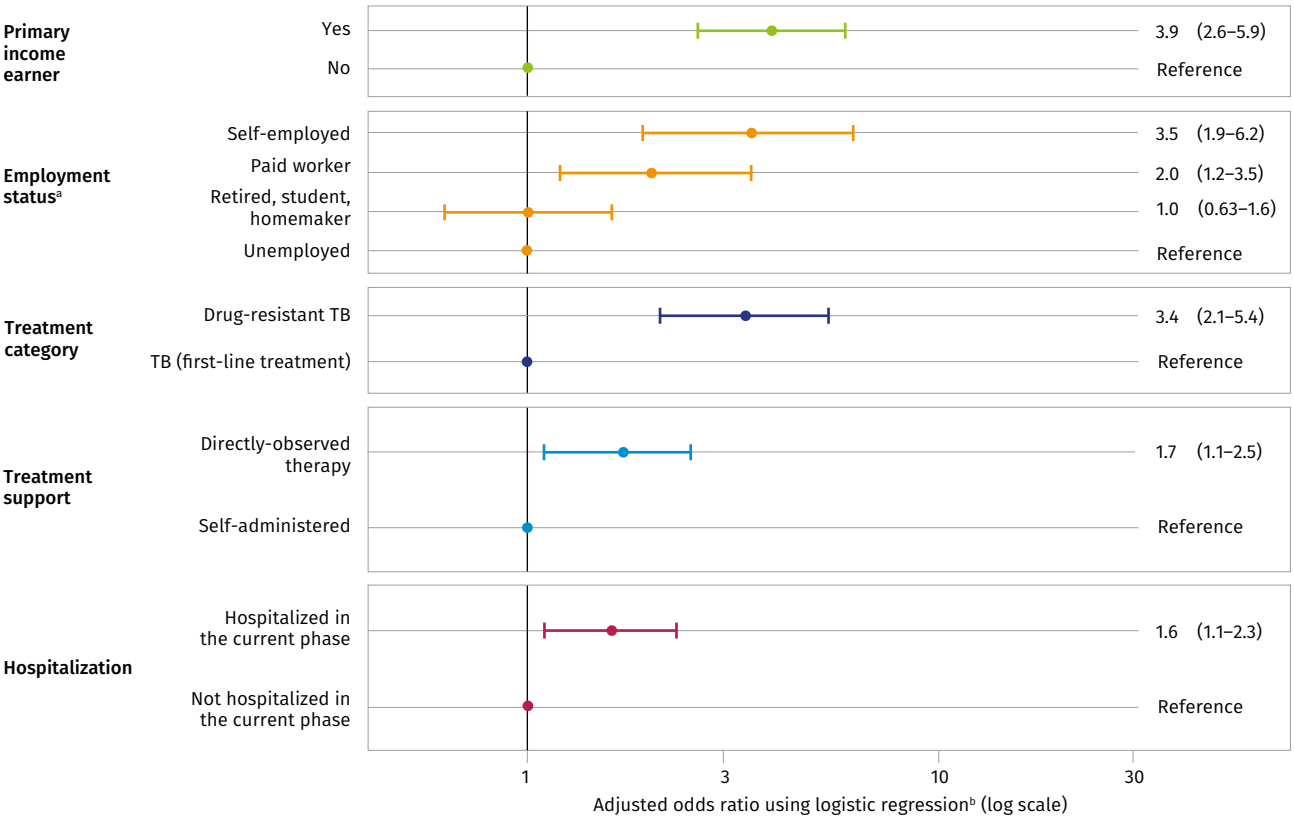
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

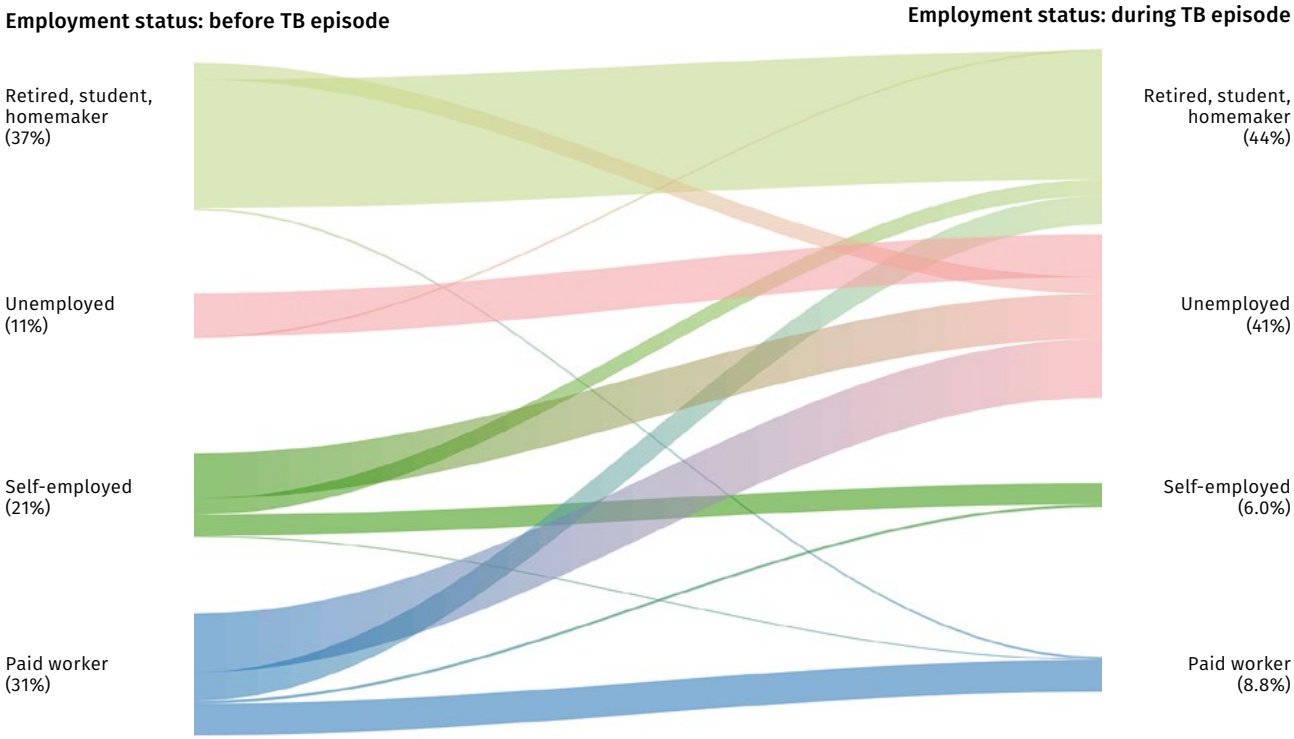
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Strengthening TB service delivery through primary health care providers: • Use of mobile technology at the primary health care level. • Capacity-building of primary health care providers.	Direct medical expenditures and indirect costs
	Expansion of community-based TB care: • Home-based directly observed therapy. • Directly observed therapy combined with provision of meal (lunch DOT).	
	Strengthening and maintaining current specimen transportation system.	
Wider health sector	Expansion of social protection package to TB patients beyond "disability" allowance.	Direct nonmedical expenditures and indirect costs
Non-health sector	Work with the Ministry of Labour and Social Welfare to develop a TB-specific social support package.	Direct nonmedical expenditures and indirect costs
	Develop and implement policies to eliminate discrimination and ensure job security for TB patients.	Indirect costs
	Advocacy to the parliament on improving financing for primary health care.	Direct medical and non-medical expenditures

Dissemination

Event

- *High-level national meeting on ending tuberculosis through multi-sectoral partnership and collaboration in the era of SDGs and the endorsement of Ulaanbaatar Declaration on ending TB in Mongolia*, organized by the Ministry of Health, Mongolian Government, November 2018.

Publication

- End tuberculosis through multi-sectoral partnership and collaboration in the era of SDGs. Mongolian Journal of infectious disease research, 2018, Number 6 (83), ISSN 2310-8754.
- Global TB report 2019. Geneva: World Health Organization; 2019:153 (https://www.who.int/publications/i/item/global-tuberculosis-report-2019) – see the National surveys of costs faced by TB patients and their households in Mongolia: results, high-level advocacy and policy translation (Box 7.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Myanmar

2015–2016

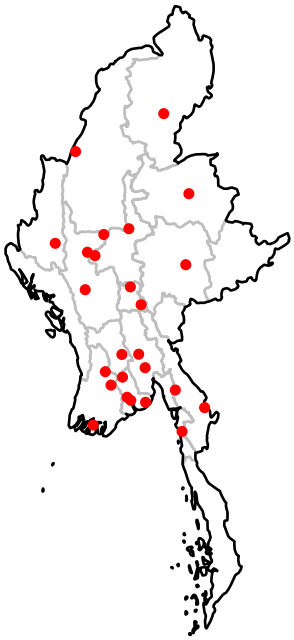
Summary statistics, national TB patient cost survey

Total number of survey participants	**967**
Number of participants by treatment category	
• TB (first-line treatment)	901
• Drug-resistant TB	66
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2016 US$ (95% CI)	**449 (387–520)**
• TB (first-line treatment)	407 (361–460)
• Drug-resistant TB	1773 (1 504–2 092)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**60 (53–66)**
• TB (first-line treatment)	57 (51–64)
• Drug-resistant TB	98 (93–100)

CI: confidence interval; MMK: Myanmar kyat.

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 1283 MMK, which was the average for 2016.



Distribution of surveyed clusters (N=25)

• Surveyed cluster

Survey timeline

Initiation of preparation	August 2015
Ethics approval	October 2015
Data collection	December 2015–February 2016
Official dissemination event	August 2017
Publication of survey report	July 2021

Key people

NAME	ROLE	ORGANIZATION
Thandar Lwin	Chairperson of SC	Disease Control, Department of Public Health
Si Thu Aung	Principal investigator	NTP, Department of Public Health
Tin Mi Mi Khine	Member of SC	Lower Myanmar, Department of Public Health
Saw Thein	Member of SC	Upper Myanmar, Department of Public Health
Erwin Cooreman	Member of SC	WHO, Myanmar
Aye Aye Thwe	Co-coordinator	NTP, Department of Public Health
Aung Thu	Co-coordinator	WHO, Myanmar
Nyein Nyein Aye	Supervisor	Sagaing Regional TB office, Department of Public Health
Ei Ei Chaw	Supervisor	Kachin State TB office, Department of Public Health
Tin Maung Swe	Supervisor	Magway Regional Public Health Department
Nan Saung Khan	Supervisor	Shan State (East) TB office, Department of Public Health
Htay Lwin	Supervisor	Tanintharyi Regional Public Health Department
Ohnmar Myint	Supervisor	Ayeyarwaddy Regional TB office, Department of Public Health
Zaw Myint	Supervisor	Shan State (South) TB office, Department of Public Health
Win Naing	Supervisor	Mon and Kayin States TB office, Department of Public Health
Aye Aye Nyein	Supervisor	Bago Region TB office, Department of Public Health
Khine Sandar Aung	Supervisor	Shan State (North) TB office, Department of Public Health
Andrew Siroka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Programme; SC: steering committee; WHO: World Health Organization.

Organization and financing

Implementation agency

National Tuberculosis (TB) Programme, Ministry of Health and Sports, Republic of the Union of Myanmar

Total budget: US$ 30 000

Funding sources

Three Millennium Development Goal Fund (3MDG); World Health Organization

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	53	2016
GDP per capita (current US$)	1 267	2016
Life expectancy at birth (years)	66	2016
Cause and number of deaths (top 3 and TB)		2015
1. Stroke	65 080	
2. Ischaemic heart disease	32 220	
3. TB	30 281	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	1.4%	2017
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	15%	2017
SDG 2: Zero hunger		
Prevalence of undernourishment	8.4%	2016
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	na	–
UHC service coverage index (worst 0–100 best)	56	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	13%	2017
Population with household spending on health >25% of total household budget	3.5%	2017

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	198 000 (117 000–299 000)	2016
HIV-positive	19 000 (11 000–28 000)	2016
TB incidence rate (new cases per 100 000 population per year)		
Total	372 (221–563)	2016
HIV-positive	35 (21–53)	2016
TB treatment coverage	70% (46–120%)	2016
TB notifications		
Total new and relapse cases notified	137 551	2016
Percentage of new cases with MDR/RR-TB	5.1 (3.4–7.2)	2013
Treatment success rate		
New and relapse cases	88%	2016
Previously treated cases	77%	2016
HIV-positive TB cases	73%	2016
MDR/RR-TB cases	79%	2016
National TB budget	US$ 69 million	2016

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs, ancillary drugs for treatment of side effects • TB diagnostics (microscopy, Xpert MTB/RIF, first-line and second-line LPA, culture and phenotypic DST, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		All diagnosis and treatment services are provided free of charge
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	28 000 MMK (US$ 22[a])
		Duration	During treatment
	Food	Available to	All drug-resistant TB patients with Body Mass Index <16
		Amount	28 000 MMK (US$ 22[a])
		Duration	9 months
	Transportation	Available to	All drug-resistant TB patients
		Amount	30 000 MMK (US$ 23[a])
		Duration	During treatment
Treatment support	Intensive phase		Facility based, at least once a week
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		Severe diseases including disseminated TB and other severe forms of extrapulmonary TB
	Duration		2–4 weeks
	Location		Government and private hospitals
Heath service use in 2015[c]	Typical number of facility visits		
	• TB (first-line treatment)		4 visits
	• Drug-resistant TB		24 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		15 days
	• Drug-resistant TB		40 days

DST: drug susceptibility testing; LPA: line probe assay; MMK: Kyat (Myanmar).

[a] Current value in 2016.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions	
Estimated proportion	30%
Absolute precision	4%
Design effect	2
Sample size	1004
Clusters	
Number	25 clusters
Size	40 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 13.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	901	100	66	100	967	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	342	38	26	39	368	38
Male	555	62	40	61	595	62
Unknown	4	0.44	0	0	4	0.41
Age group (years)						
0–14	200	22	1	1.5	201	21
15–24	86	10	14	21	100	10
25–34	148	16	19	29	167	17
35–44	145	16	14	21	159	16
45–54	143	16	9	14	152	16
55–64	121	13	8	12	129	13
≥65	56	6.2	1	1.5	57	5.9
Unknown	2	0.22	0	0	2	0.21
Education level						
No education	78	8.7	5	7.6	83	8.6
Primary	375	42	16	24	391	40
Lower secondary	236	26	18	27	254	26
Higher secondary or higher	201	22	26	39	227	23
Unknown	11	1.2	1	1.5	12	1.2
Insurance status[b]						
None	898	100	66	100	964	100
With insurance	3	0.33	0	0	3	0.31
Household size, median (min–max)	4 (1–21)		4 (1–16)		4 (1–21)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	348	39	30	45	378	39
Continuation phase	553	61	36	55	589	61
Treatment category						
New	790	88	14	21	804	83
Retreatment	111	12	52	79	163	17
HIV status						
Positive	53	5.9	6	9.1	59	6.1
Negative	674	75	41	62	715	74
Unknown	174	19	19	29	193	20
Type of TB						
Bacteriologically confirmed pulmonary TB	389	43	65	98	454	47
Clinically diagnosed pulmonary TB	421	47	1	1.5	422	44
Extrapulmonary TB	89	9.9	0	0	89	9.2
Unknown	2	0.22	0	0	2	0.21
Diagnostic delay (>4 weeks)[c]	110	39	2	25	112	39
Treatment support						
Self-administered	586	65	5	7.6	591	61
Directly observed therapy	314	35	60	91	374	39
Unknown	1	0.11	1	1.5	2	0.21

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?". The options were "no" and yes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	29 (22–38)	36 (22–59)	29 (23–38)
Household	140 (127–154)	150 (99–226)	140 (127–155)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	5.4 (4.4–6.5)	2.6 (1.5–4.5)	5.1 (4.3–6.1)
Household	65 (56–76)	41 (16–109)	63 (53–75)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	53 (49–57)	46 (28–65)	52 (48–56)
Yes	39 (34–44)	44 (27–61)	39 (35–44)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	13 (8.1–18)	8.2 (2.4–17)	12 (8.1–18)
At the interview	29 (24–35)	35 (16–55)	30 (24–36)

CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2016.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

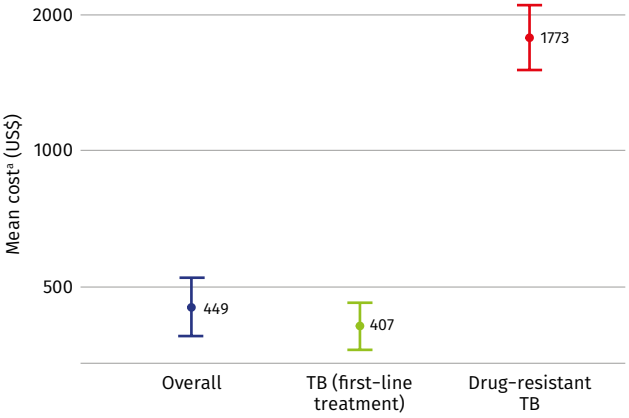
	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	37	30–44	39	27–51	37	31–44
Loan	32	26–39	43	23–64	33	27–39
Sales of assets	23	18–28	37	23–52	24	19–29
Any of above	64	57–71	72	57–85	65	58–71
SOCIAL CONSEQUENCES						
Food insecurity	1.4	0.55–2.7	3.2	0.030–14	1.5	0.56–3.0
Divorce/separation	0.52	0.17–1.0	0	NA	0.48	0.16–1.0
Job loss	1.8	0.54–3.8	1.2	<0.01–4.9	1.8	0.56–3.7
Interrupted schooling	3.2	1.7–5.1	7.6	3.4–13	3.5	2.0–5.3
Social exclusion	4.2	2.8–5.8	13	5.5–23	4.8	3.1–6.8
Any of above	9.7	6.5–13	21	7.3–39	10	7.1–14
SOCIAL SUPPORT						
Sick leave	2.1	1.1–3.3	17	2.4–42	3.1	1.6–5.0
Social welfare	14	6.8–24	92	78–99	19	12–29
TB-specific support	0.23	<0.01–0.94	13	7.8–73	0.37	0.025–1.1
Other	0.66	0.065–1.9	0	NA	0.65	0.066–1.8
Any of above	2.7	1.1–5.2	0	NA	2.7	1.1–5.1

CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB

[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2016 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

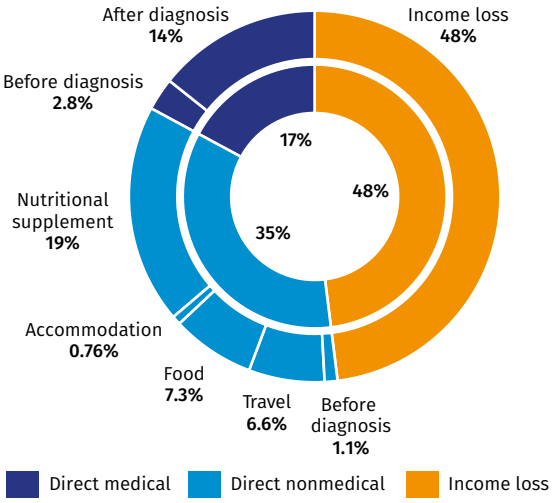
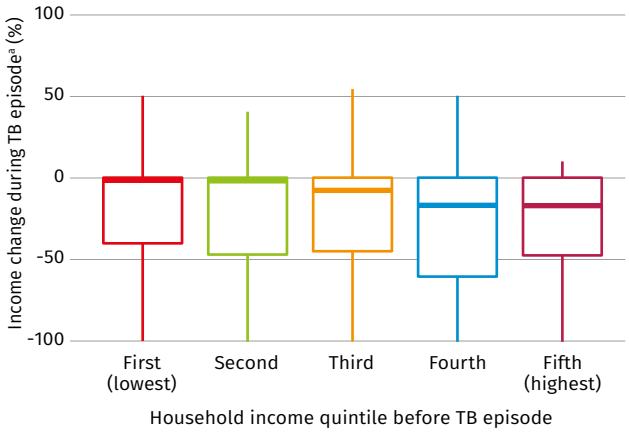
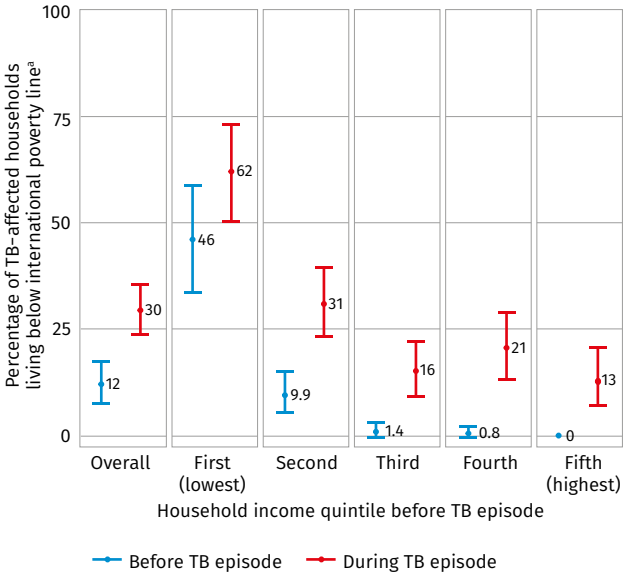


Fig. 4. Changes in distribution of monthly self-reported household income



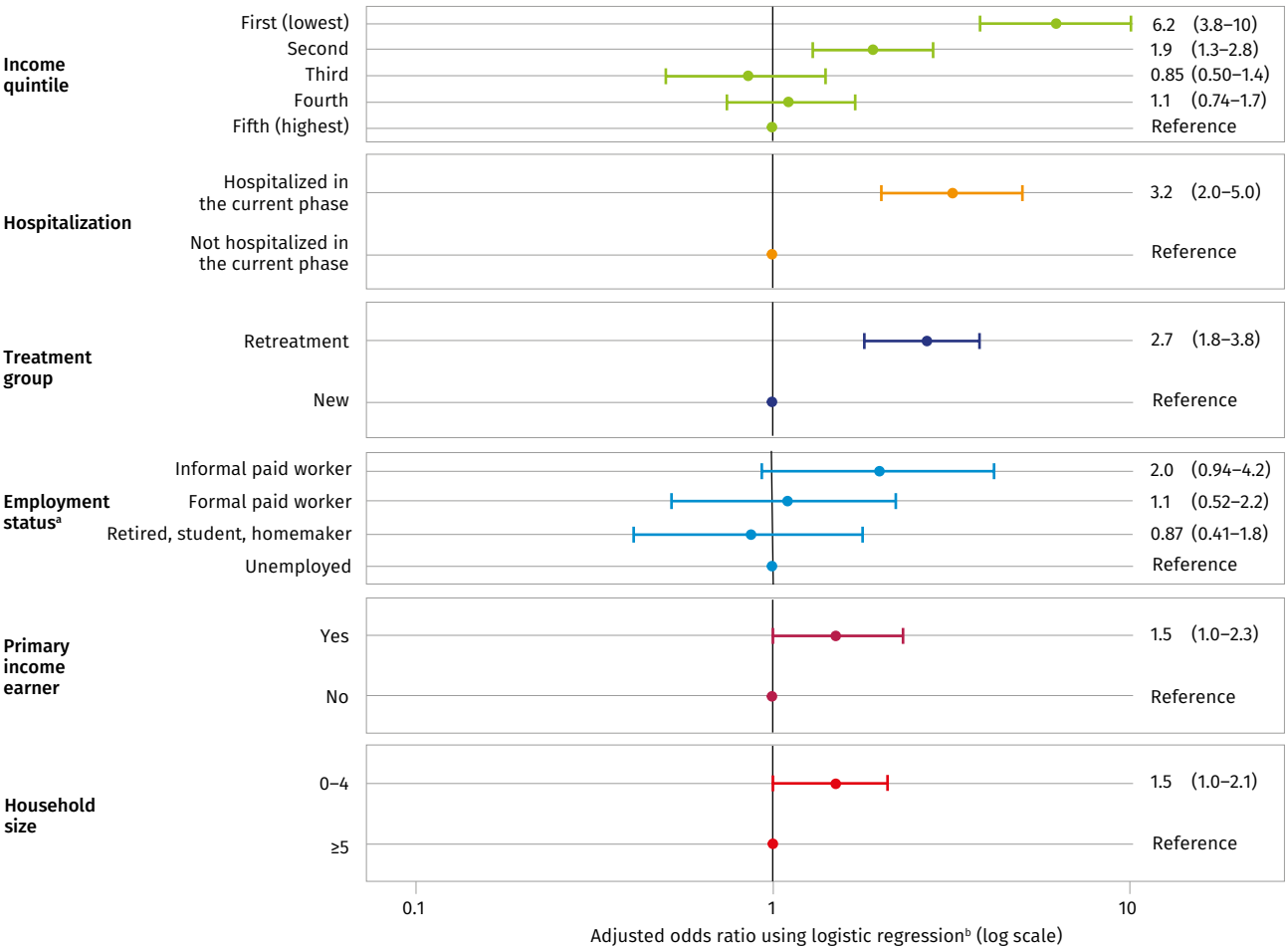
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

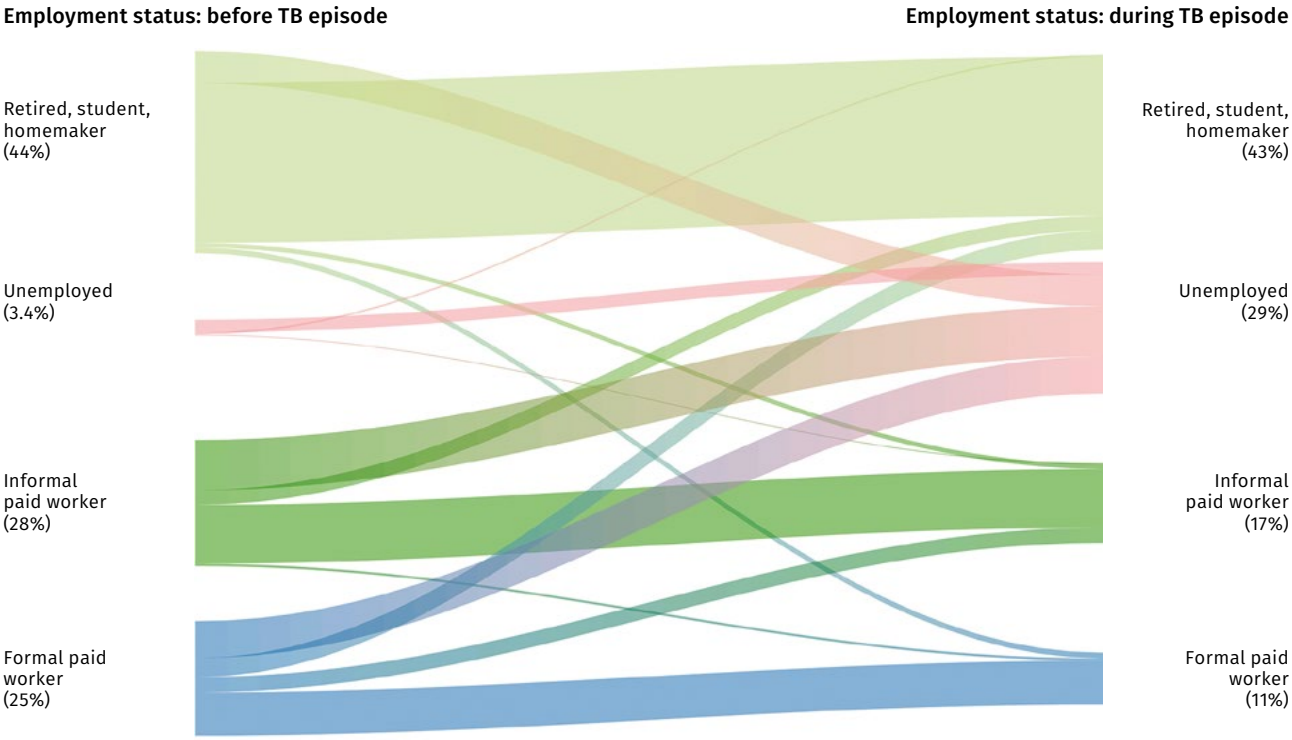
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Enhance support provided for people with TB on first-line and second-line treatment, in collaboration with The Global Fund and implementation partners.	Direct nonmedical expenditures and indirect costs
	Strengthen health services, especially through decentralization and making services patient friendly.	
Wider health sector	Strengthen ownership and investments in hospitals providing DR-TB care across the country.	Direct nonmedical expenditures and indirect costs
	Implement the essential health package to improve access to health care and reduce costs of consultations and non-TB drugs.	Direct medical and nonmedical expenditures
Non-health sector	Collaborate with the Union Ministry of Social Welfare Relief and Resettlement, particularly in its pilot cash transfer programme for the elderly, pregnant women, children aged under 5 years and TB patients.	Direct nonmedical expenditures and indirect costs
	Engagement of the Ministry of Labour for employment protection and compensation for income loss, and the Ministry of Social Welfare for alleviation of transportation costs.	

DR-TB: drug-resistant TB.

Dissemination

Event

- Presentation in the patient cost survey symposium at the 47th Union World Health Conference on Lung Health in October 2016 by Dr. Si Thu Aung.
- TB cost survey result dissemination with multi-sectoral engagement workshop for TB care and prevention, National TB Programme, Ministry of Health and Sports, Republic of the Union of Myanmar, 3 August 2017.

Publication

- Aung ST, Thu A, Aung HL, Thu M. Measuring catastrophic costs due to tuberculosis in Myanmar. Trop. Med. Infect. Dis. 2021;6(3):130 (https://www.mdpi.com/2414-6366/6/3/130).
- Global TB report 2016. Geneva: World Health Organization; 2016:103 (https://www.who.int/publications/i/item/9789241565394) – see the Myanmar TB patient cost survey (Box 6.5).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Nigeria

2017

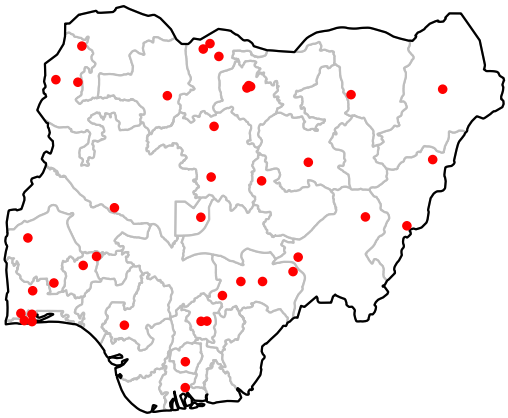
Summary statistics, national TB patient cost survey

Total number of survey participants	**1190**
Number of participants by treatment category	
• TB (first-line treatment)	1095
• Drug-resistant TB	95
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2020 US$[b] (95% CI)	**453 (398–516)**
• TB (first-line treatment)	406 (359–460)
• Drug-resistant TB	1591 (1198–2113)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**71 (66–75)**
• TB (first-line treatment)	69 (64–74)
• Drug-resistant TB	90 (83–95)

CI: confidence interval; NGN: Naira (Nigeria).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 351 NGN, which was the average of the period from June to December 2017.



Distribution of surveyed clusters (N=40)

• Surveyed cluster

Survey timeline

Initiation of preparation	March 2017
Ethics approval	May 2017
Data collection	June–December 2017
Official dissemination event	March 2019
Publication of survey report	November 2017

Key people

NAME	ROLE	ORGANIZATION
Adebola Lawanson	Principal investigator	NTBLCP, Nigeria
Abiodun Hassan	Co-principal investigator	ARFH, Nigeria
Amos Omoniyi Fadare	Co-principal investigator	WHO, Nigeria
Obioma Chijioke-Akaniro	Monitoring and evaluation manager	NTBLCP, Nigeria
Olalekan Olagunju	Data analyst	Obafemi Awolowo University, Nigeria
Eric Obikeze	Health economist	University of Nigeria Nsukka, Nigeria
Olapeju Esumai	Technical assistance	Obafemi Awolowo University, Nigeria
Andrew Siroka	Technical assistance	WHO GTB

ARFH: Association for Reproductive and Family Health; GTB: Global Tuberculosis Programme; NTBLCP: National Tuberculosis and Leprosy Control Programme; WHO: World Health Organization.

Organization and financing

Implementation agencies

National Tuberculosis (TB) Programme, Ministry of Health, Nigeria; Association for Reproductive and Family Health

Total budget: US$ 346 726

Funding sources

The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund); United States Agency for International Development (USAID)

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	191	2017
GDP per capita (current US$)	1 969	2017
Life expectancy at birth (years)	54	2017
Cause and number of deaths (top 3 and TB)		2015
1. Neonatal conditions	235 949	
2. Lower respiratory infections	211 704	
3. Diarrhoeal diseases	163 288	
5. TB	112 563	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	39%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	71%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	10%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.49	2017
UHC service coverage index (worst 0–100 best)	41	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	16%	2018
Population with household spending on health >25% of total household budget	4.1%	2018

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	418 000 (273 000–594 000)	2017
HIV-positive	58 000 (38 000–82 000)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	219 (143–311)	2017
HIV-positive	30 (20–43)	2017
TB treatment coverage	24% (17–38%)	2017
TB notifications		
Total new and relapse cases notified	102 387	2017
Percentage of new cases with MDR/RR-TB	4.3 (3.2–5.5)	2010
Treatment success rate		
New and relapse cases	86%	2017
Previously treated cases	82%	2017
HIV-positive TB cases	76%	2017
MDR/RR-TB cases	77%	2017
National TB budget	US$ 336 million	2017

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF, culture, when applicable)		
Social support schemes for TB patients	Food	Available to	All drug-resistant TB patients
		Amount	2000 NGN (US$ 5.7[a]) per month
		Duration	10 months
	Transportation	Available to	All drug-resistant TB patients
		Amount	1000 NGN (US$ 2.8[a]) per month
		Duration	10 months
Treatment support	Intensive phase		Facility based, at least once a week
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		Drug-resistant TB patients with the following conditions: severely ill, with comorbidity, on substance abuse, children younger than 5 years old and pregnant women
	Duration		One month or more depending on patient condition
	Location		Drug-resistant TB treatment centre
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		18 visits
	• Drug-resistant TB		211 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		120 days

NGN: Naira (Nigeria)

[a] Current value in 2017.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Single stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions	
Estimated proportion	44%
Absolute precision	4%
Design effect	2
Sample size	1200
Clusters	
Number	40 clusters
Size	30 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Open Data Kit (Get ODK Inc.)
Statistical software	Stata 14.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income between before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	1 095	100	95	100	1 190	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	715	65	67	71	782	66
Male	380	35	28	29	408	34
Age group (years)						
0–14	59	5.4	0	0	59	5.0
15–24	193	18	21	22	214	18
25–34	328	30	36	38	364	31
35–44	235	21	19	20	254	21
45–54	152	14	11	12	163	14
55–64	82	7.5	7	7.4	89	7.5
≥65	46	4.2	1	1.1	47	4.0
Education level						
No education	255	23	15	16	270	23
Primary school	272	25	14	15	286	24
Secondary school	356	33	37	39	393	33
Tertiary education	151	14	26	27	177	15
Other	61	5.6	3	3.2	64	5.4
Insurance status[b]						
None	1 055	96	92	97	133	96
With insurance	40	3.7	3	3.2	10	3.6
Household size, median (min–max)	6 (1–20)		5 (1–20)		6 (1–20)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	454	41	42	44	496	42
Continuation phase	641	59	53	56	694	58
Treatment category						
New	1 001	91	44	46	1 045	88
Retreatment	94	8.6	51	54	145	12
HIV status						
Positive	912	83	78	82	990	83
Negative	106	9.7	15	16	121	10
Unknown	77	7	2	2.1	79	6.6
Diagnostic delay (>4 weeks)[c]	168	15	12	13	180	15
Treatment support						
Self-administered	617	56	26	27	643	54
Directly observed therapy (by health care worker)	94	8.6	33	35	127	11
Directly observed therapy (by treatment supporter)	384	35	36	38	420	35

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?". The options were "No" and "Yes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	54 (46–63)	61 (45–84)	55 (47–63)
Household	123 (109–138)	162 (127–207)	125 (111–141)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	8.3 (6.5–11)	5.1 (3.2–8.1)	8.0 (6.3–10)
Household	57 (46–70)	70 (44–110)	58 (48–70)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	53 (48–57)	54 (44–65)	53 (48–58)
Yes	47 (43–52)	46 (35–56)	47 (42–52)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	56 (50–63)	40 (29–52)	55 (48–61)
At the interview	67 (60–73)	51 (40–61)	66 (59–71)

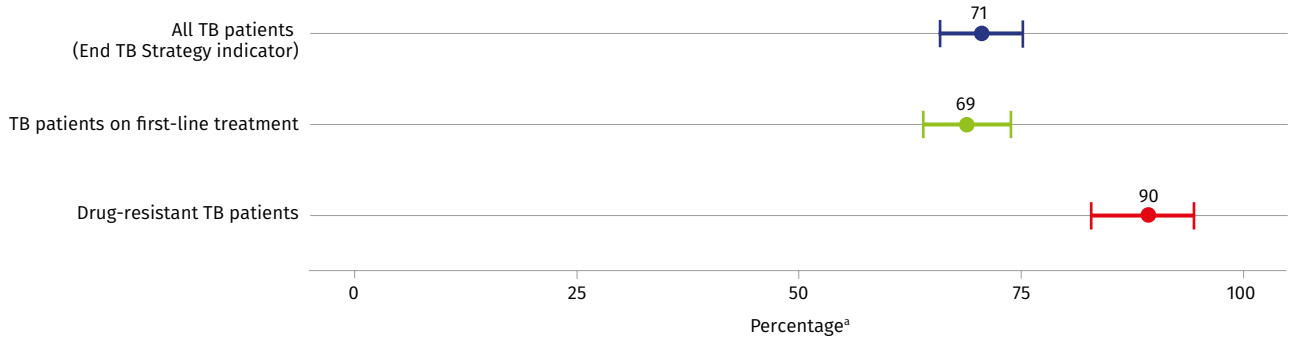
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2017.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	54	48–59	58	45–70	54	49–59
Loan	44	39–49	52	41–64	45	40–50
Sales of assets	29	24–35	33	23–44	30	24–35
Any of above	54	48–59	58	45–70	54	49–59
SOCIAL CONSEQUENCES						
Food insecurity	44	37–50	52	39–66	45	38–51
Divorce/separation	5.0	3.4–6.8	5.1	1.9–9.8	5.0	3.5–6.7
Job loss	28	23–33	48	37–60	29	24–35
Loss of residence	2.8	1.5–4.5	8.3	3.4–15	3.2	1.8–5.2
Interrupted schooling	12	8.5–15	19	11–29	12	9.0–16
Social exclusion	26	20–33	39	29–50	27	21–34
Any of above	65	59–70	81	72–89	66	60–71
SOCIAL SUPPORT						
Social welfare/support	16	12–21	53	42–63	19	15–23
Vouchers	13	8.5–17	38	27–50	15	11–19

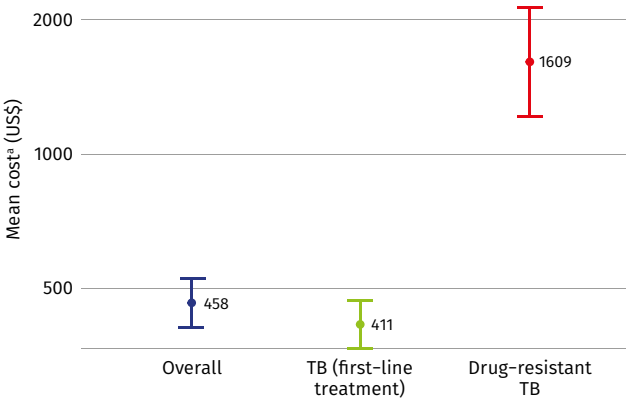
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



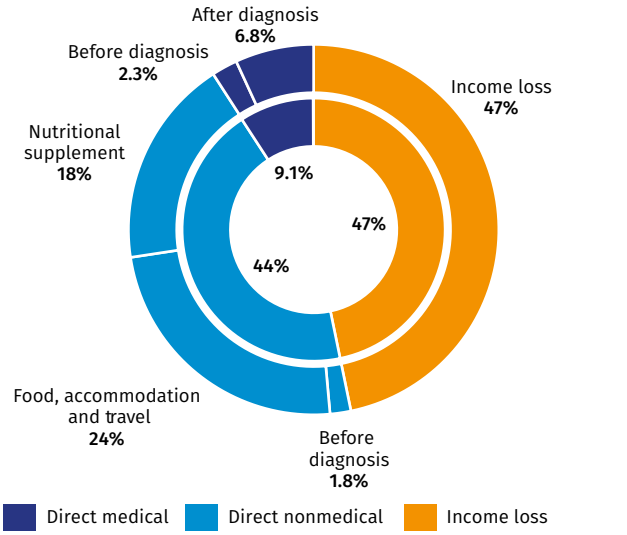
[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2017 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category



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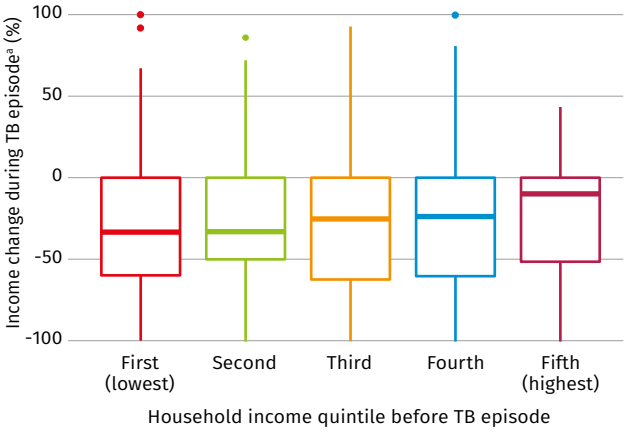
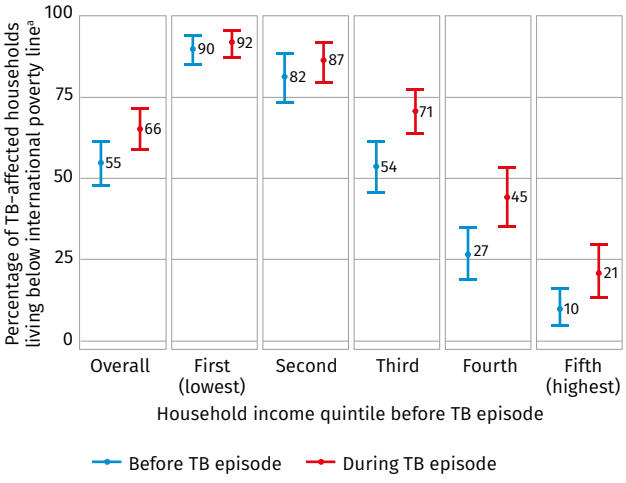


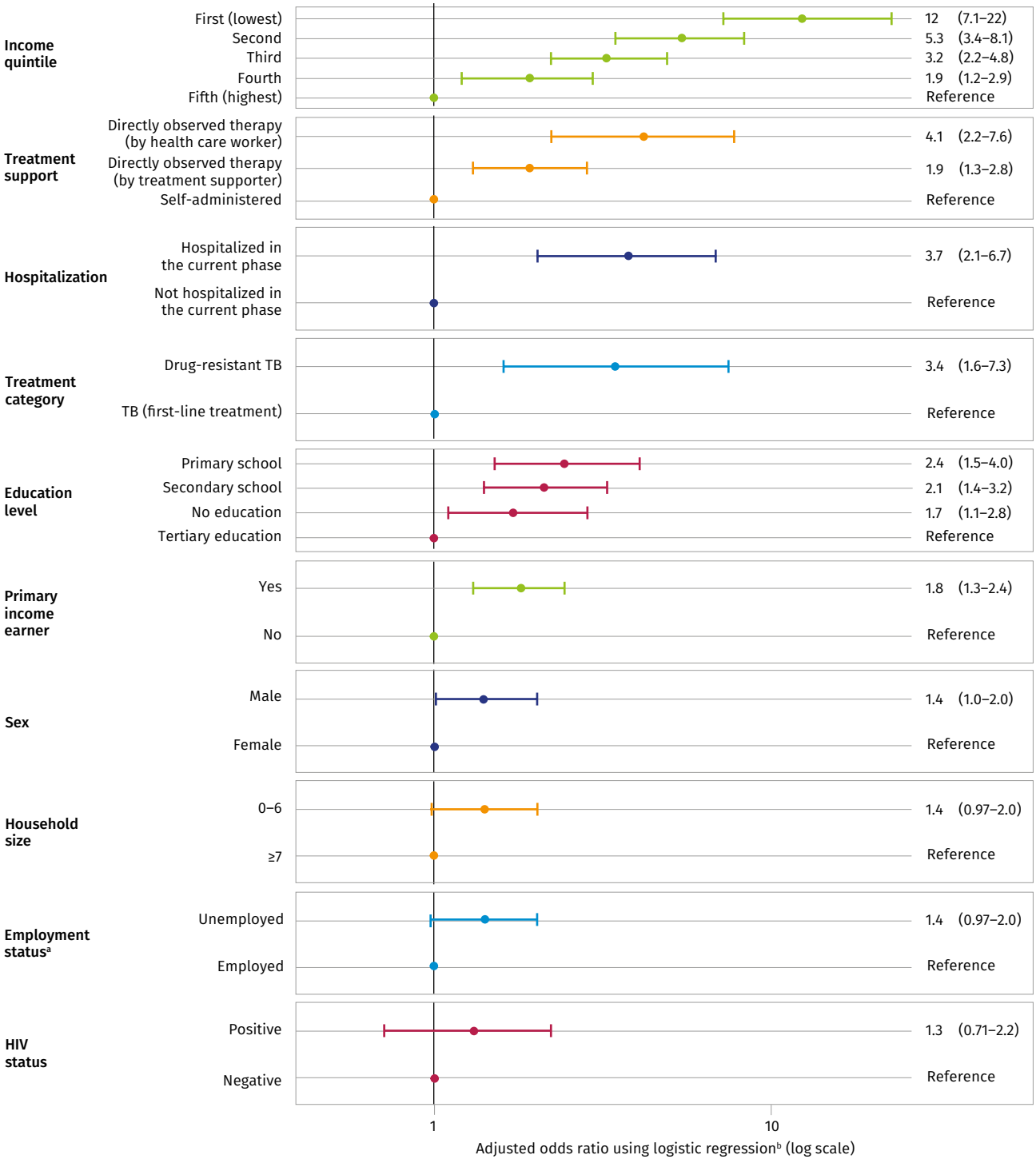
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



HIV: human immunodeficiency virus.

[a] Categories of employment status are those used in the survey.

[b] Error bars represents 95% confidence interval.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Improve TB service delivery through: • early access to diagnostics; • decentralization of treatment services; • effective private sector engagement; and • enhancing community-based services.	Direct medical expenditures, direct nonmedical expenditures and indirect costs
Wider health sector	Redesign the TB service package and explore effective integration in health insurance schemes to address medical costs.	Direct medical expenditures
Non-health sector	In collaboration with the nutrition and food security sector: • develop a policy for systematic assessment of nutritional status for all TB patients, and associated provision of therapeutic and supplementary feeding; and • explore the supply sources of ready-to-use therapeutic food that can be used to support TB patients.	Direct nonmedical expenditures
	Collaborate with the Nigeria Social Insurance Trust Fund to apply the Employees' Compensation Act (2010) to provide compensation to patients who developed TB through occupational exposure.	Indirect costs
	Collaborate with the Federal Ministry of Labour and Employment to include TB in the 2013 National Work Place policy on HIV/AIDS that includes policies on non-discrimination, paid sick leave, flexible work arrangements and various prevention activities (e.g. routine screening, contact management and preventive treatment).	Direct medical expenditures and indirect costs
	Collaborate with the Federal Ministry of Women Affairs and Social Development to include TB in various social protection schemes and enhance collaborative activities including nutritional support, household economic empowerment, and routine TB screening for orphans and vulnerable children.	Direct medical expenditures, direct nonmedical expenditures and indirect costs

AIDS: acquired immunodeficiency syndrome; HIV: human immunodeficiency virus.

Dissemination

Event

- Dissemination of the first Nigeria National TB catastrophic cost survey held on 24th March 2019 during the commemoration of the World TB day.

Publication

- *Report of the national survey to determine the proportion of TB patients and their households experiencing catastrophic cost due to TB*, national report. Abuja: National Tuberculosis and Leprosy Control Programme, Federal Ministry Health, Nigeria; 2017.
- Global TB report 2019. Geneva: World Health Organization; 2019:153–4 (https://www.who.int/publications/i/item/global-tuberculosis-report-2019) – see the National surveys of costs faced by TB patients and their households in Nigeria: results, high-level advocacy and policy translation (Box 7.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Papua New Guinea

2018–2019

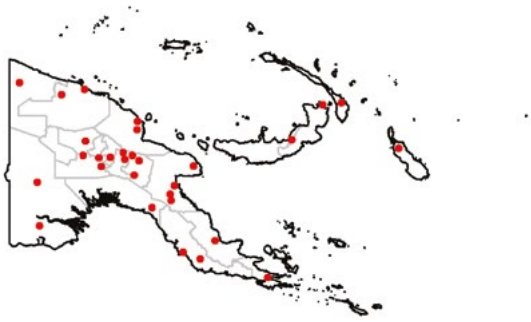
Summary statistics, national TB patient cost survey

Total number of survey participants	**1000**
Number of participants by treatment category	
• TB (first-line treatment)	981
• Drug-resistant TB	19
Total cost incurred by TB-affected households for one TB episode per TB patient – mean,[a] current 2018 US$[b] (95% CI)	**54 (42–70)**
• TB (first-line treatment)	52 (40–67)
• Drug-resistant TB	537 (411–704)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**34 (27–42)**
• TB (first-line treatment)	33 (26–40)
• Drug-resistant TB	84 (57–99)

CI: confidence interval; PGK: Kina (Papua New Guinea).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 3.2 PGK, which was the average for 2018.



Distribution of surveyed clusters (N=40)

• Surveyed cluster

Survey timeline

Initiation of preparation	June 2017
Ethics approval	September 2017
Data collection	April 2018–March 2019
Official dissemination event	November 2019
Publication of survey report	December 2020

Key people

NAME	ROLE	ORGANIZATION
Paul Aia	Principal investigator	NTP, Papua New Guinea
Margaret Kal	Associate investigator	NTP, Papua New Guinea
Jacob Kisomb	Associate investigator	NTP, Papua New Guinea
Robin Yasi	Associate investigator	NTP, Papua New Guinea
Narantuya Jadambaa	Associate investigator	WHO, Papua New Guinea
Richard Rehan	Associate investigator	WHO, Papua New Guinea
Lungten Wangchuk	Associate investigator	WHO, Papua New Guinea
Tauhidul Islam	Technical assistance	WHO WPRO
Soleil Labelle	Technical assistance	WHO GTB
Kerri Viney	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB
Julia Ershova	Technical assistance	US CDC

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Control Programme; US CDC: United States Centers for Disease Control and Prevention; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agency

National Tuberculosis (TB) Control Programme, National Department of Health, Papua New Guinea

Total budget: US$ 100 000

Funding sources

United States Centers for Disease Control and Prevention; Australian Respiratory Council, Sydney, Australia; Department of Foreign Affairs and Trade, Australia; World Health Organization (WHO) Regional Office for the Western Pacific (WPRO); National Department of Health, Papua New Guinea

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	8.6	2018
GDP per capita (current US$)	2 801	2018
Life expectancy at birth (years)	64	2018
Cause and number of deaths (top 3 and TB)		2019
1. Ischaemic heart disease	6 835	
2. Stroke	5 094	
3. Diabetes mellitus	4 533	
6. TB	3 969	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	38%	2009
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	66%	2009
SDG 2: Zero hunger		
Prevalence of undernourishment	25%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.40	2018
UHC service coverage index (worst 0–100 best)	36	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	na	–
Population with household spending on health >25% of total household budget	na	–

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	37 000 (30 000–45 000)	2018
HIV-positive	4 000 (1 500–7 800)	2018
TB incidence rate (new cases per 100 000 population per year)		
Total	432 (352–521)	2018
HIV-positive	47 (17–91)	2018
TB treatment coverage	75% (62–92%)	2018
TB notifications		
Total new and relapse cases notified	27 887	2018
Percentage of new cases with MDR/RR-TB	3.4 (1.7–5)	2014
Treatment success rate		
New and relapse cases	73%	2018
Previously treated cases	61%	2018
HIV-positive TB cases	61%	2018
MDR/RR-TB cases	59%	2018
National TB budget	US$ 28 million	2018

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for drug-resistant TB patients		
Social support schemes for TB patients	Food	Available to	Drug-resistant TB patients in Global Fund supported provinces
		Amount	150 PGK (US$ 47[a]) per month
		Duration	During treatment
	Transportation	Available to	Drug-resistant TB patients in Global Fund supported provinces
		Amount	50 PGK (US$ 16[a]) per month
		Duration	During treatment
Treatment support	Intensive phase		Facility, family and community based, at least once a week
	Continuation phase		Family and community based, at least once a month
Hospitalization[b]	Eligibility		All patients with drug-resistant TB and severely ill TB patients on first-line treatment
	Duration		One week to a month depending on patient condition
	Location		Provincial and district hospitals
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		2 visits
	• Drug-resistant TB		12 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		90 days

Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; PGK: Kina (Papua New Guinea).

[a] Current value in 2018

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Random sampling from registered patients on treatment
Assumptions	
Estimated proportion	70%
Absolute precision	4%
Design effect	2
Sample size	1000
Clusters	
Number	40 clusters
Size	25 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Paper-based questionnaire
Database	Epi Info
Statistical software	Stata 15.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	981	100	19	100	1 000	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	500	51	9	47	509	51
Male	481	49	10	53	491	49
Age group (years)						
0–14	195	20	3	16	198	20
15–24	209	21	6	32	215	22
25–34	236	24	4	21	240	24
35–44	156	16	6	32	162	16
45–54	105	11	0	0	105	11
55–64	63	6.4	0	0	63	6.3
≥65	17	1.7	0	0	17	1.7
Education level						
No education	171	17	2	11	173	17
Primary school	339	35	6	32	345	35
High school or above	457	47	11	58	468	47
Unknown	14	1.4	0	0	14	1.4
Insurance status[b]						
None	16	1.6	1	5.3	17	1.7
National health insurance	949	97	18	95	967	97
Other public insurance	16	1.6	0	0	16	1.6
Household size, median (min–max)	6 (1–51)		5 (2–18)		6 (1–51)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	652	66	6	32	658	66
Continuation phase	329	34	13	68	342	34
Treatment category						
New	932	95	19	100	951	95
Retreatment	49	5	0	0	49	4.9
HIV status						
Positive	47	4.8	2	11	49	4.9
Negative	934	95	17	89	951	95
Type of TB						
Bacteriologically confirmed pulmonary TB	236	24	14	74	250	25
Clinically diagnosed pulmonary TB	277	28	2	11	279	28
Extrapulmonary TB	468	48	3	16	471	47
Diagnostic delay (>4 weeks)[c]	181	54	11	79	192	55
Treatment support						
Self-administered	592	60	1	5.3	593	59
Directly observed therapy	264	27	18	95	282	28
Combination of self-administered and directly observed therapy	125	13	0	0	125	13

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?", and the options were "no" and "yes". If the response was "yes", a following question "What type?" was asked, and the options were "social security scheme for government", "social security scheme for private or self-employed", "family/community fund" and "private health insurance".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	8.8 (6.3–12)	4.9 (1.7–14)	8.7 (6.3–12)
Household	34 (23–50)	9.2 (1.8–48)	33 (23–49)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	4.4 (3.4–5.7)	1.6 (0.87–2.8)	4.3 (3.3–5.6)
Household	43 (34–55)	32 (19–53)	43 (33–54)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	64 (58–69)	79 (63–91)	64 (58–69)
Yes	36 (31–42)	21 (8.7–37)	36 (31–42)
Equal contributor	12 (9.1–15)	21 (<0.01–66)	12 (9.2–15)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW THE POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	92 (89–94)	84 (48–100)	91 (88–94)
At the interview	93 (91–96)	84 (48–100)	93 (90–96)

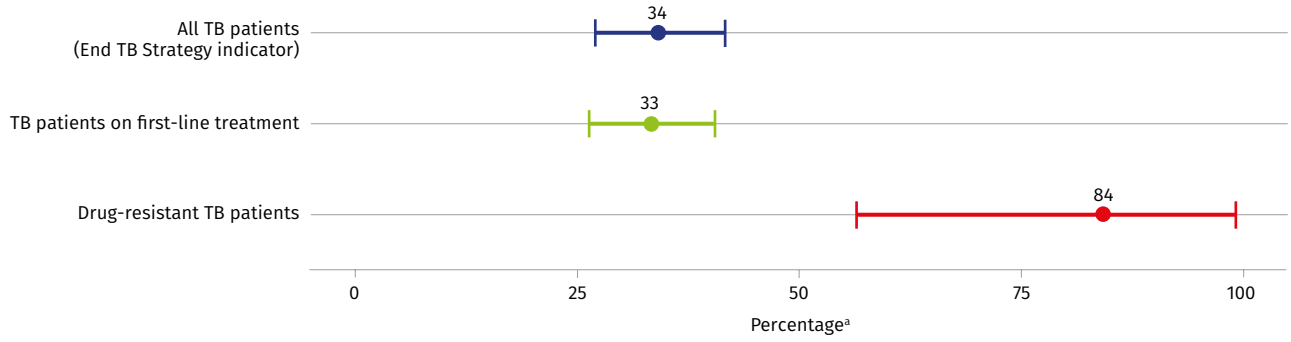
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2018.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	23	17–29	0	NA	22	17–28
Sales of assets	8.5	5.4–12	0	NA	8.3	5.3–12
Any of above	28	21–34	0	NA	27	21–34
SOCIAL CONSEQUENCES						
Food insecurity	33	24–42	47	16–80	33	25–42
Divorce/separation	2.9	1.7–4.3	5.4	0.085–23	2.9	1.8–4.3
Job loss	22	17–28	26	8.7–49	22	17–28
Interrupted schooling	13	10–17	26	2.4–63	14	11–17
Social exclusion	31	24–39	47	8.7–87	31	24–39
Any of above	62	54–69	84	39–100	62	55–70
SOCIAL SUPPORT						
Social support	0.63	0.089–1.7	0	NA	0.62	0.087–1.6
Vouchers	4.7	1.6–9.1	42	30–55	5.4	2.1–10

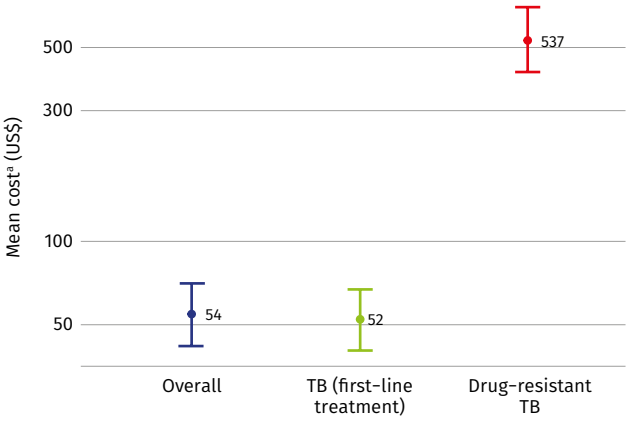
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[b] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2018 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

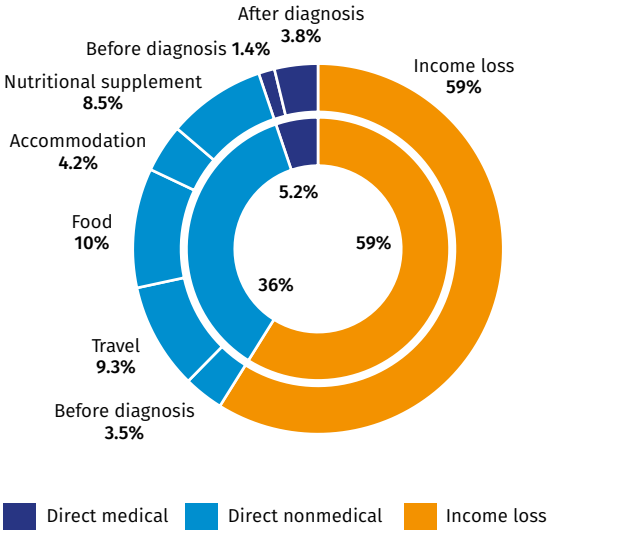
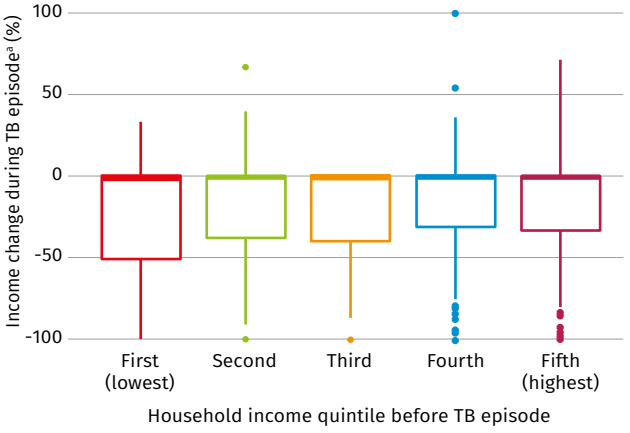
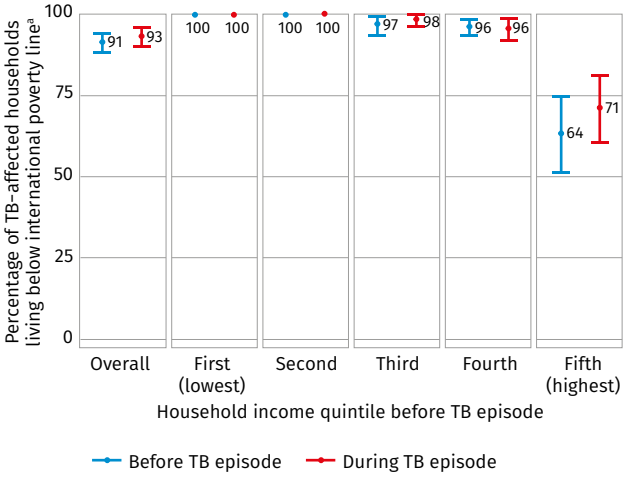


Fig. 4. Changes in distribution of monthly self-reported household income



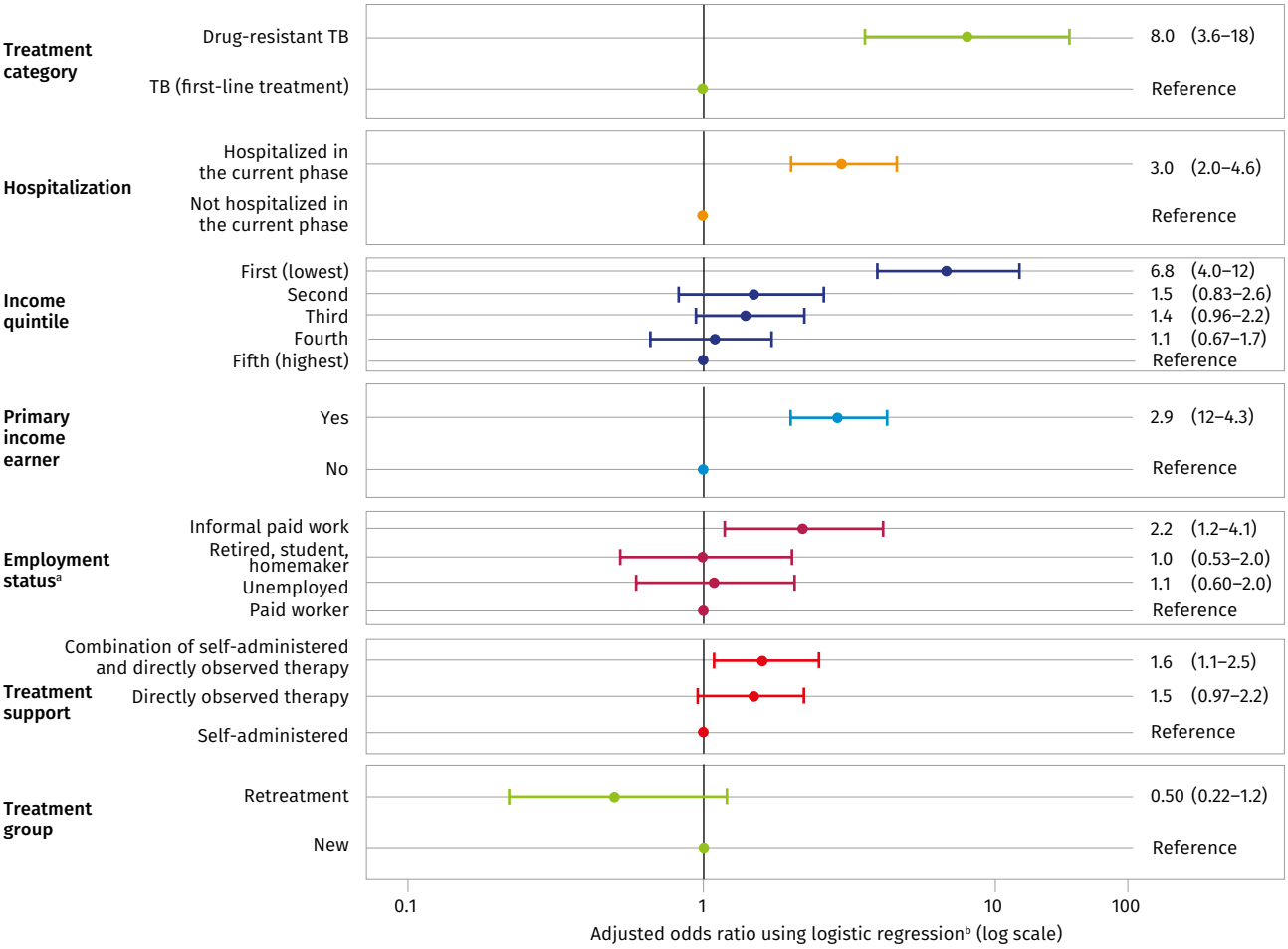
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



[a] Error bars represent 95% confidence interval.

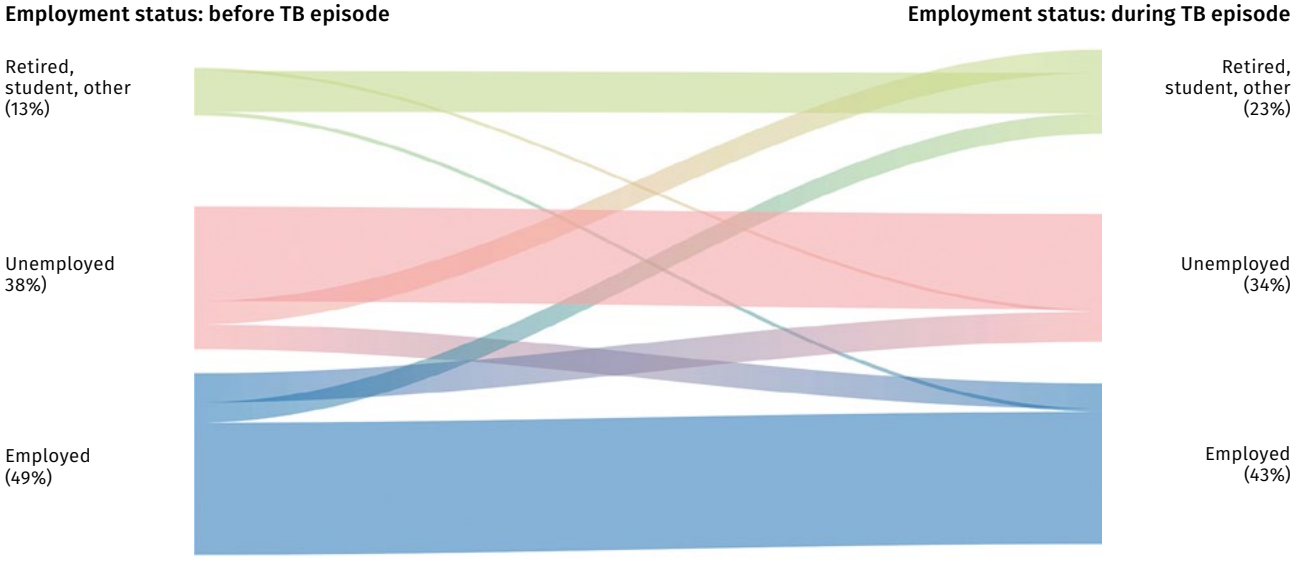
Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Improve access to quality TB diagnostic services through the decentralization and use of WHO-recommended rapid molecular diagnostics as initial test of diagnosis, implementation of specimen transportation and community-based TB treatment care and prevention, as well as support for transport and food incentives for patients on first-line or drug-resistant TB treatment.	Direct medical and nonmedical expenditures
Wider health sector	If, in the future, Papua New Guinea does consider the introduction of broader social health insurance, ensure that TB patients are covered by this insurance and consider how those working in the informal sector and those who are unemployed can be covered.	Direct nonmedical expenditures
	Social and financial support should continue to be provided to TB patients with support from partners and donors.	
Non-health sector	Work with the non-health sector to advocate for and establish a multi-sectoral accountability framework for TB.	Indirect costs
	Explore a possible collaboration with labour and corporate sectors to improve workplace policies and services for TB patients, including a way to protect employment of TB patients.	
	Collaborate with communities to support TB programmes and TB patients through community development and empowerment programmes.	

WHO: World Health Organization.

Dissemination

Event

- Multisectoral meeting on TB in November 2019 held in Port Moresby, Papua New Guinea.
- Media press conference in Port Moresby, Papua New Guinea, with high-level participation of the National Department of Health, World Health Organization country office, Department of Foreign Affairs and Trade, Australian Government and National TB Programme.
- Poster presentation at the 51st Union World Health Conference on Lung Health in October 2020 by Dr Margaret Kal.

Publication

- *Report on the national tuberculosis patient cost survey in Papua New Guinea: 2017–2018,* national report. Port Moresby: National TB Control Programme, National Department of Health, Papua New Guinea; 2020.
- Aia P, Viney K, Kal M, Kisomb J, Yasi R, Wangchuk L et al. The economic burden of tuberculosis faced by patients and affected families in Papua New Guinea. Int J Tuberc Lung Dis. 2022;26(10):934–41 (https://pubmed.ncbi.nlm.nih.gov/36163675/).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Philippines

2016–2017

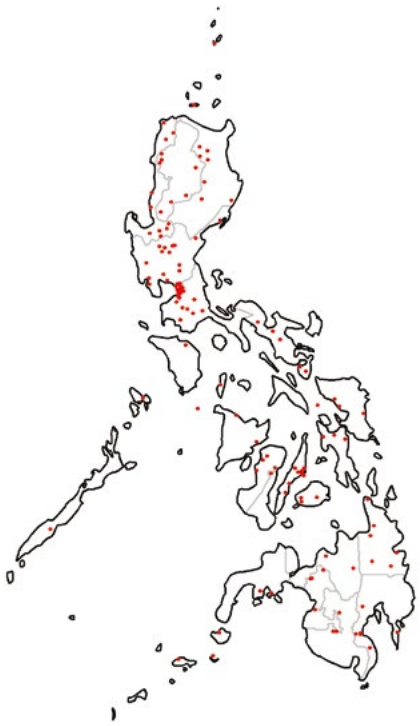
Summary statistics, national TB patient cost survey

Total number of survey participants	**1912**
Number of participants by treatment category	
• TB (first-line treatment) in urban area	786
• TB (first-line treatment) in rural area	806
• Drug-resistant TB	320
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2018 US$ (95% CI)	**255 (231–282)**
• TB (first-line treatment) in urban area	200 (173–231)
• TB (first-line treatment) in rural area	259 (230–291)
• Drug-resistant TB	1751 (1495–2050)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**42 (39–46)**
• TB (first-line treatment) in urban area	30 (29–34)
• TB (first-line treatment) in rural area	44 (40–48)
• Drug-resistant TB	90 (86–93)

CI: confidence interval; PHP: Philippine Peso (Philippines).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 50 PHP, which was the average for March 2017.



Distribution of surveyed clusters (N=188)

• Surveyed cluster

Survey timeline

Initiation of preparation	December 2015
Ethics approval	September 2016
Data collection	November 2016–August 2017
Official dissemination event	August 2017
Publication of survey report	August 2017

Key people

NAME	ROLE	ORGANIZATION
Anna Marie Celina Garfin	Co-investigator	NTP, Department of Health, Philippines
Donna Mae G Gaviola	Survey implementation	NTP, Department of Health, Philippines
Rosa Mia L Arao	Primary investigator	Health Policy Development Program – UPecon Foundation, Inc.
Jhiedon L Florentino	Primary investigator	Health Policy Development Program – UPecon Foundation, Inc.
Carlos R Tan	Survey implementation	Health Policy Development Program – UPecon Foundation, Inc
Joel Flores	Management of data collection	TNS Kantar (survey firm)
Thomas Hale Hiatt	Technical assistance	WHO, Philippines
Rajendra P Yadav	Technical assistance	WHO, Philippines
Fukushi Morishita	Technical assistance	WHO WPRO
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Control Program; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agencies

The National Tuberculosis (TB) Control Programme, Department of Health, Philippines; School of Economics, University of the Philippines, Philippines

Total budget: US$ 180 937

Funding sources

United States Agency for International Development (USAID); Department of Health, Philippines

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	105	2017
GDP per capita (current US$)	3 123	2017
Life expectancy at birth (years)	71	2017
Cause and number of deaths (top 3 and TB)		2015
1. Ischaemic heart disease	105 129	
2. Lower respiratory infections	71 398	
3. Stroke	62 398	
5. TB	28 930	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicator of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	2.7%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	17%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	11%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.12	2017
UHC service coverage index (worst 0–100 best)	53	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	6.3%	2015
Population with household spending on health >25% of total household budget	1.4%	2015

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	583 000 (327 000–911 000)	2017
HIV-positive	9 500 (4 000–17 000)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	554 (311–866)	2017
HIV-positive	9.0 (3.8–16)	2017
TB treatment coverage	54% (35–97%)	2017
TB notifications		
Total new and relapse cases notified	317 266	2017
Percentage of new cases with MDR/RR-TB	1.8 (1.3–2.6)	2019
Treatment success rate		
New and relapse cases	91%	2017
Previously treated cases	82%	2017
HIV-positive TB cases	83%	2017
MDR/RR-TB cases	58%	2017
National TB budget	US$ 104 million	2017

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • TB preventive treatment		
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	On a needs basis (hospitalization: 30 000 PHP (US$ 600[a]); surgery: 50 000 PHP (US$ 1000[a]); diagnostic examinations and consultation: 10 000 PHP (US$ 200[a]); costs for ancillary drugs, oxygen and hearing aid on request) MAIP: 5000 PHP (US$ 100[a]) for every 6 months of treatment and PHP 10 000 on treatment completion (implemented from 2015 to 2018)
		Duration	During treatment
	Food and transportation	Available to	Indigent patients with drug-resistant TB
		Amount	PHP 200 (US$ 4[a]) per treatment day (for food and transportation)
		Duration	During treatment
Treatment support	Intensive phase		Facility based, at least once a week
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		Not implemented
	Duration		NA
	Location		NA
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		62 visits
	• Drug-resistant TB		435 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		5 days
	• Drug-resistant TB		10 days

NA: not applicable; MAIP: milestone achievement incentive package; PHP: Philippine Peso (Philippines); WHO: World Health Organization.

[a] Current value in 2017.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY			
Sampling design	Stratified single-stage cluster sampling using probability proportional to size		
Stratification	TB (first-line treatment) in urban area	TB (first-line treatment) in rural area	Drug-resistant TB
Sampling frame	List of health facilities providing first-line treatment in urban area (3 cities: Manila, Cebu and Davao)	List of health facilities providing first-line treatment in rural area (areas other than 3 urban cities)	List of health facilities providing second-line treatment (those implementing PMDT)
Patient enrolment	Random sampling from registered patients on treatment	Random sampling from registered patients on treatment	Random sampling from registered patients on treatment
Assumptions for sample size calculation			
Estimated proportion	20%	20%	50%
Relative precision	20%	20%	20%
Design effect	1.8	1.8	2.0
Stratum size	780	780	320
Clusters			
Number	78 clusters	78 clusters	32 clusters
Size	10 patients	10 patients	10 patients
DATA COLLECTION AND ANALYSIS			
Field data collection tool	Paper-based questionnaire		
Database	None		
Statistical software	Stata 16.0 (StataCorp) and R 4.0.2 statistic software (Comprehensive R Archive Network)		
METHODOLOGY FOR KEY METRICS			
Measurement for ability to pay	Self-reported household income		
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)		

PMDT: programmatic management of drug-resistant TB.

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT) IN URBAN AREA		TB PATIENTS (FIRST-LINE TREATMENT) IN RURAL AREA		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]	N	%[a]
TOTAL	786	100	806	100	320	100	1 912	100
DEMOGRAPHIC CHARACTERISTICS								
Sex								
Female	276	35	292	36	102	32	670	35
Male	510	65	514	64	218	68	1 242	65
Age group (years)								
0–14	72	9.2	108	13	0	0	180	9.4
15–24	172	22	85	11	37	12	294	15
25–34	124	16	113	14	60	19	297	16
35–44	124	16	125	16	76	24	325	17
45–54	111	14	117	15	77	24	305	16
55–64	110	14	131	16	47	15	288	15
≥65	73	9.3	127	16	23	7.2	223	12
Education level								
No education	4	0.51	13	1.6	7	2.2	24	1.3
Pre-school/elementary level	182	23	321	40	86	27	589	31
High-school/secondary level	421	54	323	40	155	48	899	47
College level	175	22	143	18	70	22	388	20
Unknown	4	0.51	6	0.74	2	0.62	12	0.63
Insurance status[b]								
None	393	50	267	33	126	39	786	41
With insurance	393	50	539	67	194	61	1 126	59
Household size, median (min–max)	5 (1–22)		5 (1–19)		4 (1–17)		5 (1–22)	
CLINICAL CHARACTERISTICS								
Treatment phase								
Intensive phase	155	20	98	12	118	37	371	19
Continuation phase	631	80	708	88	202	63	1 541	81
Treatment category								
New	671	85	727	90	33	10	1 431	75
Relapse	85	11	57	7.1	169	53	311	16
Retreatment	28	3.6	18	2.2	117	37	163	8.5
Unknown	2	0.25	4	0.50	1	0.31	7	0.37
Type of TB								
Bacteriologically confirmed pulmonary TB	323	41	362	45	320	100	1 005	53
Clinically diagnosed pulmonary TB	451	57	434	54	0	0	885	46
Extrapulmonary TB	12	1.5	10	1.2	0	0	22	1.2
Diagnostic delay (>4 weeks)[c]	76	44	37	53	22	59	135	48
Treatment support								
Self-administered	162	21	115	14	12	3.8	289	15
Directly observed therapy	624	79	684	85	308	96	1 616	85

Min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Which health insurance do you belong to?". The options were "hindi sakop ng health insurance (not covered by health insurance)", "philhealth paying", "philhealth dependent of paying member", "philhealth indigent member", "philhealth dependent of indigent member", "government service insurance system (GSIS)", "social security system (SSS)", "private health insurance/health maintenance organization (HMO)/pre-need insurance plan" and "others".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT) IN URBAN AREA	TB PATIENTS (FIRST-LINE TREATMENT) IN RURAL AREA	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)				
Individual patient	11 (8.6–14)	11 (9.3–14)	13 (8.8–18)	11 (9.6–13)
Household	143 (122–166)	101 (88–115)	120 (100–143)	107 (95–120)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)				
Individual patient	5.6 (4.6–6.9)	5 (4.2–6.0)	2.4 (2.0–3.0)	5.1 (4.4–5.9)
Household	97 (81–117)	71 (61–83)	49 (38–62)	74 (65–85)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)				
No	60 (56–64)	59 (56–63)	52 (46–59)	59 (56–62)
Yes	40 (36–44)	41 (37–44)	48 (41–54)	41 (38–44)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)				
Before onset of TB symptoms	30 (26–34)	42 (38–46)	35 (30–40)	40 (36–44)
At the interview	35 (31–39)	49 (45–53)	50 (45–56)	47 (43–50)

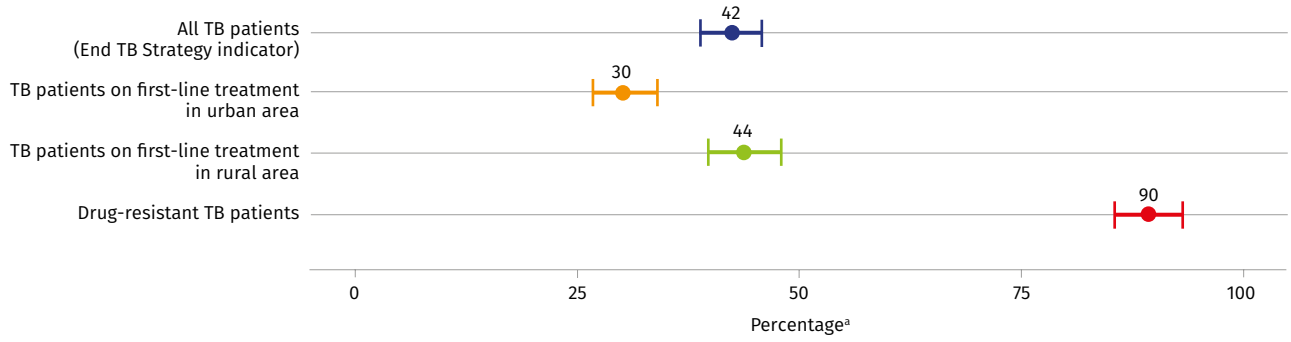
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2017.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms, social consequences and social support

	TB PATIENTS (FIRST-LINE TREATMENT) IN URBAN AREA		TB PATIENTS (FIRST-LINE TREATMENT) IN RURAL AREA		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS								
Dissaving	13	9.9–16	14	11–17	12	7.9–16	14	11–16
Loan	26	22–29	33	29–37	35	30–40	32	28–35
Sales of assets	4.7	3.2–6.5	8.4	6.5–11	15	11–19	7.9	6.3–9.7
Any of above	34	30–39	45	40–49	44	39–50	43	39–47
SOCIAL CONSEQUENCES								
Food insecurity	16	13–20	26	21–31	21	17–26	24	21–28
Divorce/separation	0.76	0.28–1.5	0.25	0.023–0.71	1.9	0.58–3.9	0.36	0.12–0.72
Job loss	24	21–28	28	24–31	45	39–51	27	24–30
Interrupted schooling	3.3	2.2–4.6	3.2	2.1–4.6	8.8	5.9–12	3.3	2.4–4.4
Social exclusion	9.4	7.2–12	13	9.9–17	20	15–25	13	9.9–16
Any of above	43	39–47	52	47–57	65	58–72	51	46–55
SOCIAL SUPPORT								
Vouchers	0.89	0.36–1.7	1.5	0.70–2.6	69	62–77	2.4	1.7–3.3
Conditional cash transfer	0.38	0.073–0.93	1.2	0.53–2.2	3.4	1.6–5.9	1.1	0.53–2.0

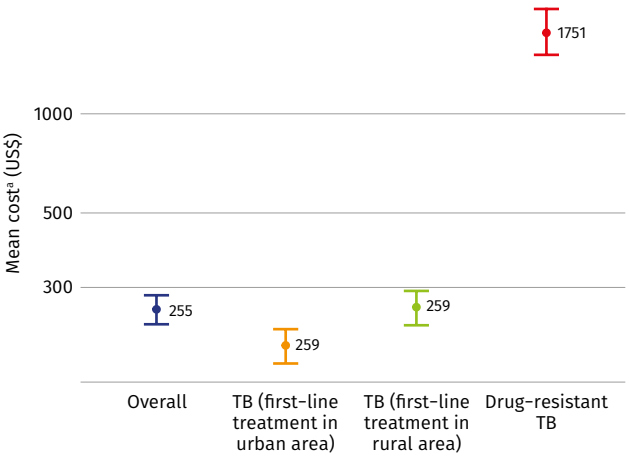
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2017 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

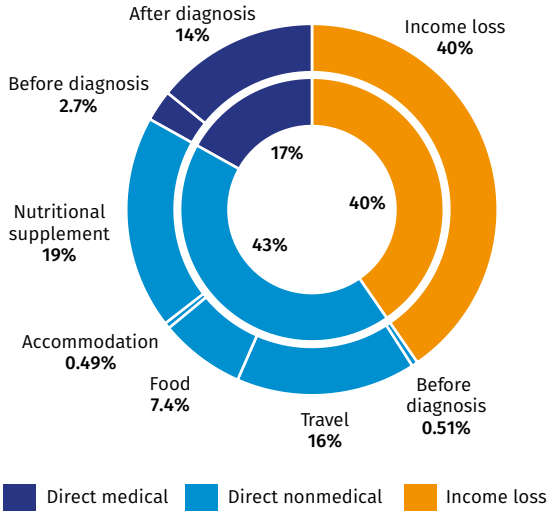
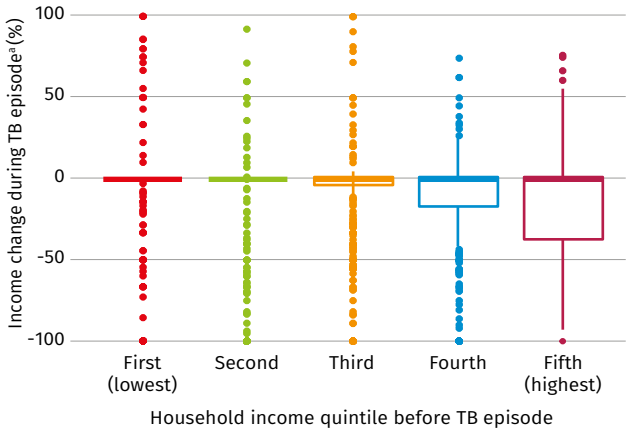
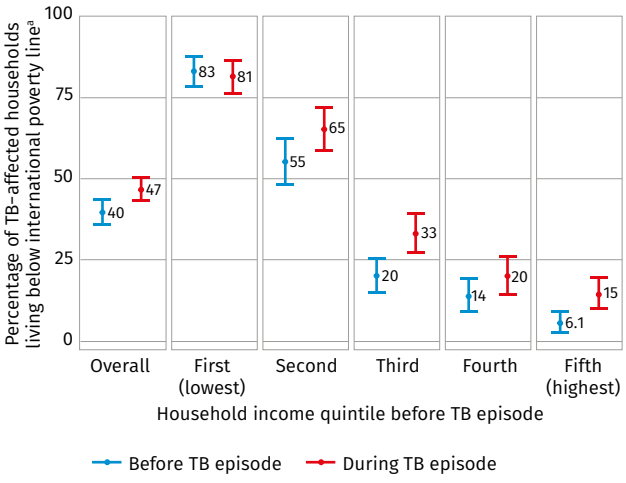


Fig. 4. Changes in distribution of monthly self-reported household income



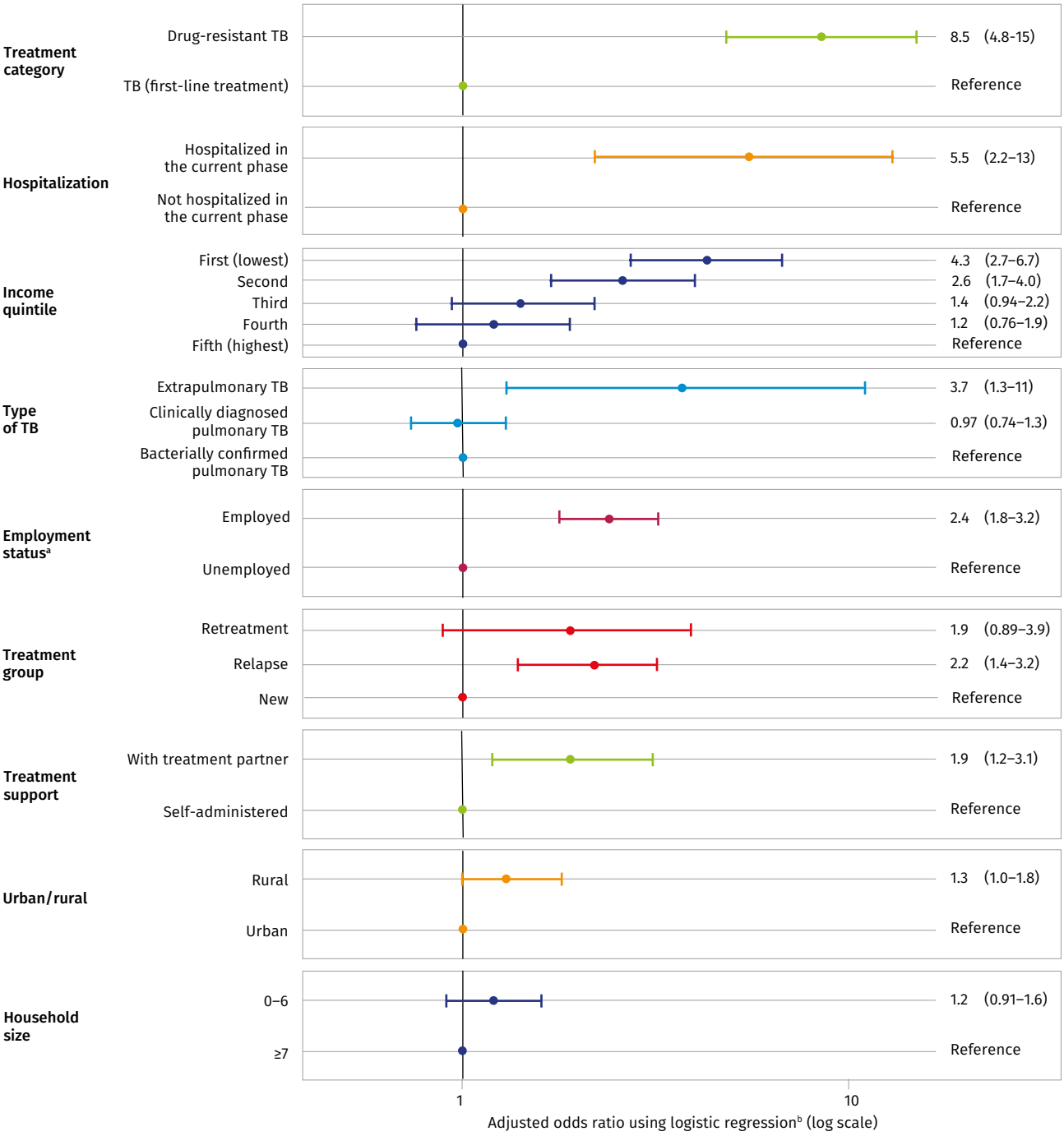
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



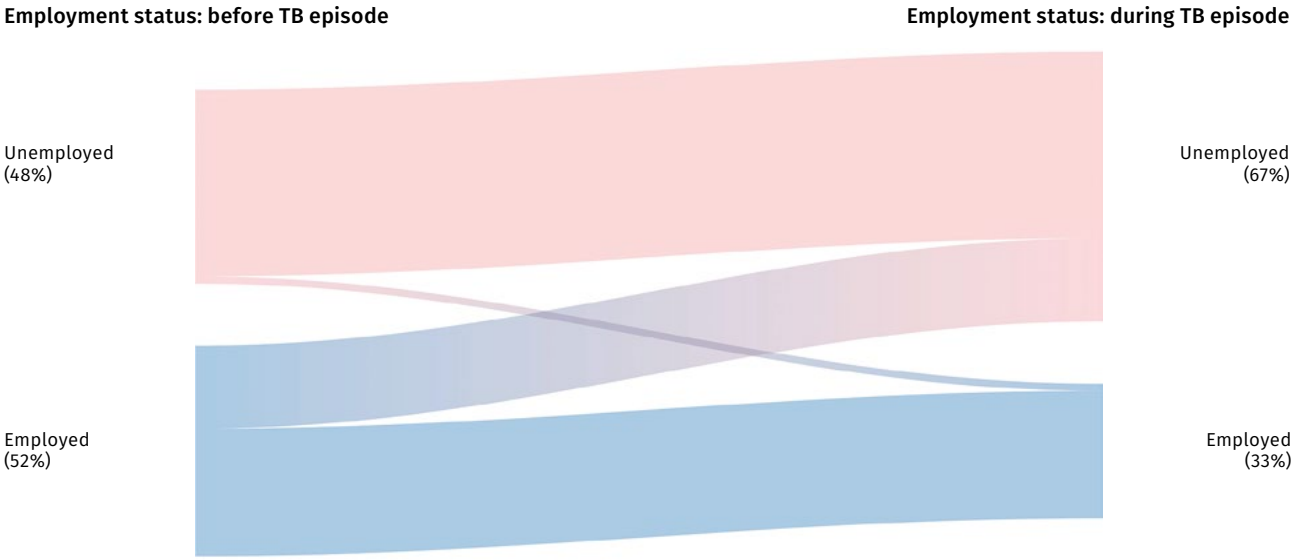
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Disseminate the TB standards of care to public and private physicians.	Direct medical expenditures
	Implement community-based care.	Direct nonmedical expenditures
	Use innovative strategies to transport specimens and monitor treatment adherence.	
	Use the available short treatment regimen for drug-susceptible and-drug resistant TB cases.	Direct medical expenditures, direct nonmedical expenditures and indirect costs
	Intensify implementation of TB preventive therapy to prevent the progress from infection to disease.	
Wider health sector	Update and expand the coverage of the national health insurance TB package from screening to treatment for both drug-susceptible and drug-resistant TB cases.	Direct medical expenditures
	Coordinate with other health programmes to maximize the resources (e.g. collaborative activities for TB-HIV and TB-DM).	Direct nonmedical expenditures
	Coordinate with the National Nutrition Council to address the nutritional needs of patients.	
	Advocate to LGUs on prioritization of the health programme.	Direct medical expenditures, direct nonmedical expenditures and indirect costs
Non-health sector	Integrate the NTP with the Social Welfare Program.	Indirect costs
	Issue policies to address stigma, discrimination and human rights (e.g. in the community and workplace).	

DM: diabetes mellitus; HIV: human immunodeficiency virus; LGU: local government unit; NTP: National Tuberculosis Control Program.

Dissemination

Event

- Presentation to Zonal Dissemination Forums – September 2017
- Presentation during the 25th Annual Philippine Coalition Against Tuberculosis (PhilCAT) Convention – August 2018

Publication

- *Results from the survey of TB patients to determine direct and indirect costs due to TB and to estimate proportion of TB affected households experiencing catastrophic total costs due to TB in the Philippines*, national report. Manila: National TB Programme, Department of Health, Philippines; 2017.
- Florentino JL, Arao RML, Garfin AMC, Gaviola DMG, Tan CR, Yadav RP, et al. Expansion of social protection is necessary towards zero catastrophic costs due to TB: The first national TB patient cost survey in the Philippines. PLoS One. 2022;17(2):e0264689 (https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0264689).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Solomon Islands

2017–2019

Summary statistics, national TB patient cost survey

Total number of survey participants	**183**
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2018 US$[b] (95% CI)	**673 (380–1192)**
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**92 (86–97)**

CI: confidence interval; SBD: Solomon Dollar (Solomon Islands).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 8.1 SBD, which wasthe rate on 1 April 2019.

Distribution of surveyed clusters (N=9)

• Surveyed cluster

Survey timeline

Initiation of preparation	December 2015
Ethics approval	April 2016
Data collection	February 2017–October 2019
Official dissemination event	–
Publication of survey report	August 2020

Key people

NAME	ROLE	ORGANIZATION
Kerri Viney	Principal investigator	Australian National University
Susana Vaz Nery	Principal investigator	University of New South Wales Sydney
Noel Itogo	Associate investigator	NTP, Solomon Islands
Ridha Jebeniani	Associate investigator	Independent consultant
Anupama Hazarika	Associate investigator	WHO, Solomon Islands
Richard Rehan	Associate investigator	WHO, Papua New Guinea
Fukushi Morishita	Technical assistance	WHO WPRO
Takuya Yamanaka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; NTP: National Tuberculosis Programme; WHO: World Health Organization; WPRO: WHO Regional Office for the Western Pacific.

Organization and financing

Implementation agencies

National Tuberculosis (TB) Programme, Ministry of Health, Honiara, Solomon Islands;
Research School of Population Health, Australian National University, Canberra, Australia

Total budget: US$ 27 922

Funding sources

Australian National University, Canberra, Australia; World Health Organization (WHO) Regional Office for the Western Pacific (WPRO); WHO country office for Solomon Islands; Ministry of Health, Honiara, Solomon Islands

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	0.64	2017
GDP per capita (current US$)	2 333	2017
Life expectancy at birth (years)	73	2017
Cause and number of deaths (top 3 and TB)		2019
1. Ischaemic heart disease	975	
2. Stroke	670	
3. Lower respiratory infections	371	
21. TB	45	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	25%	2012
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	58%	2012
SDG 2: Zero hunger		
Prevalence of undernourishment	18%	2017
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	na	–
UHC service coverage index (worst 0–100 best)	49	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	na	–
Population with household spending on health >25% of total household budget	na	–

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	470 (350–600)	2017
HIV-positive	na	–
TB incidence rate (new cases per 100 000 population per year)		
Total	73 (54–95)	2017
HIV-positive	na	–
TB treatment coverage	80% (62–110%)	2017
TB notifications		
Total new and relapse cases notified	373	2017
Percentage of new cases with MDR/RR-TB	2.3 (0.86–4.4)	2017
Treatment success rate		
New and relapse cases	92%	2017
Previously treated cases	100%	2017
HIV-positive TB cases	na	–
MDR/RR-TB cases	na	–
National TB budget	US$ 0.97 million	2017

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; na: not available; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for intensive phase		
Social support schemes for TB patients	Cash transfer	Available to	All TB patients
		Amount	795 SBD (US$ 100[a]) for 4 months
		Duration	Entire duration of continuation phase
	Food	Available to	All TB patients
		Amount	64 SBD (US$ 7.9[a]) per day (estimated for 3 meals per day)
		Duration	2 months of intensive phase treatment
	Transportation	Available to	All TB patients
		Amount	Necessary amount to transfer patients from the designated hospital to the patient's residence
		Duration	After hospital discharge
Treatment support	Intensive phase		Daily treatment support during hospitalization
	Continuation phase		Community based, at least once a month
Hospitalization[b]	Eligibility		All TB patients
	Duration		Intensive phase of TB treatment
	Location		Designated central or provincial hospitals (7 hospitals nationwide)
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		20 visits
	• Drug-resistant TB		NA
	Average duration of hospitalization		
	• TB (first-line treatment)		60 days
	• Drug-resistant TB		NA

SBD: Solomon Dollar (Solomon Islands); NA: not applicable.

[a] Current values in 2019.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB report 2021. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240013131, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Total sampling with allocation of sample size at provincial level proportional to the TB notification
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions for sample size calculation	
Estimated proportion	30%
Absolute precision	4%
Design effect	1
Sample size	228
Clusters	
Number	9
Size	Size allocated proportional to the TB notification (ranged from 5 to 65)
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and Ona (Ona Systems Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	R 4.0.2 statistic software (Comprehensive R Archive Network)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	ALL TB PATIENTS	
	N	%[a]
TOTAL	183	100
DEMOGRAPHIC CHARACTERISTICS		
Sex		
Female	91	50
Male	92	50
Age group (years)		
0–14	21	11
15–24	41	22
25–34	40	22
35–44	38	21
45–54	24	13
55–64	11	6.0
≥65	8	4.4
Education level		
No education	32	17
Pre- or primary school	91	50
Secondary school	49	27
University/vocational/other	10	5.5
Unknown	1	0.55
Insurance status[b]		
None	180	98
With insurance	3	1.6
Household size, median (min–max)	7 (1–20)	
CLINICAL CHARACTERISTICS		
Treatment phase		
Intensive phase	97	53
Continuation phase	86	47
Treatment category		
New	170	93
Relapse	6	3.3
Retreatment	7	3.8
HIV status		
Positive	1	0.55
Negative	116	63
Unknown	66	36
Type of TB		
Bacteriologically confirmed TB	121	66
Clinically diagnosed TB	62	34
Diagnostic delay (>4 weeks)[c]	44	53
Treatment support		
Hospitalized	84	46
Self-administered	74	40
Facility-based directly observed therapy	14	7.7
Community-based directly observed therapy	11	6.0

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?". The options were "no" and "yes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)	
Individual patient	16 (9.2–29)
Household	20 (12–34)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)	
Individual patient	3.1 (1.3–7.2)
Household	6.0 (2.0–18)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)	
No	66 (32–93)
Yes	4.9 (0.72–13)
Equal contributor	29 (3.8–65)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)	
Before onset of TB symptoms	95 (87–99)
At the interview	96 (90–99)

CI: confidence interval; PPP: purchasing power parity.

[a] Current value in 2019.

[b] Geometric mean.

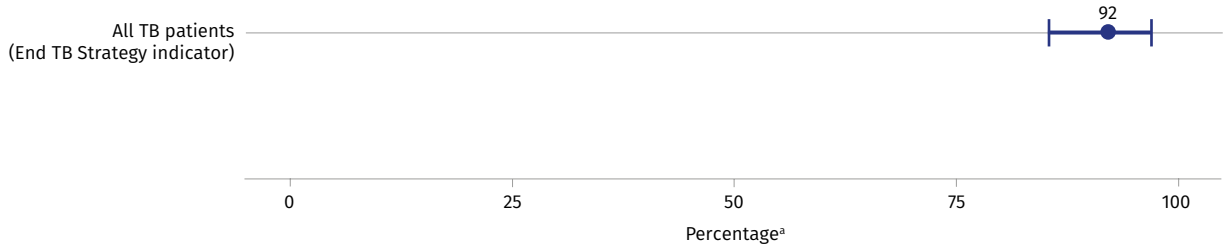
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	ALL TB PATIENTS	
	%	95% CI
COPING MECHANISMS		
Dissaving	9.3	0.68–26
Loan	11	2.7–24
Sales of assets	3.3	0.35–9.0
Any of above	20	5.6–40
SOCIAL CONSEQUENCES		
Food insecurity	25	5.0–53
Divorce/separation	0.55	0.025–2.7
Job loss	8.2	2.0–18
Interrupted schooling	21	7.8–39
Social exclusion	7.7	1.9–17
Any of above	54	32–76
SOCIAL SUPPORT		
Sick leave	4.9	0.74–12
Vouchers	36	19–55

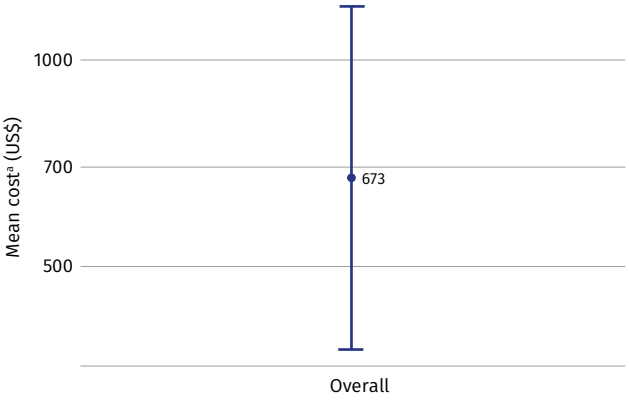
CI: confidence interval.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2019 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

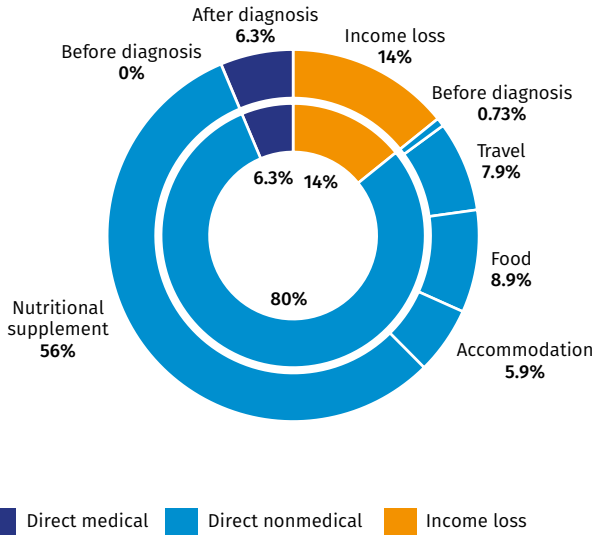
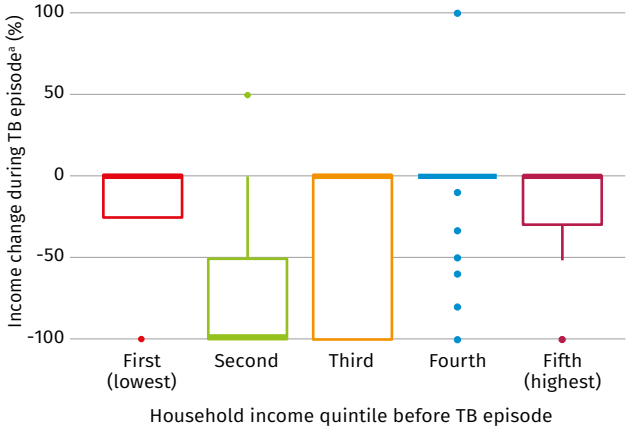
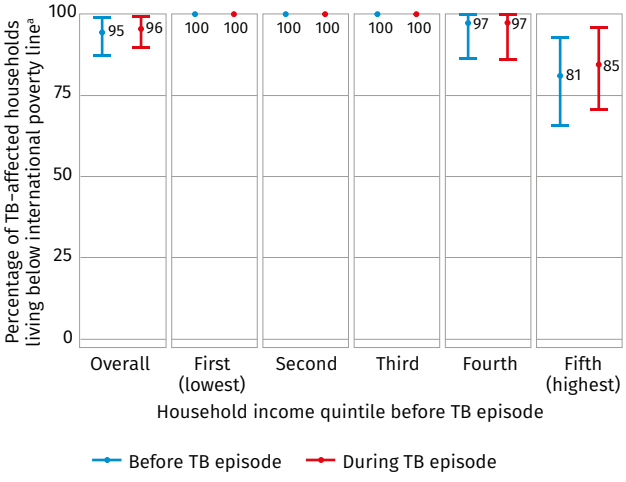


Fig. 4. Changes in distribution of monthly self-reported household income



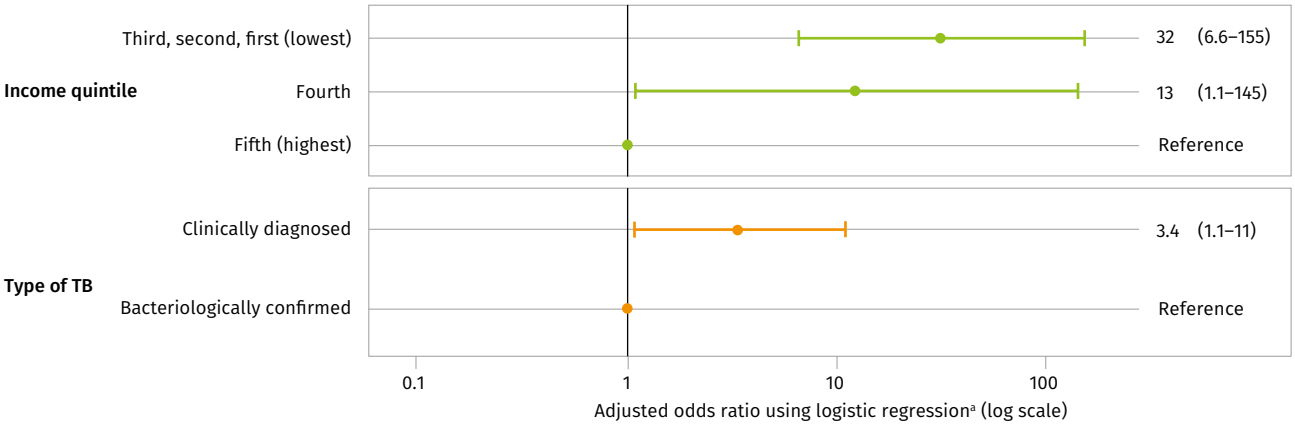
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



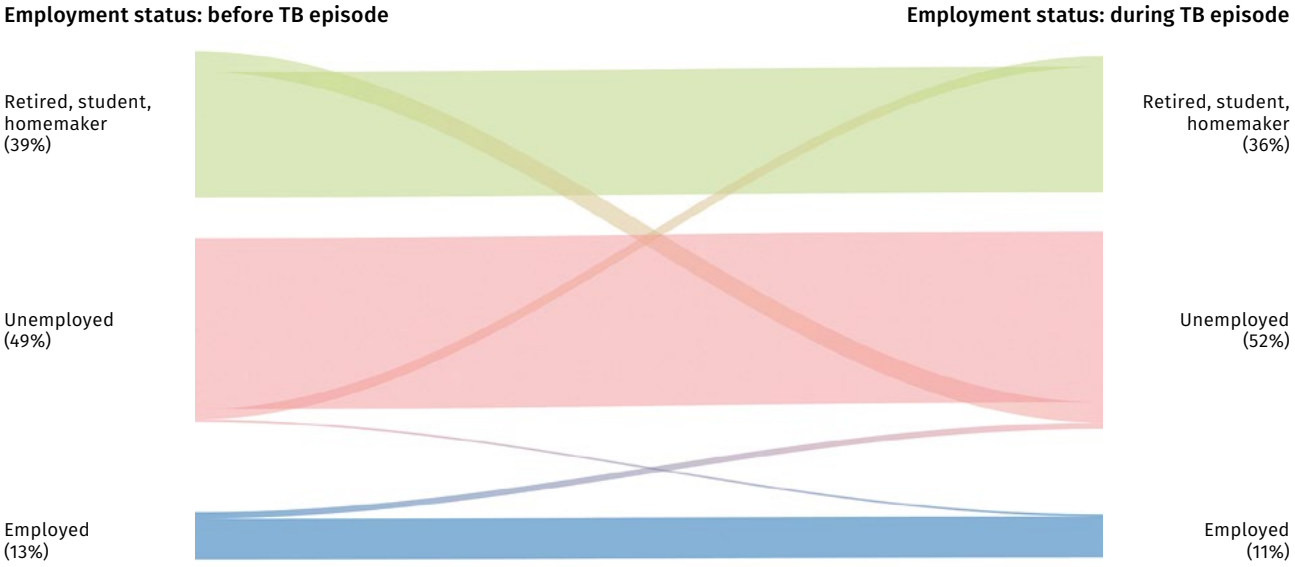
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Consider options for moving away from hospitalization in the intensive phase of TB treatment.	Direct medical expenditures
	Explore a robust system of patient support with a real-time evaluation in place to determine the impact of decentralized care on TB treatment outcomes and other patient outcomes.	
	Further understand malnourishment of TB patients in the context of Solomon Islands, and also understand how health care workers recommend certain foods to aid recovery or whether there are other local beliefs about the effect of certain nutritional supplements on health.	Direct nonmedical expenditures
Non-health sector	Explore a multisectoral collaboration with government agencies (e.g. the Social Welfare Department in the Ministry of Health and Medical Services) to implement social and financial protection schemes in Solomon Islands.	Indirect costs

Dissemination

Publication

- *Economic evaluation of patient costs associated with tuberculosis diagnosis and care in Solomon Islands*, national report. National TB Control Programme, Ministry of Health, Solomon Islands; 2020.
- Viney K, Itogo N, Yamanaka T, Jebeniani R, Hazarika A, Morishita F et al. Economic evaluation of patient costs associated with tuberculosis diagnosis and care in Solomon Islands. BMC Public Health. 2021;21(1928):1–14 (https://doi.org/10.1186/s12889-021-11938-8).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Thailand

2019–2021

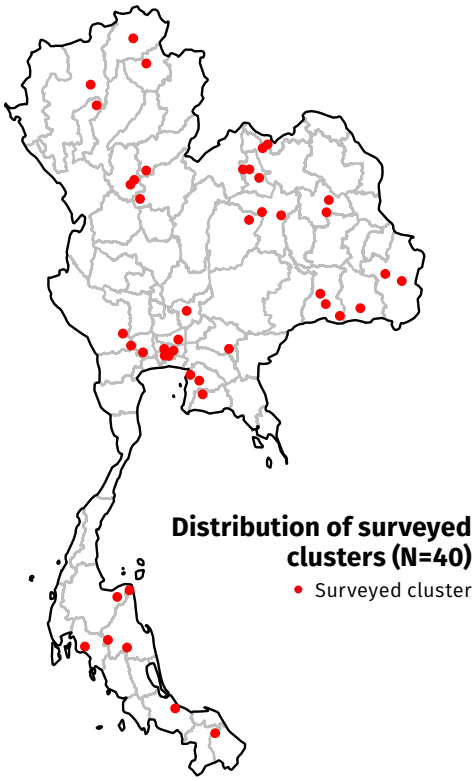
Summary statistics, national TB patient cost survey

Number of survey participants by treatment category:	**1400**
• TB (first-line treatment)	1382
• Drug-resistant TB	18
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2021 US$[b] (95% CI)	**402 (353–456)**
• TB (first-line treatment)	392 (345–445)
• Drug-resistant TB	2591 (1367–4909)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**30 (26–34)**
• TB (first-line treatment)	29 (25–34)
• Drug-resistant TB	61 (30–88)

CI: confidence interval; THB: Thai Bhat (Thailand).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 31 THB, which was the average of the period from October 2019 to July 2021.



Survey timeline

Initiation of preparation	June 2019
Ethics approval	September 2019
Data collection	October 2019–July 2021
Official dissemination event	January 2022
Publication of survey report	

Key people

Name	Role	Organization
Phalin Kamolwat	Principal investigator	DTB, Department of Disease Control, MOPH, Thailand
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Sriprapa Nateniyom	Project advisor	DTB, Department of Disease Control, MOPH, Thailand
Petchawan Pungrassami	Project advisor	DTB, Department of Disease Control, MOPH, Thailand
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Jiraphun Jittikoon	Co-investigator	Faculty of Pharmacy, Mahidol university, Thailand
Montarat Thavorncharoensap	Co-investigator	Faculty of Pharmacy, Mahidol university, Thailand
Naiyana Praditsitthikorn	Co-investigator	Department of Disease Control, MOPH, Thailand
Surakameth Mahasirimongkol	Co-investigator	Department of Medical Sciences, MOPH, Thailand
Auttagorn Junmartong	Co-investigator	DTB, Department of Disease Control, MOPH, Thailand
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Wassanan Khanthachai	Field team leader	DTB, Department of Disease Control, MOPH, Thailand
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Ines Garcia Baena	Technical assistance	WHO GTB
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; DTB: Division of tuberculosis; MOPH: Ministry of Public Health; WHO: World Health Organization.

Organization and financing

Implementation agencies

Division of Tuberculosis, Department of Disease Control, Ministry of Public Health, Thailand; Faculty of Pharmacy, Mahidol university, Thailand

Total budget: US$ 204 987

Funding source

Health Systems Research Institute (HSRI), Thailand

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	70	2020
GDP per capita (current US$)	7 187	2020
Life expectancy at birth (years)	77	2019
Cause and number of deaths (top 3 and TB)		2019
1. Ischaemic heart disease	51 305	
2. Stroke	50 273	
3. Lower respiratory infections	31 290	
14. TB	9 551	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	0.10%	2019
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	0.30%	2020
SDG 2: Zero hunger		
Prevalence of undernourishment	8.2%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.10	2020
UHC service coverage index (worst 0–100 best)	83	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	1.9%	2019
Population with household spending on health >25% of total household budget	0.27%	2019

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	105 000 (79 000–134 000)	2020
HIV-positive	9 900 (7 400–13 000)	2020
TB incidence rate (new cases per 100 000 population per year)		
Total	150 (113–192)	2020
HIV-positive	14 (11–18)	2020
TB treatment coverage	82% (64–110%)	2020
TB notifications		
Total new and relapse cases notified	85 837	2020
Percentage of new cases with MDR/RR-TB	1.3 (0.8–2)	2018
Treatment success rate		
New and relapse cases	85%	2019
Previously treated cases	63%	2019
HIV-positive TB cases	75%	2019
MDR/RR-TB cases	63%	2018
National TB budget	US$ 31 million	2020

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs, including shorter all-oral bedaquiline-containing regimen • Tuberculosis preventive treatment (TPT) drugs (1HP, 3HP, 4R and 6–9H) • TB active case finding • TB diagnostics (chest X-ray, all conventional tests, all molecular testing methods such as Xpert MTB/RIF, first- and second-line drug susceptibility test and IGRA)		
Social support schemes for TB patients	Cash transfer	Available to	All MDR/RR-TB (shorter regimen) and XDR-TB patients who experience adverse drug reaction
		Amount	4000 THB (US$ 129[a]) per treatment
		Duration	During treatment
	Transportation	Available to	All MDR/RR-TB (shorter regimen) and XDR-TB patients
		Amount	1500 THB (US$ 48[a]) per month
		Duration	During treatment
Treatment support	Intensive phase		Facility based, 2 months
	Continuation phase		Facility based, 4 months
Hospitalization[b]	Eligibility		All XDR-TB patients
	Duration		30 days
	Location		MDR-TB central (secondary or tertiary hospitals)
Health service use in 2020[c]	Typical number of facility visits		
	• TB (first-line treatment)		12 visits
	• Drug-resistant TB		23 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		30 days

1HP: one month of daily rifapentine plus isoniazid; 3HP: three months of weekly rifapentine plus isoniazid; 4R: four months of daily rifampicin monotherapy; 6–9H: six or nine months of daily isoniazid monotherapy; DOT: directly observed therapy; IGRA: interferon-gamma release assay; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; THB: Thai Bhat (Thailand); XDR-TB: extensively drug-resistant TB.

[a] Current value in 2021.

[b] Refers to a policy that mandates/encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY				
Sampling design	Stratified multi-stage cluster sampling using probability proportional to size			
Stratification	Tertiary hospitals in areas with low incidence of poverty (<7.87% from a report on poverty and income inequality in Thailand, 2017)	Tertiary hospitals in areas with high incidence of poverty (≥7.87%)	Secondary hospitals in areas with low incidence of poverty	Secondary hospitals in areas with high incidence of poverty
Sampling frame	List of tertiary hospitals providing TB treatment in areas with low incidence of poverty	List of tertiary hospitals providing TB treatment in areas with high incidence of poverty	List of secondary hospitals providing TB treatment in areas with low incidence of poverty	List of secondary hospitals providing TB treatment in areas with high incidence of poverty
Patient enrolment	Random sampling from registered patients on treatment			
Assumptions for sample size calculation				
Estimated proportion	50%			
Absolute precision	5%			
Design effect	2.0			
Sample size	420	280	315	385
Clusters				
Number	12 clusters	8 clusters	9 clusters	11 clusters
Size	35 patients	35 patients	35 patients	35 patients
DATA COLLECTION AND ANALYSIS				
Field data collection tool	Paper-based questionnaire			
Database	None			
Statistical software	Stata 15.0 (StataCorp) and R 4.0.2 statistic software (Comprehensive R Archive Network)			
METHODOLOGY FOR KEY METRICS				
Measurement for ability to pay	Self-reported household expenditure			
Estimates for indirect costs	Human capital approach (based on lost time and hourly wage rate) Hourly wage: 79 THB (US$ 2.5[a]) – mean hourly wage computed individually from reported income in the survey dataset			

THB: Thai Bhat (Thailand).

[a] Current value in 2021.

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	1 382	100	18	100	1 400	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	428	31	7	39	435	31
Male	954	69	11	61	965	69
Age group (years)						
0–14	7	0.51	0	0	7	0.50
15–24	68	4.9	2	11	70	5.0
25–34	142	10	4	22	146	10
35–44	204	15	3	17	207	15
45–54	300	22	4	22	304	22
55–64	299	22	2	11	301	22
≥65	362	26	3	17	365	26
Education level						
No education	76	5.5	1	5.6	77	5.5
Pre/Primary school	831	60	10	56	841	60
Secondary school or above	475	34	7	39	482	34
Insurance status[b]						
None	27	2.0	1	5.6	28	2.0
With insurance	1 355	98	17	94	1,372	98
Household size, median (min–max)	3 (0–17)		4 (1–7)		3 (0–17)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	638	46	7	39	645	46
Continuation phase	744	54	11	61	755	54
Treatment category						
New	1 309	95	13	72	1 322	94
Relapse	60	4.3	3	17	63	4.5
Retreatment	11	0.80	2	11	13	0.93
Unknown	2	0.14	0	0	2	0.14
HIV status						
Positive	117	8.5	2	11	119	8.5
Negative	1 215	88	16	89	1 231	88
Unknown	45	3.3	0	0	45	3.2
Type of TB						
Bacteriologically confirmed pulmonary TB	884	64	16	89	900	64
Clinically diagnosed pulmonary TB	350	25	2	11	352	25
Extrapulmonary TB	147	11	0	0	147	11
Diagnostic delay (>4weeks)[c]	224	32	5	45	229	32
Treatment support						
Self-administered	1 039	76	11	61	1 050	75
Home-based directly observed therapy	247	18	3	17	250	18
Facility-based directly observed therapy	88	6.4	4	22	92	6.6

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question, "Do you have any of the following treatment entitlements?". The options were "social security", "universal health care", "agency reimbursement (civil servant)", "agency reimbursement (state enterprise)", "agency reimbursement (local)", "health insurance for migrant worker", "no medical treatment entitlements (for migrant worker)" and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	200 (178–225)	248 (129–476)	200 (178–226)
Household	542 (496–591)	732 (541–990)	544 (499–593)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	47 (40–57)	14 (4.8–41)	47 (39–56)
Household	284 (249–324)	208 (75–576)	282 (247–322)
ESTIMATED MONTHLY EXPENDITURE: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Household	338 (299–381)	383 (229–640)	338 (300–381)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	51 (48–54)	45 (20–72)	51 (48–54)
Yes	48 (45–51)	55 (28–80)	48 (45–51)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	2.7 (1.5–4.3)	0 (NA)	2.7 (1.5–4.2)
At the interview	12 (10–14)	11 (0.53–33)	12 (10–14)

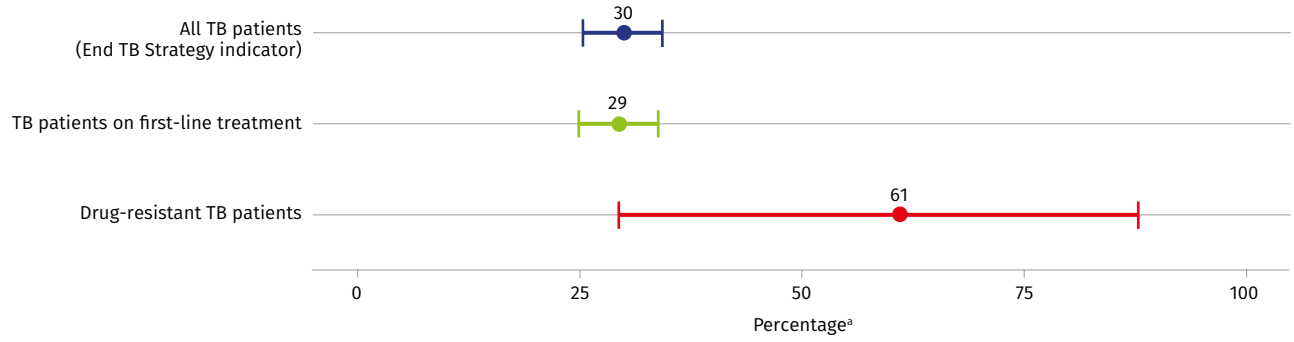
CI: confidence interval; NA: not applicable; PPP: purchasing power parity.
[a] Current value in 2021.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	19	16–23	22	6.5–44	19	16–23
Sales of assets	5.2	3.6–7.0	11	1.2–29	5.3	3.7–7.2
Any of above	22	18–25	22	6.5–44	22	18–25
SOCIAL CONSEQUENCES						
Food insecurity	4.5	3.0–6.4	17	2.7–39	4.7	3.1–6.5
Divorce/separation	1.8	1.1–2.8	5.7	0.12–24	1.9	1.1–2.8
Job loss	34	30–39	56	30–79	35	31–39
Interrupted schooling	1.6	0.88–2.4	0	NA	1.5	0.87–2.4
Social exclusion	27	22–33	66	38–89	28	23–33
Woking days lost	42	37–46	56	32–78	42	38–46
Any of above	55	50–60	94	75–100	56	51–60
SOCIAL SUPPORT						
Social assistance	2.2	1.3–3.2	5.7	0.12–24	2.2	1.4–3.3
Vouchers from NTP	0.98	0.16–2.5	5.7	0.12–24	1	0.21–2.5
PERCEIVED FINANCIAL IMPACT						
Richer	0.14	0.011–0.43	0	NA	0.14	0.011–0.42
Not changed	52	48–57	21	4.3–47	52	47–56
Poorer	38	35–41	55	34–76	38	35–41
Much poorer	8.4	6.0–11	17	3.8–36	8.5	6.1–11

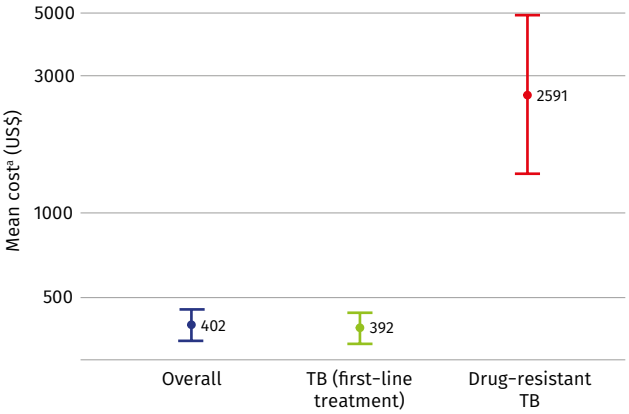
NA: not applicable; NTP: National TB Programme.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2021 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

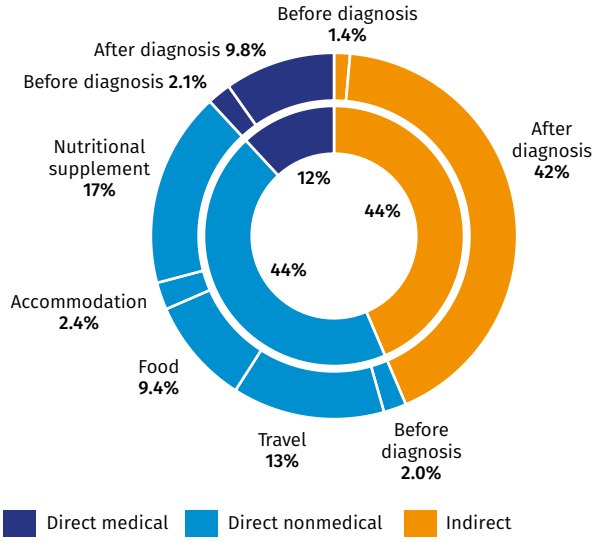
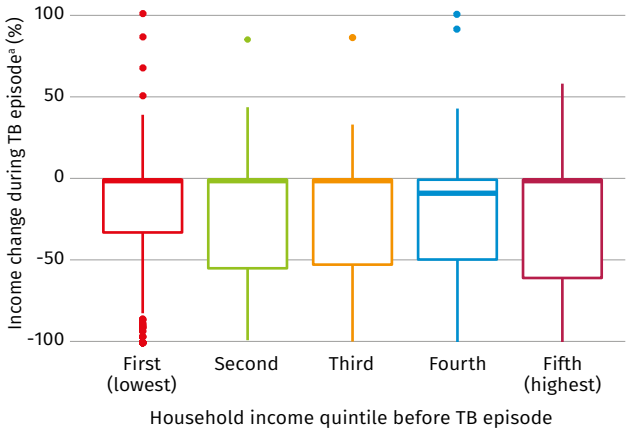
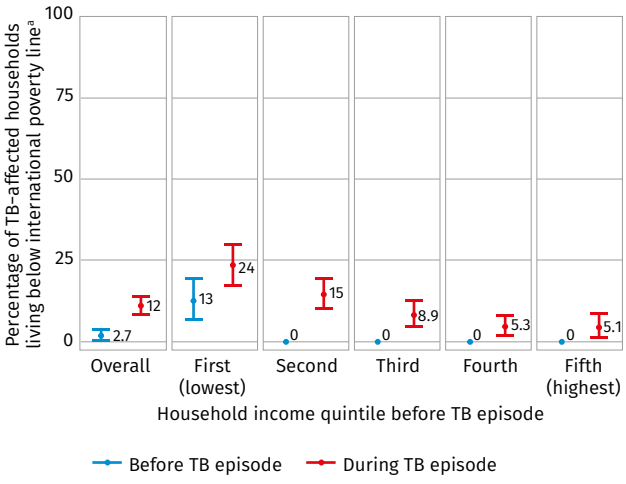


Fig. 4. Changes in distribution of monthly self-reported household income



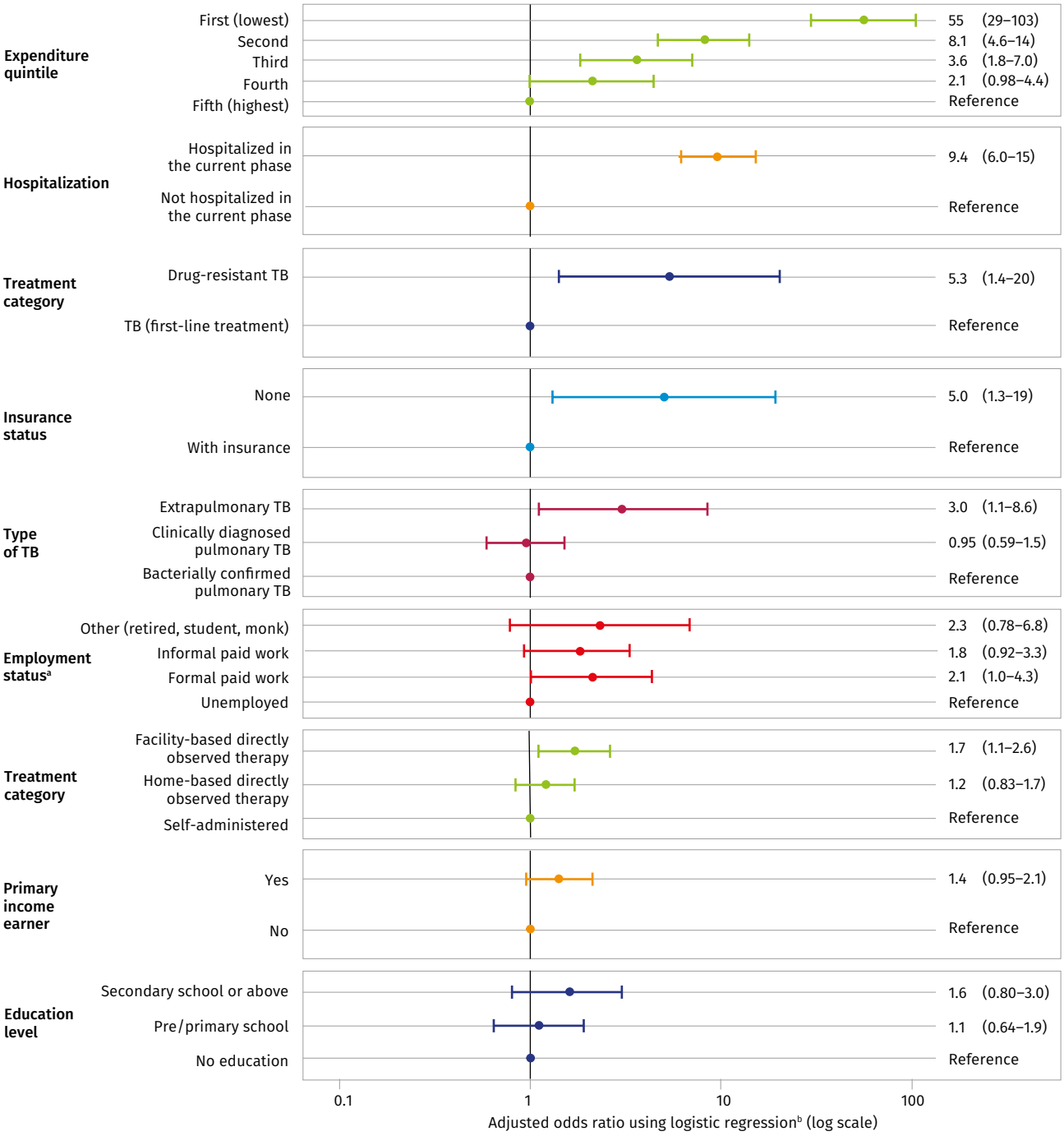
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



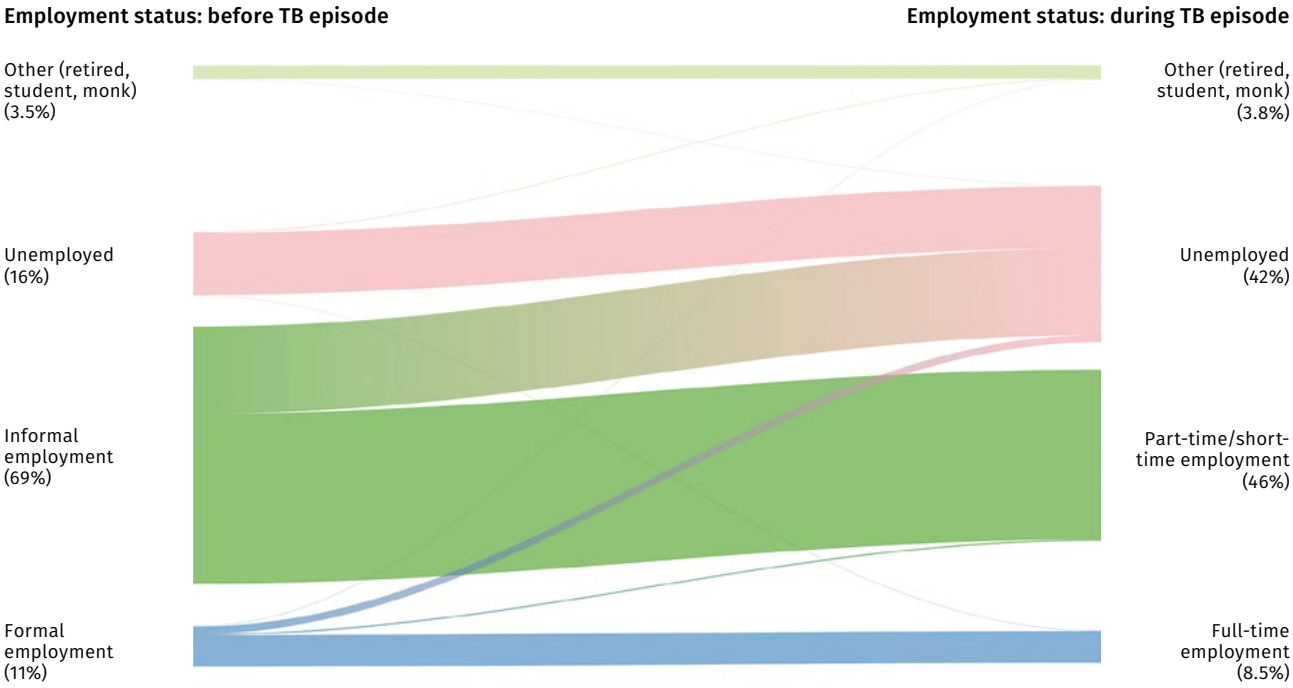
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Implement TB-specific social support, to cover cost of living and sickness benefit.	Indirect costs
	Enhance capacity and motivation of health workers to conduct contact tracing.	Direct nonmedical expenditures
Wider health sector	Refine benefit packages in all health insurance schemes to include standard TB care, including diagnosis, treatment and social support.	Direct medical expenditures and indirect costs
Non-health sector	Cooperate with social welfare and Ministry of Labour or NGO agencies to support patients with TB throughout their treatment.	Indirect costs

NGO: nongovernmental organization.

Dissemination

Publication

- *Economic burden for healthcare expenditure of tuberculosis patients in Thailand: the first national tuberculosis patient cost survey*, national report. Bangkok: National TB Control Programme, Ministry of Public Health, Thailand; 2022.

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Uganda

2017

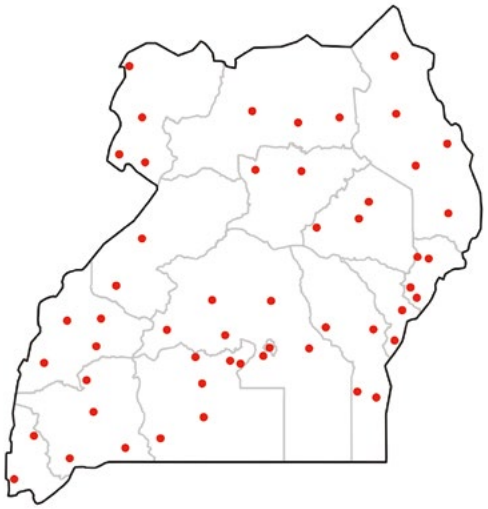
Summary statistics, national TB patient cost survey

Total number of survey participants	
Number of participants by treatment category	1178
• TB (first-line treatment)	1142
• Drug-resistant TB	36
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2017 US$[b] (95% CI)	**187 (161–216)**
• TB (first-line treatment)	166 (147–187)
• Drug-resistant TB	4188 (3161–5548)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**53 (43–63)**
• TB (first-line treatment)	51 (41–61)
• Drug-resistant TB	100 (92–100)

CI: confidence interval; SDG: Sustainable Development Goal; UGS: Ugandan Shilling (Uganda).

[a] Geometric mean.

[b] The analysis of the survey used an exchange rate of US$ 1 = 3598 UGS, which was the average of the period from 11 May to 23 November 2017.



Distribution of surveyed clusters (N=67)

• Surveyed cluster

Survey timeline

Initiation of preparation	July 2016
Ethics approval	November 2016
Data collection	May–November 2017
Official dissemination event	March 2019
Publication of survey report	February 2019

Key people

NAME	ROLE	ORGANIZATION
Frank Mugabe	Primary investigator	NTLP, Kampala, Uganda
Bruce J Kirenga	Primary investigator	MLI Makerere, Kampala, Uganda
Winters Muttamba	Study coordinator	MLI Makerere, Kampala, Uganda
Racheal Tumwebaze	Study coordinator	MLI Makerere, Kampala, Uganda
Claudio Marra	Co-investigator	NTLP, Kampala, Uganda
Achilles Katamba	Co-investigator	URC & CHS Makerere, Kampala, Uganda
Abel Nkolo	Co-investigator	URC & CHS Makerere, Kampala, Uganda
Simon Kasasa	Co-investigator	SPH Makerere, Kampala, Uganda
Rogers Sekibira	Data manager	MLI Makerere, Kampala, Uganda
Charles Batte	Data analyst	MLI Makerere, Kampala, Uganda
Levicatus Mugenyi	Data analyst	MLI Makerere, Kampala, Uganda
Estella Birabwa	Steering committee	USAID Mission, Kampala, Uganda
Seyoum Dejene	Steering committee	USAID Mission, Kampala, Uganda
Ndawula Gideon	Steering committee	CUAMM
Peter Lochoro	Steering committee	CUAMM
Inés Garcia Baena	Technical assistance	WHO GTB
Peter Nguhiu	Technical assistance	WHO GTB
Julia Ershova	Technical assistance	US CDC

CUAMM: Doctors with Africa, CUAMM [University college for aspiring missionary doctors]; GTB: Global Tuberculosis Programme; MLI: Makerere University Lung Institute, College of Health Sciences, Makerere University; NTLP: National Tuberculosis, Leprosy & Lung Disease Programme; URC & CHS: University Research Co., Llc [URC] & Center for Human Services [CHS], Makerere University; USAID: United States Agency for International Development; US CDC: United States Centers for Disease Control and Prevention; WHO: World Health Organization.

Organization and financing

Implementation agency

Makerere University

Total budget: US$ 89 645

Funding sources

United States Centers for Disease Control and Prevention (US CDC); United States Agency for International Development (USAID); Doctors with Africa, CUAMM

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	41	2017
GDP per capita (current US$)	747	2017
Life expectancy at birth (years)	63	2017
Cause and number of deaths (top 3 and TB)		2019
1. Neonatal conditions	26 793	
2. HIV/AIDS	21 188	
3. Lower respiratory infections	18 865	
9. TB	7 255	

AIDS: acquired immunodeficiency syndrome; GDP: gross domestic product; HIV: human immunodeficiency virus.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	41%	2016
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	70%	2016
SDG 2: Zero hunger		
Prevalence of undernourishment	na	–
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	1.6	2017
UHC service coverage index (worst 0–100 best)	48	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	15%	2016
Population with household spending on health >25% of total household budget	3.8%	2016

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	83 000 (48 000–126 000)	2017
HIV-positive	33 000 (19 000–50 000)	2017
TB incidence rate (new cases per 100 000 population per year)		
Total	201 (118–306)	2017
HIV-positive	80 (47–121)	2017
TB treatment coverage	55% (36–95%)	2017
TB notifications		
Total new and relapse cases notified	45 794	2017
Percentage of new cases with MDR/RR-TB	1.0 (0.93–1.2)	2019
Treatment success rate		
New and relapse cases	72%	2017
Previously treated cases	67%	2017
HIV-positive TB cases	69%	2017
MDR/RR-TB cases	74%	2017
National TB budget	US$ 54 million	2017

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		
Social support schemes for TB patients	Food	Available to	All drug-resistant TB patients
		Amount	5000 UGS (US$ 1.4[a]) per day
		Duration	During treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	5000 UGS (US$ 1.4[a])
		Duration	During treatment
Treatment support	Intensive phase		• Patients on first-line TB treatment and patients coinfected with HIV (2 months): ambulatory visits (day 0, 14, 28 and monthly drug refills) • Patients on drug-resistant TB treatment (2 months): 2–8 weeks hospitalization followed by daily ambulatory care visit at public or private facility near the patient's home
	Continuation phase		• Patients on first-line TB treatment and patients coinfected with HIV (4 months): monthly ambulatory visits for drug refills • Patients on drug-resistant TB treatment (4–6 months): daily ambulatory directly observed therapy at a public or private health facility near the patient's home (and increasingly community level care) and monthly visits to the health facility for monitoring treatment response and side effects
Hospitalization[b]	Eligibility		All patients with drug-resistant TB and severely ill TB patients on first-line treatment
	Duration		2–8 weeks for drug-resistant TB patients; depending on the condition for TB patients on first-line treatment
	Location		TB ward at the hospitals
Health service use in 2017[c]	Typical number of facility visits		
	• TB (first-line treatment)		8 visits
	• Drug-resistant TB		26 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		15 days
	• Drug-resistant TB		30 days

HIV: human immunodeficiency virus; UGS: Ugandan Shilling (Uganda).

[a] Current value in 2017.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of 1680 diagnostic and treatment units (DTU) and 46 171 notified patients (2014) at national level
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions for sample size calculation	
Estimated proportion	30%
Absolute precision	4%
Design effect	2
Sample size	1174
Clusters	
Number	67 clusters
Size	15 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 13.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household consumption
Estimates for indirect costs	Human capital approach (based on lost time and hourly wage rate) Hourly wage: 1433 UGS (US$ 0.40[a]) – national minimum wage

UGS: Ugandan Shilling (Uganda).

[a] Current value in 2017.

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	1 142	100	36	100	1 178	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	413	36	11	31	424	36
Male	729	64	25	69	754	64
Age group (years)						
0–14	60	5.3	2	5.6	62	5.3
15–24	161	14	4	11	165	14
25–34	338	30	11	31	349	30
35–44	302	26	9	25	311	26
45–54	158	14	8	22	166	14
55–64	73	6.4	0	0	73	6.2
≥65	50	4.4	2	5.6	52	4.4
Education level						
No education	162	14	7	19	169	14
Primary education	582	51	19	53	601	51
Secondary or higher	398	35	10	28	408	35
Insurance status[b]						
None	1 125	99	36	100	1 161	99
With insurance	17	1.5	0	0	17	1.4
Household size, median (min–max)	5 (1–5)		4 (1–5)		4 (1–5)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	534	47	13	36	547	46
Continuation phase	608	53	23	64	631	54
Treatment category						
New	1 057	93	14	39	1 071	91
Retreatment	85	7.4	22	61	107	9.1
HIV status						
Positive	464	41	21	58	485	41
Negative	664	58	15	42	679	58
Unknown	14	1.2	0	0	14	1.2
Type of TB						
Bacteriologically confirmed pulmonary TB	817	72	35	97	852	72
Clinically diagnosed pulmonary TB	230	20	0	0	230	20
Extrapulmonary TB	95	8.3	1	2.8	96	8.2
Diagnostic delay (>4 weeks)[c]	219	45	2	40	221	45
Treatment support						
Self-administered	857	75	7	19	864	73
Directly observed therapy	285	25	29	81	314	27

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?". The options were "no" and "yes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	27 (22–33)	25 (18–35)	27 (22–32)
Household	65 (53–81)	49 (28–86)	65 (52–80)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	4.2 (3.1–5.7)	1.7 (0.98–3.0)	4.1 (3.0–5.6)
Household	8.6 (6.6–11)	1.8 (0.95–3.4)	8.1 (6.1–11)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	44 (40–49)	35 (1.0–46)	44 (39–48)
Yes	56 (51–60)	65 (3.0–74)	56 (52–61)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	48 (38–57)	53 (28–77)	48 (39–58)
At the interview	56 (46–67)	100 (NA)	58 (47–68)

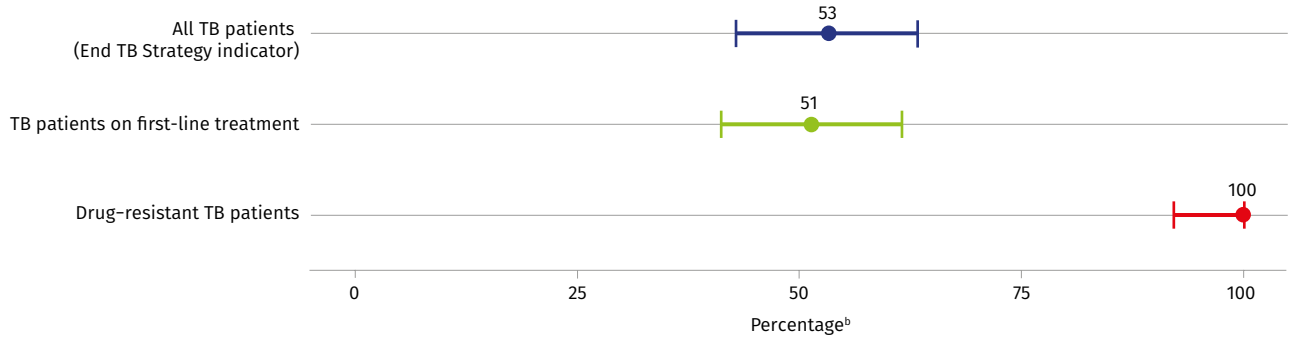
CI: confidence interval; NA: not applicable; PPP: purchasing power parity.
[a] Current value in 2017.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	10	7.0–14	40	24–57	11	8.3–14
Loan	26	20–32	36	20–53	26	21–32
Sales of assets	25	19-32	54	37-71	26	20-33
Any of above	47	40–55	81	67–92	48	41–56
SOCIAL CONSEQUENCES						
Food insecurity	49	41–58	60	27–88	50	41–58
Divorce/separation	7.8	4.8–12	11	4.5–19	8.0	4.9–12
Job loss	40	35–45	56	32–79	41	35–46
Interrupted schooling	12	9.3–15	11	2.4–26	12	9.4–15
Social exclusion	54	42–66	46	16–77	54	42–65
Any of above	100	NA	100	NA	100	NA
SOCIAL SUPPORT						
Sick leave	0.51	0.15–1.1	0	NA	0.49	0.15–1.0
Social welfare	1.1	0.45–2.1	35	9.2–66	2.4	1.1–4.1
Disability support	0	NA	22	2.2–54	0.81	0.035–2.6
Other	0.21	<0.01–0.83	0	NA	0.20	<0.01-0.80
Any of above	1.8	0.87–3.2	56	35–76	3.9	1.8–6.7

CI: confidence interval; NA: not applicable.

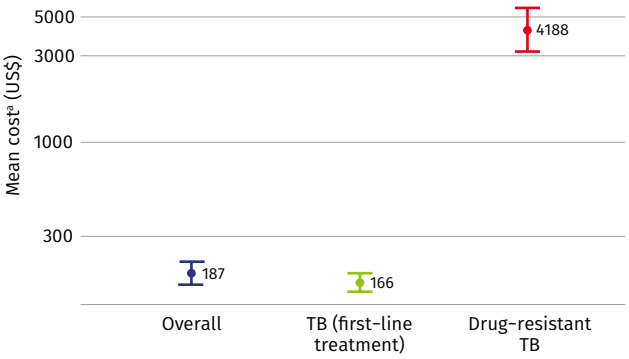
Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB[a]



[a] Results have been computed with the total costs including cost of dissaving (other countries exclude this cost). When the cost of dissaving is excluded, the percentage of TB-affected households facing catastrophic costs falls from 53% to 46% for overall, 51% to 44% for those on first-line treatment and is unchanged for those on treatment for drug-resistant TB.

[b] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2017 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

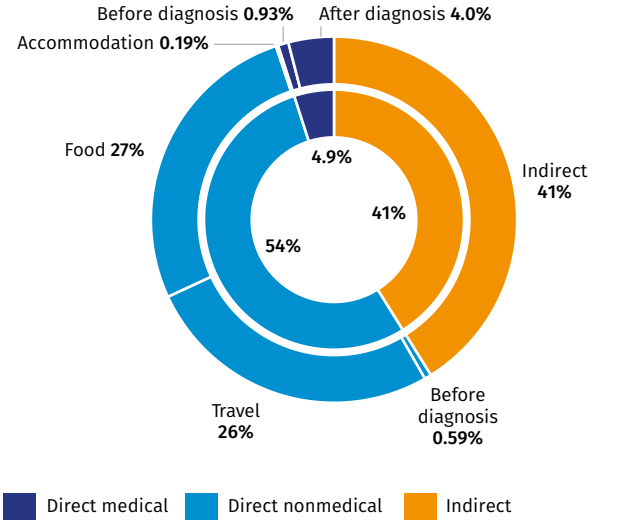
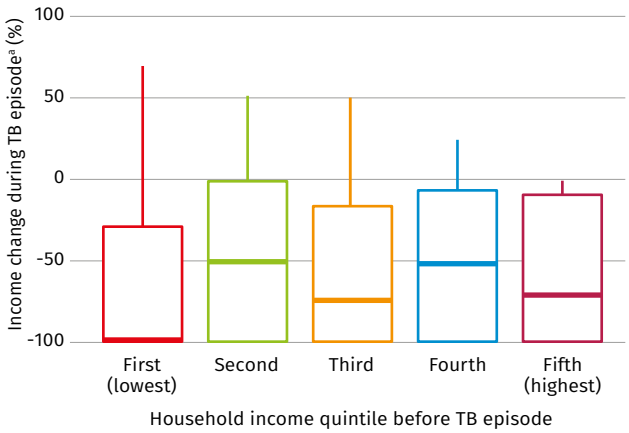
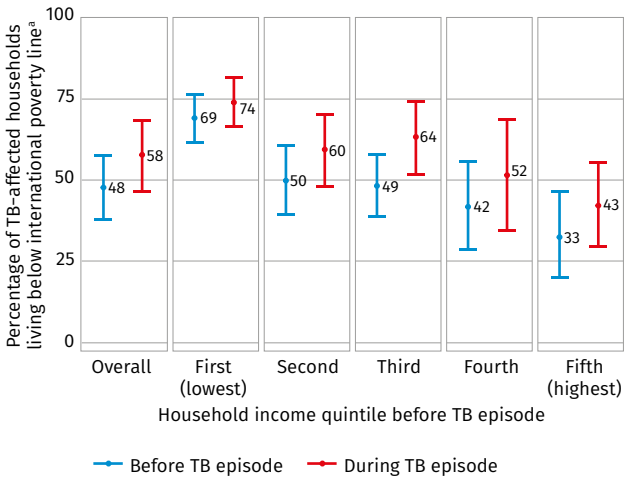


Fig. 4. Changes in distribution of monthly self-reported household income



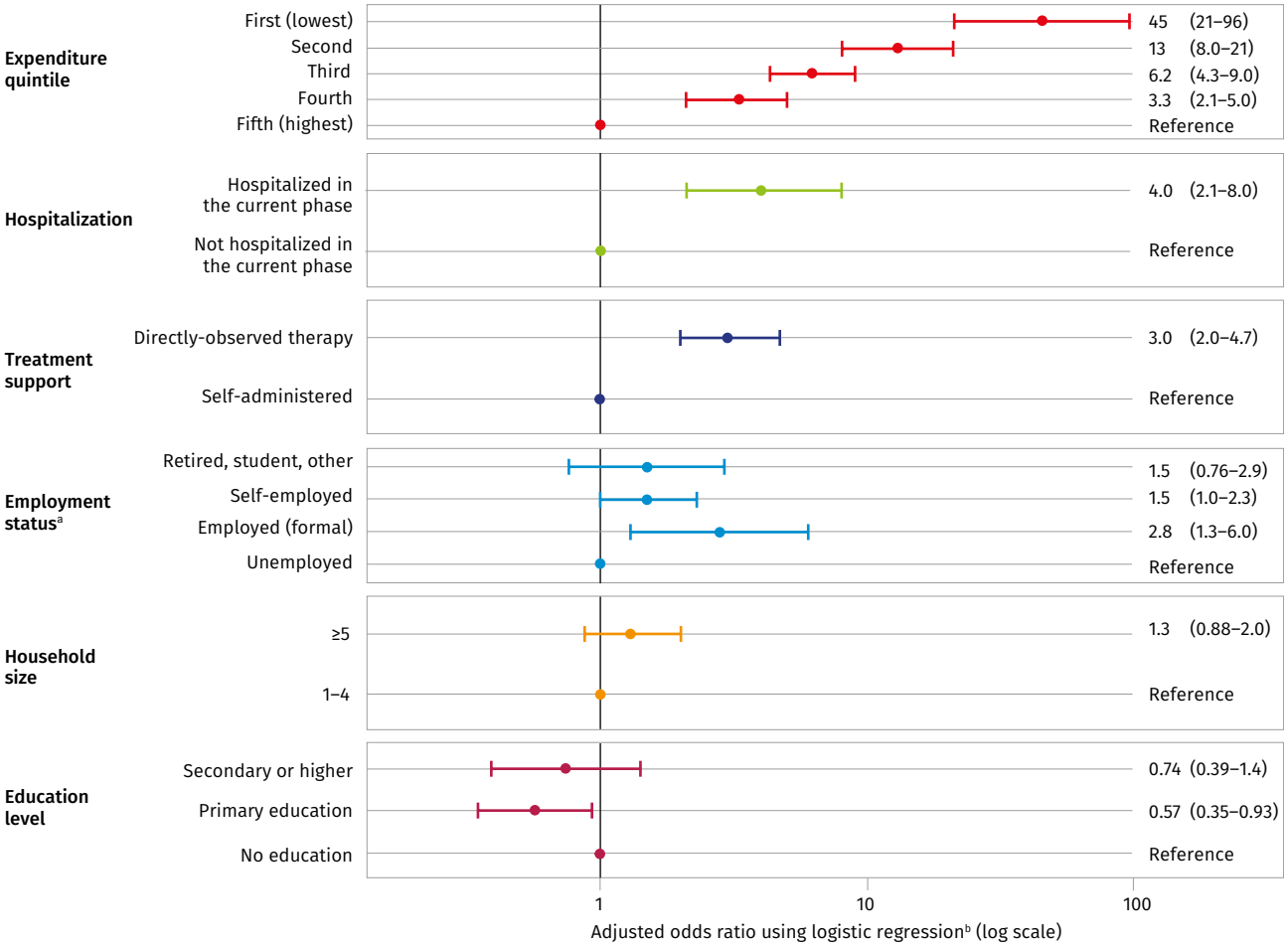
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



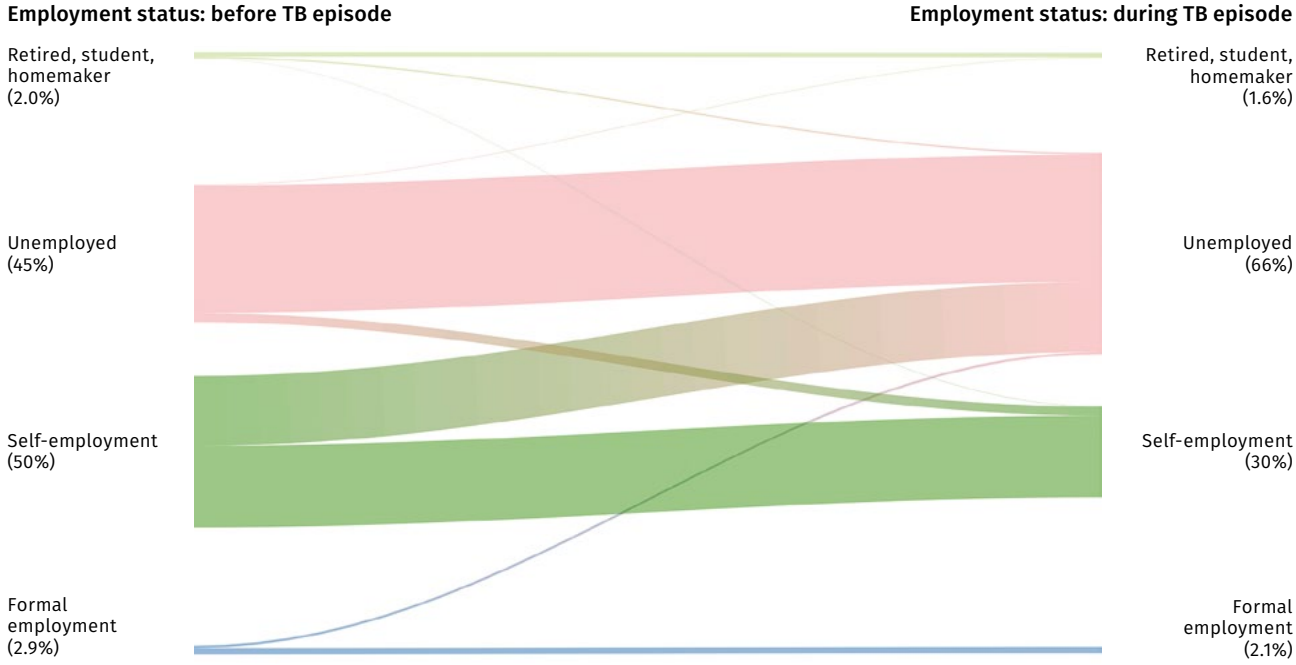
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Promote decentralization of TB care including strengthening sputum referral mechanisms and community level interventions.	Direct medical and nonmedical expenditures
	Improve TB service delivery through capacity-building of health workers, prompt TB diagnosis and initiation of treatment, and rolling out of new interventions including TB preventive therapy for at-risk populations.	
	Enhance TB screening activities for early diagnosis of TB at all health facility entry points, and institute timely contact tracing.	Direct medical expenditures, direct nonmedical expenditures and indirect costs
	Incorporate routine measurement of catastrophic costs in the reporting systems.	
	Bring TB services closer to the community through the development of a community mobilization and engagement strategy for TB, community-based DOTS and the strengthening of village health teams.	Direct nonmedical expenditures and indirect costs
	Strengthen PPPs to ensure that the private facilities receive government support.	Direct medical expenditures
Wider health sector	Operationalize national health insurance.	Direct medical expenditures
Non-health sector	Support the operationalization of the national social insurance.	Indirect costs
	Strengthen and enforce legislation related to social protection.	
	Strengthen intersectoral collaborations.	
	Advocate for prioritization of TB-affected households in national financial empowerment schemes.	
	Develop guidelines for social protection among TB patients.	
	Engage employer and employee associations.	
	Develop a referral mechanism between health facilities and social protection services.	

DOTS: directly observed treatment short course; PPP: public–private partnership.

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Uganda, December 2019.

Publication

- *Direct and indirect costs due to tuberculosis and proportion of tuberculosis-affected households experiencing catastrophic costs due to TB in Uganda*, national report. Kampala: Ministry of Health, Republic of Uganda; 2019 (https://www.health.go.ug/cause/direct-and-indirect-costs-due-to-tuberculosis-and-proportion-of-tuberculosis-affected-households-experiencing-catastrophic-costs-due-to-tb-in-uganda-febrauary-2019/).
- Muttamba W, Tumwebaze R, Mugenyi L, Batte C, Sekibira R, Nkolo A et al. Households experiencing catastrophic costs due to tuberculosis in Uganda: magnitude and cost drivers. BMC Public Health. 2020;20(1):1409 (https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09524-5).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

United Republic of Tanzania

2019

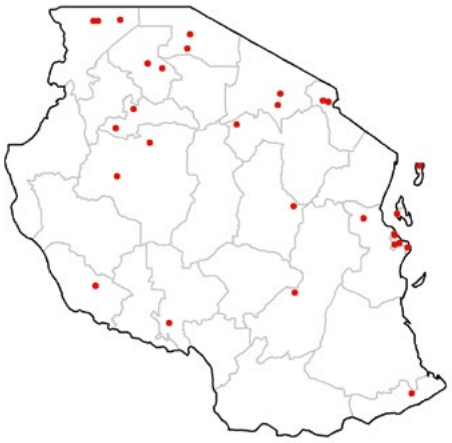
Summary statistics, national TB patient cost survey

Total number of survey participants	**777**
Number of participants by treatment category	
• TB (first-line treatment)	752
• Drug-resistant TB	25
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2020 US$[b] (95% CI)	**155 (138–174)**
• TB (first-line treatment)	151 (135–168)
• Drug-resistant TB	383 (236–620)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**45 (37–53)**
• TB (first-line treatment)	44 (36–52)
• Drug-resistant TB	80 (58–95)

CI: confidence interval; TZS: Tanzania Shilling (United Republic of Tanzania).

[a] Geometric mean.

[b] The analysis of the survey used the exchange rate of US$ 1 = 2307 TZS, which was the average for 2020.



Distribution of surveyed clusters (N=30)

• Surveyed cluster

Survey timeline

Initiation of preparation	April 2018
Ethics approval	April 2019
Data collection	July–September 2019
Official dissemination event	–
Publication of survey report	July 2020

Key people

NAME	ROLE	ORGANIZATION
Beatrice K Mutayoba	Principal investigator	NTLP, United Republic of Tanzania
Asha Ussi	Co-principal investigator	Zanzibar Integrated Hepatitis, HIV, Tuberculosis and Leprosy Programme
Andrew Martin Kilale	Survey coordinator	NIMR
Melkizedeck Majaha	Associate investigator	NIMR
Charles Makasi	Associate investigator	NIMR
Chacha Manga	Associate investigator	NIMR
Benard Ngowi	Associate investigator	NIMR
Nyagosya Range	Associate investigator	NIMR
Bhavin Subhash Jani	Associate investigator	WHO, United Republic of Tanzania
Vishnu Mahamba	Associate investigator	KNCV, Dar es Salaam Office
Emmanuel Nkiligi	Statistician	NTLP, United Republic of Tanzania
John Mduda	Data manager	NIMR
Nobuyuki Nishikiori	Technical assistance	WHO GTB
Andrea Pantoja	Technical assistance	WHO GTB
Debora Pedrazzoli	Technical assistance	WHO GTB
Takuya Yamanaka	Technical assistance	WHO GTB
Julia Ershova	Technical assistance	US CDC

GTB: Global Tuberculosis Programme; NIMR: National Institute for Medical Research; NTLP: National Tuberculosis and Leprosy Programme; US CDC: United States Centers for Disease Control and Prevention; WHO: World Health Organization.

Organization and financing

Implementation agency

National Tuberculosis (TB) and Leprosy Program, Ministry of Health, Community Development, Gender, Elderly and Children, United Republic of Tanzania;
National Institute for Medical Research (NIMR), Muhimbili Medical Research Centre, United Republic of Tanzania;
KNCV Tuberculosis Foundation, Dar es Salaam Office, United Republic of Tanzania

Total budget: US$ 124 700

Funding sources

United States Centers for Disease Control and Prevention; Ministry of Health, Community Development, Gender, Elderly and Children, United Republic of Tanzania

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	58	2019
GDP per capita (current US$)	1 122	2019
Life expectancy at birth (years)	65	2018
Cause and number of deaths (top 3 and TB)		2019
1. Neonatal conditions	36 911	
2. HIV/AIDS	27 402	
3. Lower respiratory infections	26 028	
5. TB	20 269	

AIDS: acquired immunodeficiency syndrome; GDP: gross domestic product; HIV: human immunodeficiency virus.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	49%	2018
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	77%	2018
SDG 2: Zero hunger		
Prevalence of undernourishment	25%	2019
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	1.5	2019
UHC service coverage index (worst 0–100 best)	46	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	4.3%	2018
Population with household spending on health >25% of total household budget	0.82%	2018

HIV: human immunodeficiency virus; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	137 000 (65 000–237 000)	2019
HIV-positive	33 000 (15 000–56 000)	2019
TB incidence rate (new cases per 100 000 population per year)		
Total	237 (112–408)	2019
HIV-positive	56 (27–97)	2019
TB treatment coverage	59% (34–130%)	2019
TB notifications		
Total new and relapse cases notified	81 208	2019
Percentage of new cases with MDR/RR-TB	0.97 (0.4–1.6)	2018
Treatment success rate		
New and relapse cases	93%	2019
Previously treated cases	88%	2019
HIV-positive TB cases	90%	2019
MDR/RR-TB cases	75%	2018
National TB budget	US$ 62 million	2019

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • Diagnostics and follow-up laboratory tests (microscopy, Xpert MTB/RIF and culture, when applicable) • Follow-up visits		
Social support schemes for TB patients	Food	Available to	All drug-resistant TB patients
		Amount	50 000 TZS (US$ 22[a]) per month
		Duration	During treatment
	Transportation	Available to	All drug-resistant TB patients
		Amount	50 000 TZS (US$ 22[a]) per month
		Duration	During treatment
Treatment support	Intensive phase		Facility based, once a week
	Continuation phase		Facility based, twice a month
Hospitalization[b]	Eligibility		Severely ill TB patients
	Duration		As needed, anytime during the course of treatment
	Location		TB wards and medical wards at the hospitals
Health service use in 2019[c]	Typical number of facility visits		
	• TB (first-line treatment)		18 visits
	• Drug-resistant TB		24 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		180 days

[a] TZS: Tanzanian Shilling (United Republic of Tanzania).

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey method

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of TB basic management units
Patient enrolment	Consecutive enrolment of eligible patients attending health facilities
Assumptions	
Estimated proportion	50%
Absolutee precision	5%
Design effect	2
Sample size	764
Clusters	
Number	30 clusters
Size	26 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 15.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Estimated household expenditure
Estimates for indirect costs	Human capital approach (based on lost time and hourly wage rate) Mean hourly wage: US$ 0.49 (TZS 1 136) – estimated hourly wage of patient using individual income and working hours before TB episode. Missing income data were imputed with a predicted income by a linear regression model based on household assets and characteristics.

TZS: Tanzanian shilling.

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	752	100	25	100	777	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	285	38	4	16	289	37
Male	467	62	21	84	488	63
Age group						
0–14	73	10	0	0	73	9.4
15–24	84	11	2	8.0	86	11
25–34	148	20	6	24	154	20
35–44	157	21	7	28	164	21
45–54	135	18	4	16	139	18
55–64	78	10	4	16	82	11
≥65	77	10	2	8.0	79	10
Education level						
No education	4	0.53	0	0	4	0.51
Primary school	420	56	15	60	435	56
High school or above	153	20	5	20	158	20
Unknown	175	23	5	20	180	23
Insurance status[b]						
None	659	88	24	96	683	88
With insurance	93	12	1	4.0	94	12
Household size, median (min–max)	5 (1–45)		6 (1–10)		5 (1–45)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	292	39	11	44	303	39
Continuation phase	460	61	14	56	474	61
Treatment category						
New	677	90	17	68	694	89
Relapse	57	7.6	3	12	60	7.7
Retreatment	18	2.4	5	20	23	3.0
HIV status						
Positive	229	30	5	20	234	30
Negative	509	68	19	76	528	68
Unknown	14	1.9	1	4.0	15	1.9
Type of TB						
Bacteriologically confirmed pulmonary TB	387	51	20	80	407	52
Clinically diagnosed pulmonary TB	230	31	3	12	233	30
Extrapulmonary TB	135	18	2	8	137	18
Diagnostic delay (>4 weeks)[c]	86	11	8	32	94	12
Treatment support						
Self-administration	420	56	12	48	432	56
Home-based directly observed therapy	317	42	3	12	320	41
Facility-based directly observed therapy	15	2.0	10	40	25	3.2

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have health insurance?", and the options were "No" and "Yes". If the response was "Yes", a following question "What type?" was asked, and the options were "National health insurance fund (NHIF)", "Social health insurance benefit (NSSF)", "Community health insurance fund (CHIF)", "Tiba Kwa Kadi (TIKA)" and "Private health insurance schemes".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	48 (38–61)	105 (72–152)	50 (40–62)
Household	140 (124–158)	184 (138–245)	141 (126–159)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	7.8 (6.2–9.9)	5.7 (2.8–12)	7.8 (6.2–9.8)
Household	102 (91–114)	119 (98–144)	103 (92–115)
ESTIMATED MONTHLY EXPENDITURE: AT THE INTERVIEW, IN US$, MEANB (95% CI)			
Household	68 (55–83)	49 (28–86)	67 (54–83)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	42 (37–47)	24 (4.9–52)	42 (37–46)
Yes	58 (53–63)	76 (48–95)	58 (54–63)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	36 (31–41)	20 (5.4–41)	35 (30–41)
At the interview	47 (40–54)	40 (22–60)	47 (40–53)

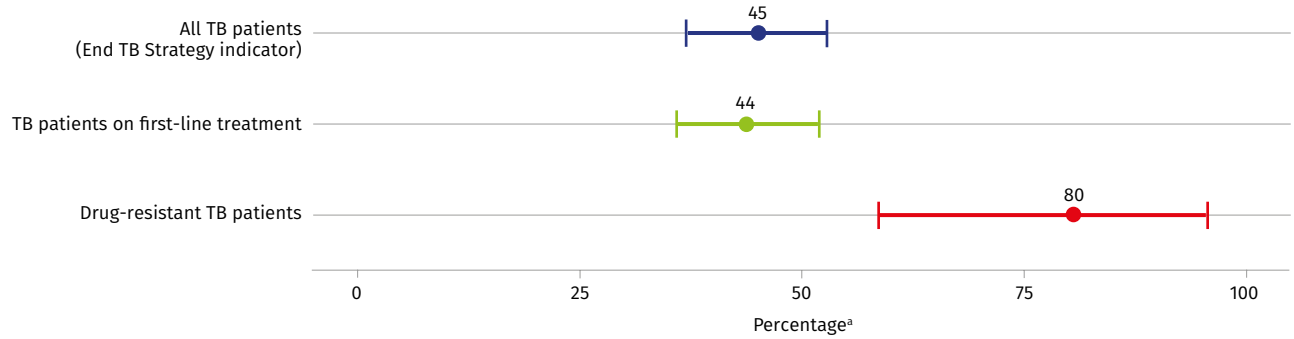
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2020.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	36	30–41	52	33–71	36	31–42
Sales of assets	35	29–41	60	42–77	35	30–41
Any of above	53	47–58	72	51–89	53	47–59
SOCIAL CONSEQUENCES						
Food insecurity	45	36–55	56	36–75	46	37–55
Divorce/separation	4.1	2.4–6.2	12	0.68–35	4.4	2.4–6.8
Job loss	36	29–42	32	15–52	35	29–42
Interrupted schooling	5.7	4–7.6	0	NA	5.5	3.9–7.4
Social exclusion	11	6.8–15	12	3.3–25	11	6.9–15
Relocation	5.6	3.3–8.4	4.1	0.07–18	5.5	3.4–8.2
Any of above	94	91–96	100	NA	94	91–96
SOCIAL SUPPORT						
Social support	3.9	1.9–6.6	24	7.7–46	4.6	2.4–7.4
Vouchers	10	5.2–17	32	11–58	11	5.6–18

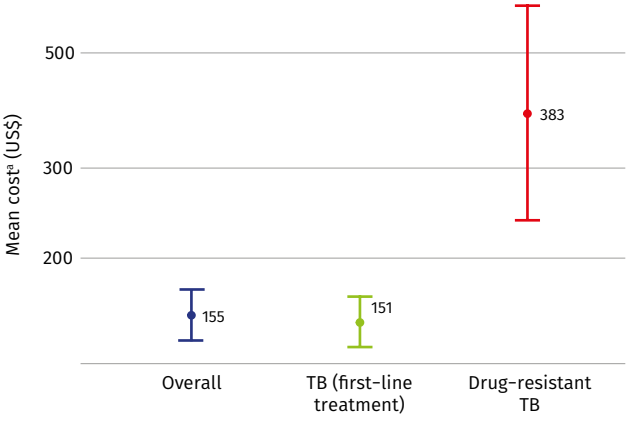
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2019 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

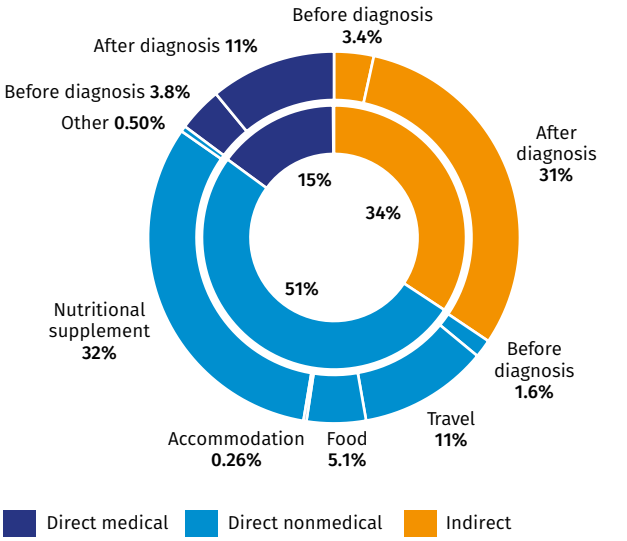
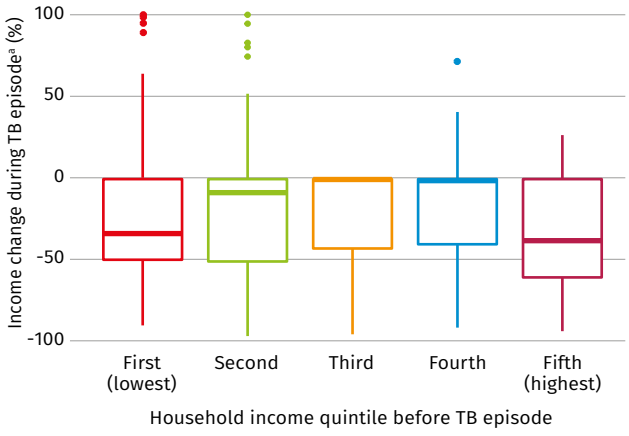
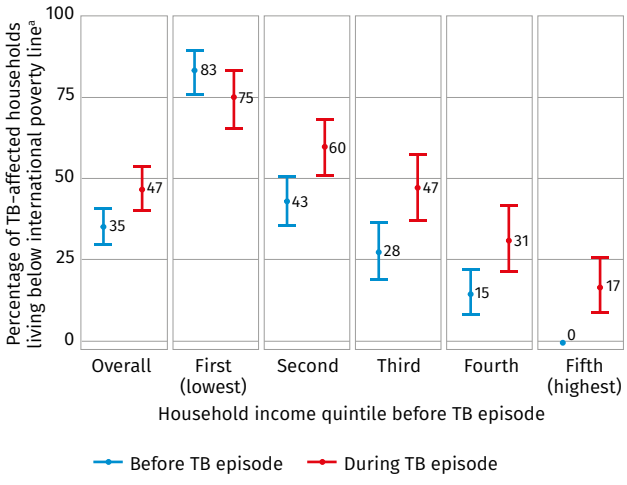


Fig. 4. Changes in distribution of monthly self-reported household income



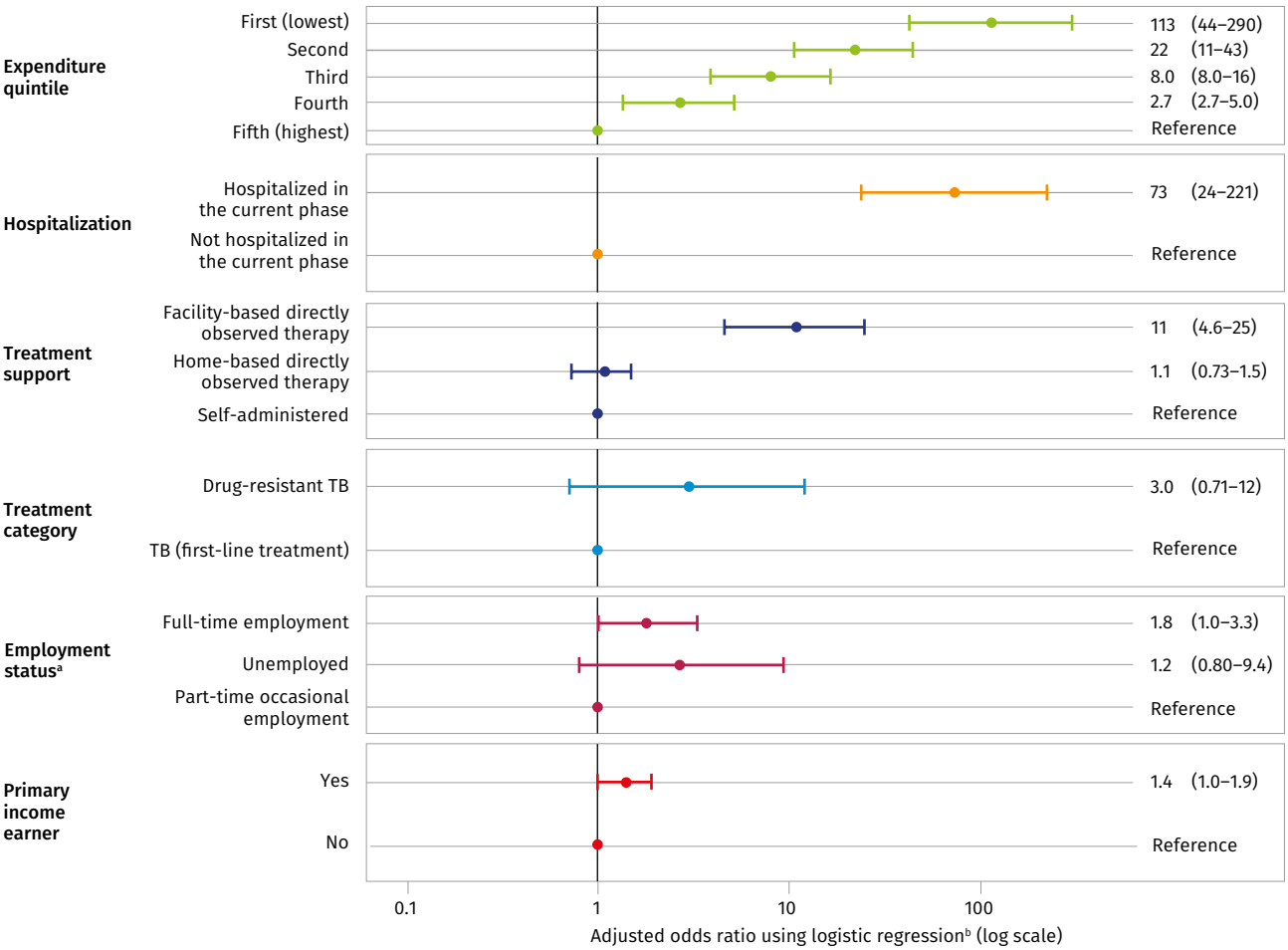
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



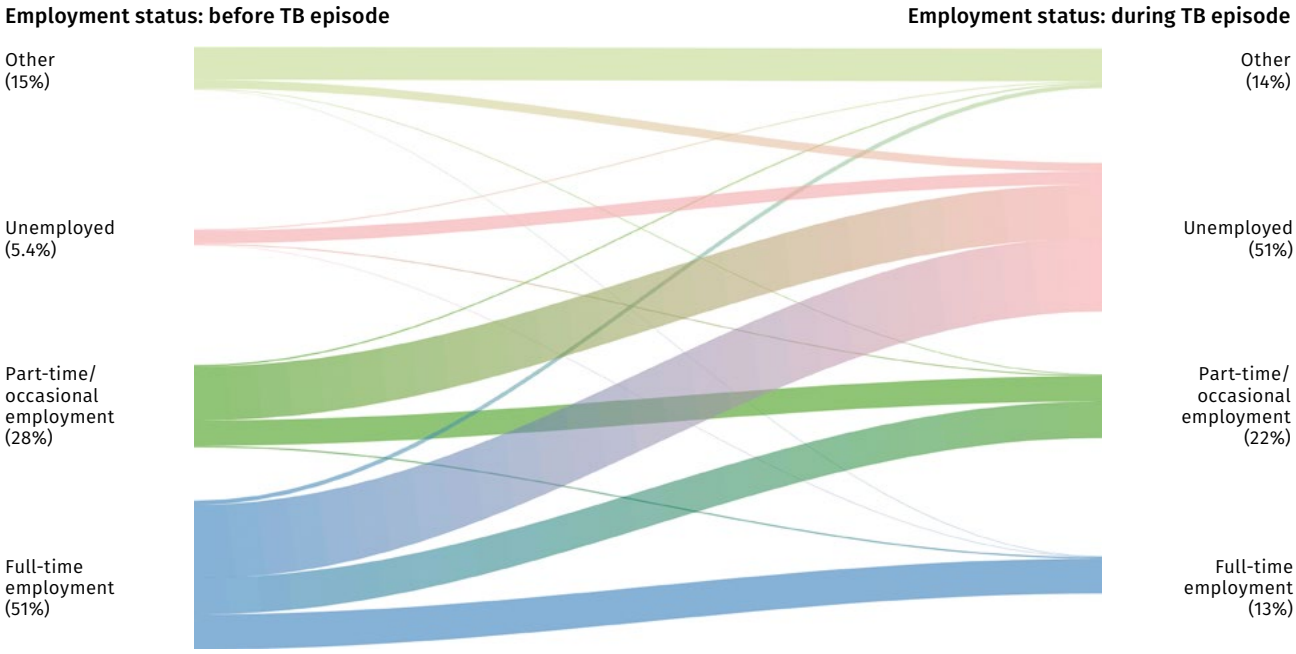
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey.
[b] Error bars represents 95% confidence interval..

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey.

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Assure that TB care is provided free of charge to eliminate any possible medical cost to patients during treatment.	Direct medical expenditures
	Improve access to TB diagnosis and care that could reduce the time spent on health care (e.g. drug pick-ups, follow-up visits and hospitalizations). This will help to mitigate indirect costs experienced by TB patients.	Indirect costs
Wider health sector	Support patients with nutrition to improve their health condition so they are better able to endure TB treatment.	Direct nonmedical expenditures
Non-health sector	Enhance social protection measures for TB patients that can mitigate adverse consequences of having TB (e.g. loss of job and income) and social exclusion due to stigma.	Indirect cost

Dissemination

Publication

- *Assessment of the economic burden incurred by tuberculosis patients and their households on diagnosis and treatment of tuberculosis in Tanzania*, national report. Dodoma: National Tuberculosis and Leprosy Programme, Ministry of Health, Community Development, Gender, Elderly and Children, United Republic of Tanzania; 2021.
- Kilale AM, Pantoja A, Jani B, Range N, Ngowi BJ, Makasi C et al. Economic burden of tuberculosis in Tanzania: a national survey of costs faced by tuberculosis-affected households. BMC Public Health. 2022;22(1):600 (https://link.springer.com/article/10.1186/s12889-022-12987-3).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

Viet Nam

2016

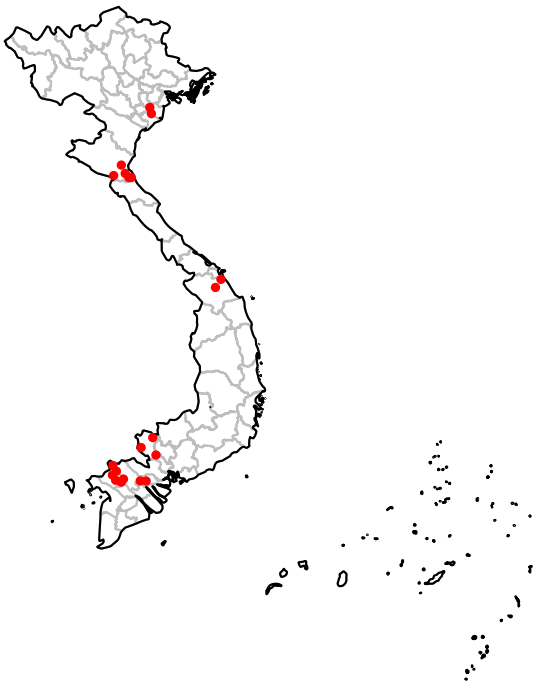
Summary statistics, national TB patient cost survey

Total number of survey participants	**735**
Number of participants by treatment category	
• TB (first-line treatment)	676
• Drug-resistant TB	59
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2016 US$[b] (95% CI)	**884 (773–1011)**
• TB (first-line treatment)	774 (678–884)
• Drug-resistant TB	3940 (3470–4473)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**63 (58–67)**
• TB (first-line treatment)	60 (55–64)
• Drug-resistant TB	98 (73–100)

CI: confidence interval; VND: Viet Nam Dong (Viet Nam).

[a] Geometric mean.

[b] The analysis of the survey used an exchange rate of US$ 1 = 22 085 VND, which was the average for 2016.



Distribution of surveyed clusters (N=20)

• Surveyed cluster

Survey timeline

Initiation of preparation	March 2016
Ethics approval	October 2016
Data collection	August–October 2016
Official dissemination event	March 2017
Publication of survey report	September 2018

Key people

NAME	ROLE	ORGANIZATION
Viet Nhung Nguyen	Principal investigator	NTP and VATL, Viet Nam
Binh Hoa Nguyen	Principal investigator and study coordinator	NTP, Viet Nam and IJTLD, France
Le Thi Ngoc Anh	Investigator	NTP, Viet Nam
Hoang Thi Thanh Thuy	National coordinator	NTP, Viet Nam
Do Quang Huy	Research officer	NTP, Viet Nam
Le Thi Hai Minh	Research officer	NTP, Viet Nam
Le Ha My	Research officer	NTP, Viet Nam
Nguyen Tuan Anh	Data manager	NTP and Hanoi Medical University, Hanoi, Viet Nam
Inés Garcia Baena	Technical assistance	WHO GTB
Knut Lönnroth	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB

GTB: Global Tuberculosis Programme; IJTLD: Centre for Operational Research, International Union Against Tuberculosis and Lung Disease, Paris, France; NTP: National Tuberculosis Programme; VATL: Viet Nam Association for Tuberculosis and Lung Disease, Hanoi, Viet Nam; WHO: World Health Organization.

Organization and financing

Implementation agencies

National Tuberculosis (TB) Programme, Ministry of Health, Viet Nam; World Health Organization (WHO) country office for Viet Nam

Total budget: US$ 61 693

Funding source

US Agency for International Development (USAID) through Challenge TB

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	94	2016
GDP per capita (current US$)	2 192	2016
Life expectancy at birth (years)	75	2016
Cause and number of deaths (top 3 and TB)		2015
1. Stroke	156 462	
2. Ischaemic heart disease	79 956	
3. Chronic obstructive pulmonary disease	33 450	
14. TB	13 909	

GDP: gross domestic product.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	1.8%	2016
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	7.8%	2016
SDG 2: Zero hunger		
Prevalence of undernourishment	7.8%	2016
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	0.10	2016
UHC service coverage index (worst 0–100 best)	68	2017
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	9.4%	2016
Population with household spending on health >25% of total household budget	1.9%	2016

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	181 000 (109 000–271 000)	2016
HIV-positive	6 000 (3 600–9 000)	2016
TB incidence rate (new cases per 100 000 population per year)		
Total	193 (116–290)	2016
HIV-positive	6.4 (3.9–9.6)	2016
TB treatment coverage	56% (38–94%)	2016
TB notifications		
Total new and relapse cases notified	102 097	2016
Percentage of new cases with MDR/RR-TB	4.1 (3.9–4.3)	2020
Treatment success rate		
New and relapse cases	92%	2016
Previously treated cases	86%	2016
HIV-positive TB cases	49%	2016
MDR/RR-TB cases	68%	2016
National TB budget	US$ 71 million	2016

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4.TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture, when applicable) • Hospitalization for patients on first-line and drug-resistant TB treatment		• Second-line TB drugs are financed by donors (The Global Fund)
Social support schemes for TB patients	Cash transfer	Available to	All drug-resistant TB patients
		Amount	42 513 VND (US$ 1.9[a]) per day
		Duration	During treatment (Global Fund funded project)
	Food	Available to	All drug-resistant TB patients in inpatient treatment
		Amount	100 000 VND (US$ 4.5[a]) per day
		Duration	14 days
	Transportation	Available to	All drug-resistant TB patient
		Amount	150 000 VND (US$ 6.8[a]) per month
		Duration	20 months, including unscheduled visit due to adverse event
	Social assistance	Available to	All TB patients
		Amount	In-kind supports
		Duration	Khanh Hoa project (June 2016–March 2017)
Treatment support	Intensive phase		• Patients on first-line TB treatment: facility based, once a week and drug pick-up
			• Patients on drug-resistant TB treatment: facility based, daily
	Continuation phase		• Patients on first-line TB treatment: facility based, once a week and drug pick-up
			• Patients on drug-resistant TB treatment: facility based, daily
Hospitalization[b]	Eligibility		All drug-resistant TB patient Patients with adverse event
	Duration		14 days
	Location		Provincial hospitals/treatment centrals
Health service use in 2016[c]	Typical number of facility visits		
	• TB (first-line treatment)		30 visits
	• Drug-resistant TB		520 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		Outpatient at the beginning of treatment or 7–14 days
	• Drug-resistant TB		14 days

Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; VND: Viet Nam Dong (Viet Nam).

[a] Current value in 2016.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single stage cluster sampling enhanced by stratification using probability proportional to size
Stratification	Six provinces were stratified by 3 zones (North, Central, South). Twenty clusters were divided into each zone proportionate to the notifications in each zone as followed: North (7 clusters), Central (2 clusters) and South (11 clusters).
Sampling frame	List of TB basic management units
Patient enrolment	Random sampling from registered patients on treatment
Assumptions for sample size calculation	
Estimated proportion	17%
Relative precision	25%
Design effect	2.1
Sample size	720
Clusters	
Number	20 clusters
Size	36 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Paper-based questionnaire
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 14.2 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	676	100	59	100	735	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	166	25	11	19	177	24
Male	510	75	48	81	558	76
Age group (years)						
0–14	11	1.6	0	0	11	1.5
15–24	45	6.7	4	6.7	49	6.7
25–34	102	15	16	27	118	16
35–44	129	19	15	25	144	20
45–54	173	26	13	22	186	25
55–64	132	20	8	14	140	19
≥65	84	12	3	5.1	87	12
Education level						
No education	23	3.4	2	3.4	25	3.4
Primary education	215	32	14	24	229	31
Secondary or higher	438	65	43	73	481	65
Insurance status[b]						
None	161	24	15	25	176	24
National health insurance (NHIF)	473	70	39	66	512	70
Medical allowance	9	1.3	3	5.1	12	1.6
Private	33	4.9	2	3.4	35	4.8
Household size, median (min–max)	4 (1–10)		4 (1–10)		4 (1–10)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	335	50	25	42	360	49
Continuation phase	341	50	34	58	375	51
Treatment category						
New	633	94	16	27	649	88
Retreatment	43	6.4	43	73	86	12
HIV status						
Positive	7	1.0	3	5.1	10	1.4
Negative	596	88	55	93	651	89
Unknown	73	11	1	1.7	74	10
Type of TB						
Bacteriologically confirmed pulmonary TB	450	67	59	100	509	69
Clinically diagnosed pulmonary TB	130	19	0	0	130	18
Extrapulmonary TB	96	14	0	0	96	13
Diagnostic delay (>4 weeks)[c]	98	29	2	8.0	100	28
Treatment support						
Self-administered	409	61	10	17	419	57
Directly observed therapy	267	40	49	83	316	43

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question (in Vietnamese) "Do you have any of the following health insurance types?". The options were "none", "government health insurance", "medical allowance or medical exemption (mien phi boi benh vien)", "private health insurance" and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	77 (51–115)	68 (31–149)	76 (53–109)
Household	262 (230–297)	263 (243–284)	262 (233–294)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	20 (8.5–48)	13 (5.3–31)	19 (8.3–45)
Household	166 (144–191)	159 (133–189)	165 (144–190)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	42 (34–51)	44 (28–61)	43 (35–50)
Yes	48 (40–56)	51 (34–67)	48 (41–56)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	4.0 (0.81–9.4)	3.3 (<0.01–13)	3.9 (1.0–8.7)
At the interview	18 (8.8–30)	77 (50–96)	23 (13–35)

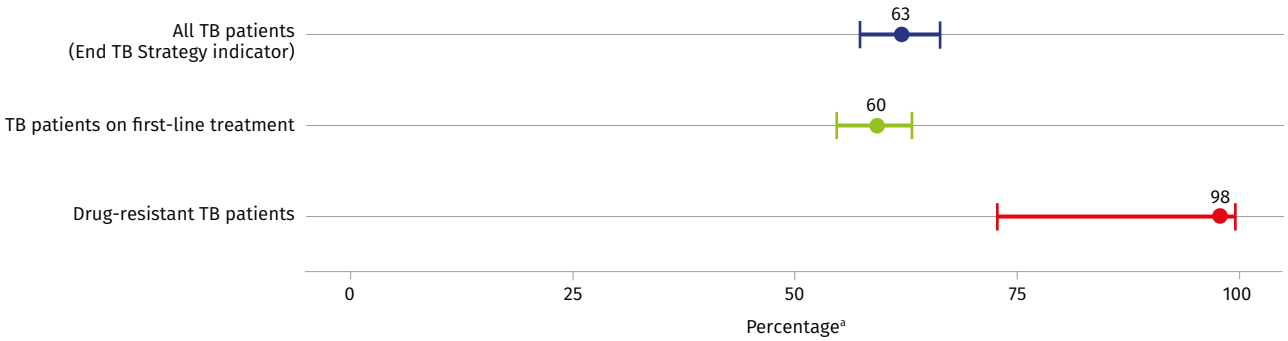
CI: confidence interval; PPP: purchasing power parity.
[a] Current value in 2016.
[b] Geometric mean.
[c] Defined as US$ 1.90 PPP.

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Dissaving	15	3.5–34	22	8.3–39	16	3.9–34
Loan	24	17–32	35	22–50	25	18–33
Sales of assets	6.1	4.3–8.2	14	8.8–20	6.8	5.3–8.4
Any of above	37	29–45	52	36–68	38	31–46
SOCIAL CONSEQUENCES						
Food insecurity	23	4.7–49	32	20–47	23	6.6–46
Divorce/separation	0.45	<0.01–1.6	3.3	0.13–10	0.69	0.072–1.9
Job loss	17	9.0–27	24	4.3–52	18	8.9–28
Interrupted schooling	1.6	0.27–4.0	1.5	0.22–8.2	1.6	0.32–3.8
Any of above	42	19–67	63	48–77	44	22–67
SOCIAL SUPPORT						
Sick leave	1.0	0.020–3.5	1.8	0.54–11	1.1	<0.01–3.9
Social welfare	0.29	0.034–0.80	1.5	0.22–8.2	0.39	0.11–0.83
Poor families	0.65	0.11–1.6	0	NA	0.59	0.10–1.5
Other	0.26	0.073–1.7	0	NA	0.24	0.064–1.5

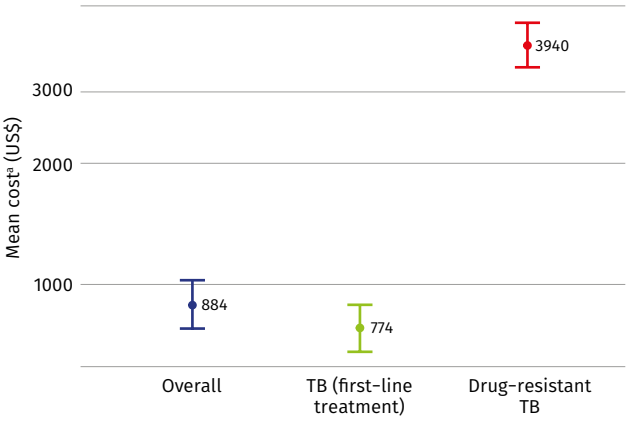
CI: confidence interval ; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2016 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

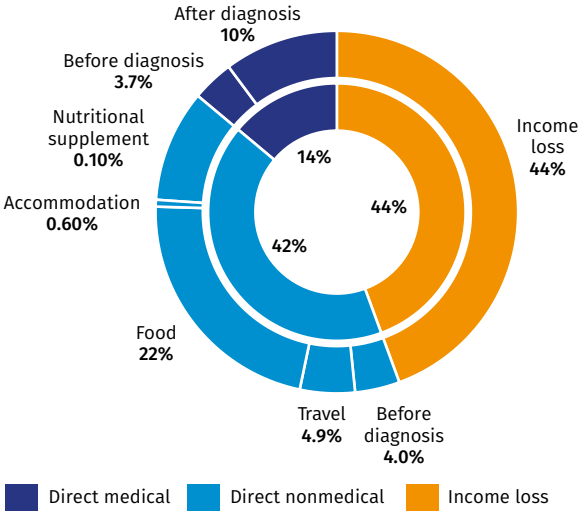
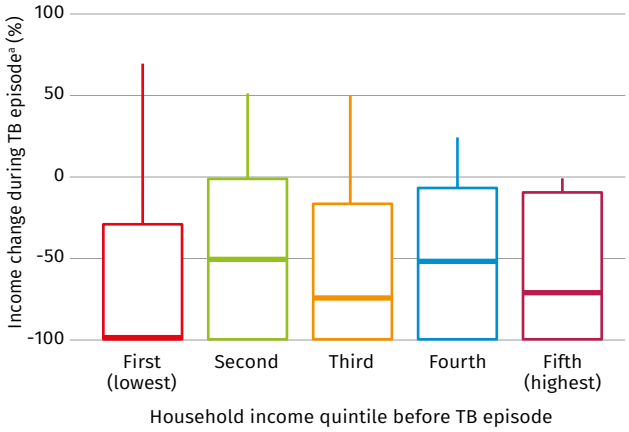
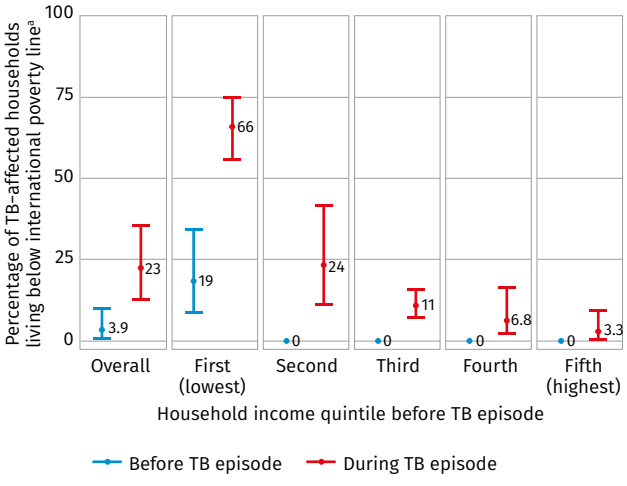


Fig. 4. Changes in distribution of monthly self-reported household income



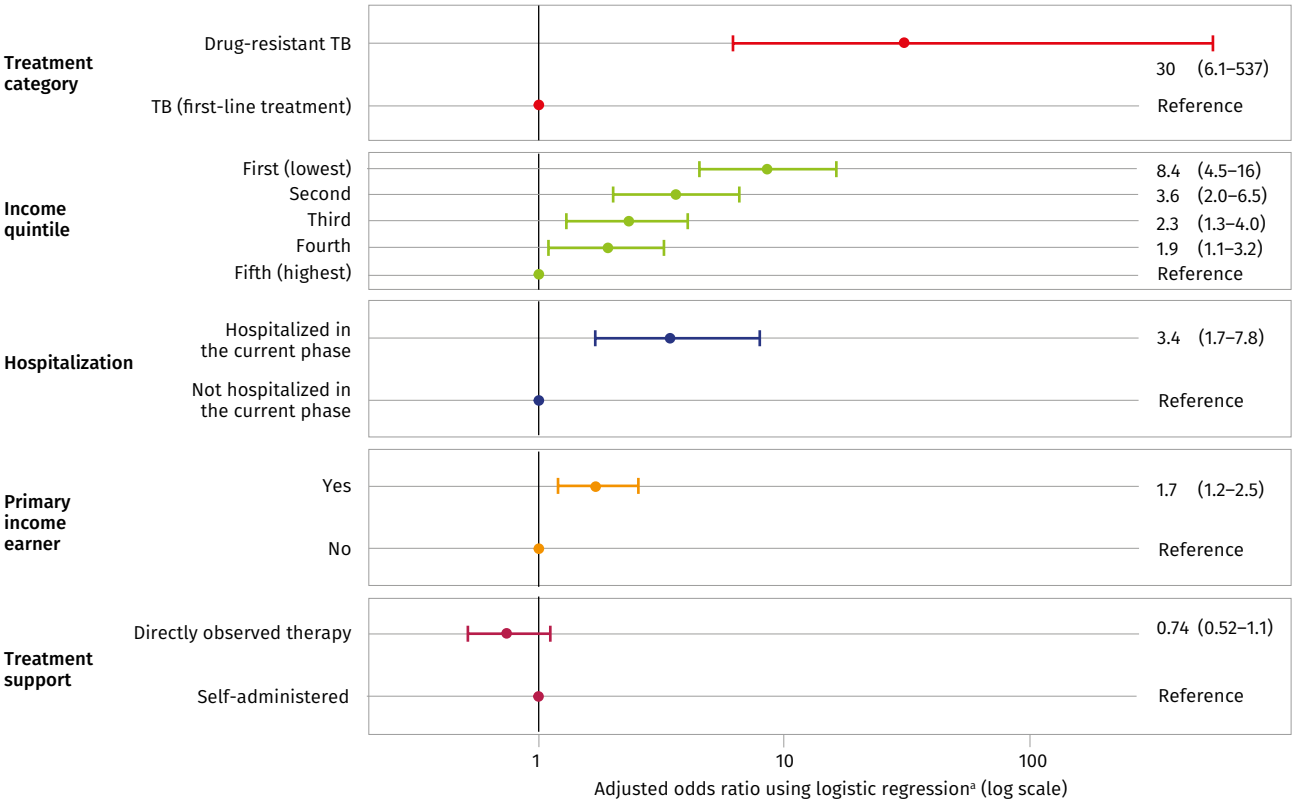
[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

Fig. 5. Impoverishment of TB-affected households during TB treatment



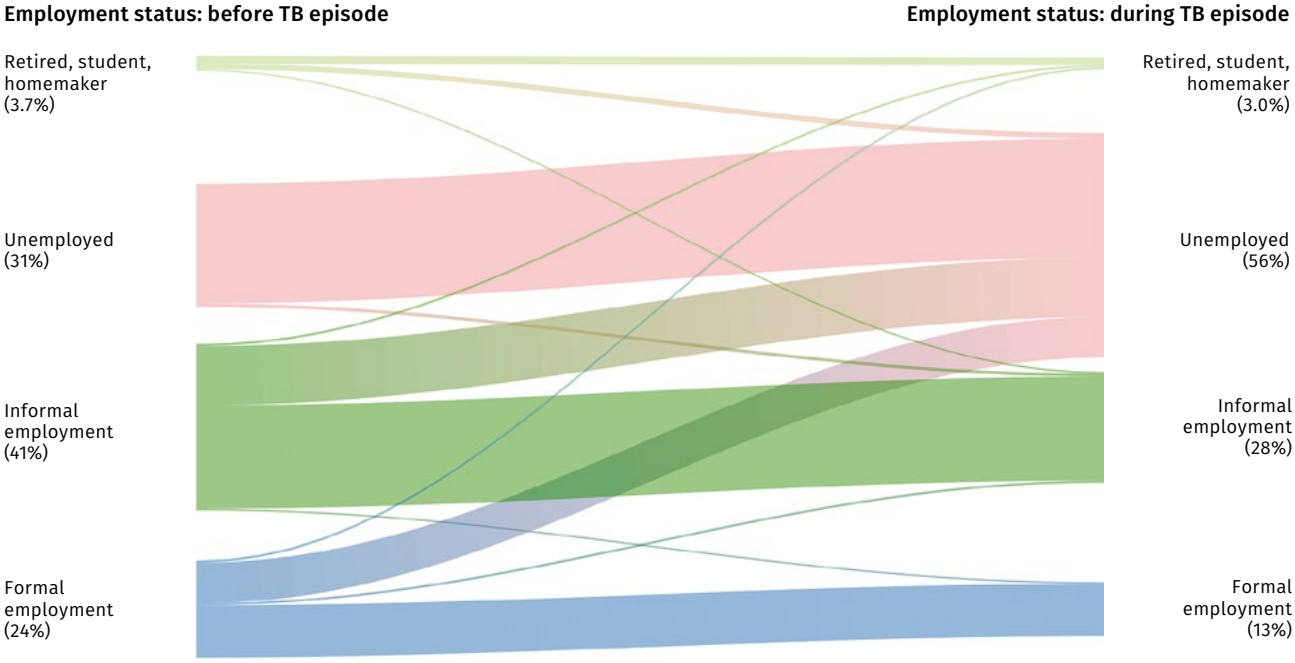
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB service delivery	Purchase of health insurance cards for the poor.	Direct medical expenditures
	Advocate for donor support for specific social elements for people with TB, and for the inclusion of such elements in the NTP's request for funding from the Global Fund for the period 2018–2022.	Direct nonmedical expenditures
	The NTP to establish a charity fund for people with TB, called Patients Support to Fight TB (PASTB).	
	Provide travel vouchers, food packages or cash to people with TB.	
	Evaluate interventions to improve patient support and reduce patient costs (active case finding and comprehensive patient support) using data from the IMPACT-TB study.	Direct medical and nonmedical expenditures
Wider health sector	Development and costing by the NTP and MoH of a comprehensive package of ambulatory TB services to advocate for patients for social health insurance coverage.	Direct medical expenditures
	For people with TB, scale up and adapt the existing mechanism to purchase health insurance cards for the poor.	
	Assessment by the NTP, MoH and MOLISA for additional financial and human resource needs.	Indirect costs
Non-health sector	Joint MOLISA and NTP monitoring and evaluation initiatives to be developed as part of roadmap to alleviate patient costs identified by the national survey.	Direct nonmedical expenditures
	Enhancing research capacity on health and social protection through national and international collaborative mechanisms (e.g. VICTORY and SPARKS).	Indirect costs

Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; MoH: Ministry of Health; MOLISA: Ministry of Labour-Invalids and Social Affairs; NTP: National TB Programme; SPARKS: Social Protection Action Research Knowledge Sharing; VICTORY: Viet Nam Integrated Centre for TB and Respirology Research.

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Viet Nam, March 2018.

Publication

- Nhung NV, Hoa NB, Anh NT, Anh LTN, Siroka A, Lönnroth K, Garcia Baena I. Measuring catastrophic costs due to tuberculosis in Viet Nam. Int J Tuberc Lung Dis. 2018;22(9):983–90 (https://pubmed.ncbi.nlm.nih.gov/30092862/).
- Hoa NB, Nhung NV. National tuberculosis patients cost survey: research findings lead to change in policy and practice, Viet Nam. Public Health Action. 2019;9(2):50–2 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6645445/).
- Global TB report 2017. Geneva: World Health Organization; 2017:128 (https://www.who.int/publications/i/item/9789241565516) – see Measuring costs faced by TB patients and their households in Viet Nam (Box 7.2).

Other references and data sources

1. Dataset from the first national TB patient cost survey.
2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
3. United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022).
4. World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022).
5. Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).
6. AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022).

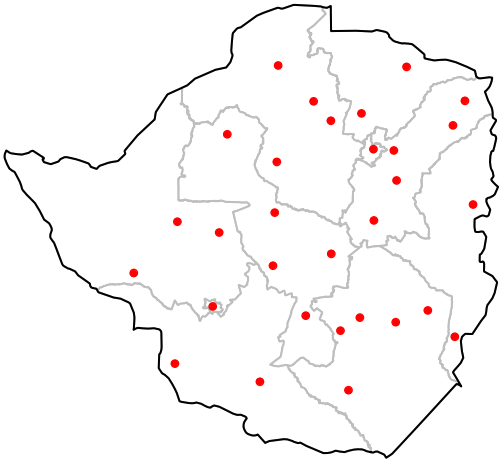
Zimbabwe

2018

Summary statistics, national TB patient cost survey

Total number of survey participants	**841**
Number of participants by treatment category	
• TB (first-line treatment)	793
• Drug-resistant TB	48
Total cost incurred by TB-affected households for one TB episode – mean,[a] current 2018 US$ (95% CI)	**1226 (1055–1424)**
• TB (first-line treatment)	1157 (995–1346)
• Drug-resistant TB	3310 (2517–4351)
Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB (95% CI)	**80 (74–85)**
• TB (first-line treatment)	79 (74–85)
• Drug-resistant TB	90 (76–98)

CI: confidence interval.
[a] Geometric mean.



Distribution of surveyed clusters (N=60)

• Surveyed cluster

Survey timeline

Initiation of preparation	September 2017
Ethics approval	May 2018
Data collection	July 2018–August 2018
Official dissemination event	March 2019
Publication of survey report	March 2019

Key people

NAME	ROLE	ORGANIZATION
Charles Sandy	Principal investigator	NTP, MOHCC, Zimbabwe
Collins Timire	Investigator	NTP, MOHCC, Zimbabwe
Geshem Madzingaidzo	Investigator and survey coordinator	NTP, MOHCC, Zimbabwe
Kwenzikweyinkosi Ndlovu	Investigator	NTP, MOHCC, Zimbabwe
Joconiah Chirenda	Investigator	University of Zimbabwe, College of Health Sciences, Zimbabwe
Mkhokheli Ngwenya	Investigator	WHO Country Office, Zimbabwe
Vasco Chikwasha	Biostatistician	University of Zimbabwe, College of Health Sciences, Zimbabwe
Peter Nguhiu	Technical assistance	WHO GTB
Debora Pedrazzoli	Technical assistance	WHO GTB
Andrew Siroka	Technical assistance	WHO GTB

GTB: Global TB Programme; MOHCC: Ministry of Health and Child Care; NTP: National TB Programme; WHO: World Health Organization.

Organization and financing

Implementation agency

Ministry of Health and Child Care, Zimbabwe

Total budget: US$ 219 921

Funding sources

United States Agency for International Development (USAID) The Challenge TB Grant; World Health Organization (WHO) Country Office for Zimbabwe

Table 1. Demographic, socioeconomic and health-related indicators

INDICATOR	NUMBER	YEAR[a]
Population size (million)	15	2019
GDP per capita (current US$)	1 464	2019
Life expectancy at birth (years)	61	2019
Cause and number of deaths (top 3 and TB)		2019
1. HIV/AIDS	19 988	
2. Lower respiratory infections	10 779	
3. Neonatal conditions	9 516	
14. TB	1 999	

AIDS: acquired immunodeficiency syndrome; GDP: gross domestic product; HIV: human immunodeficiency virus.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data sources:

United Nations. 2019 revision of world population prospects [website]. 2022 (https://population.un.org/wpp, accessed 1 May 2022);

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 2. Indicators of Sustainable Development Goals

INDICATOR	NUMBER OR PERCENTAGE	YEAR[a]
SDG 1: No poverty		
Proportion of population living below the international poverty line[b] at US$ 1.90/day (2011 PPP)	40%	2019
Proportion of population living below the international poverty line[b] at US$ 3.20/day (2011 PPP)	64%	2019
SDG 2: Zero hunger		
Prevalence of undernourishment	na	–
SDG 3: Good health and well-being		
New HIV infections (per 1000 uninfected population)	2.2	2018
UHC service coverage index (worst 0–100 best)	55	2019
Percentage of population with catastrophic out-of-pocket expenditures on health		
Population with household spending on health >10% of total household budget	12%	2017
Population with household spending on health >25% of total household budget	7.0%	2017

HIV: human immunodeficiency virus; na: not available; PPP: purchasing power parity; SDG: Sustainable Development Goal; UHC: universal health coverage.

[a] Data were selected for the year closest to the one in which the survey was implemented.

[b] Official SDG indicators are poverty headcount ratio at US$ 1.90/day and US$ 3.20/day, both at 2011 PPP.

Data sources:

World Bank open data [website]. 2022 (https://data.worldbank.org/, accessed 1 May 2022);

AIDS info [website]. 2022 (http://aidsinfo.unaids.org/, accessed 1 May 2022); and

Global Health Observatory [website]. 2022 (https://www.who.int/data/gho, accessed 1 May 2022).

Table 3. TB indicators

INDICATOR	BEST ESTIMATE (AND 95% UI) OR PERCENTAGE	YEAR[a]
TB incidence (new cases per year)		
Total	30 000 (22 000–40 000)	2018
HIV-positive	19 000 (14 000–25 000)	2018
TB incidence rate (new cases per 100 000 population per year)		
Total	210 (153–276)	2018
HIV-positive	130 (95–171)	2018
TB treatment coverage	83% (63-110%)	2018
TB notifications		
Total new and relapse cases notified	25 204	2018
Percentage of new cases with MDR/RR-TB	1.7 (1.4–2.0)	2020
Treatment success rate		
New and relapse cases	84%	2018
Previously treated cases	95%	2018
HIV-positive TB cases	82%	2018
MDR/RR-TB cases	50%	2018
National TB budget	US$ 30 million	2018

HIV: human immunodeficiency virus; MDR/RR-TB: multidrug-resistant or rifampicin-resistant TB; UI: uncertainty interval.

[a] Data were selected for the year closest to the one in which the survey was implemented.

Data source:

Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 4. TB policies

POLICY	COMPONENTS		DETAILS
Free TB services	• First- and second-line TB drugs • TB diagnostics (microscopy, Xpert MTB/RIF and culture when applicable) • Hospitalization for drug-resistant TB patients		Radiology is not covered
Social support schemes for TB patients	Cash transfer and transportation	Available to	All drug-resistant TB patients
		Amount	US$ 25[a]
		Duration	During treatment
Treatment support	Intensive phase		Facility based, daily
	Continuation phase		Facility based or community based, daily
Hospitalization[b]	Eligibility		Based on the presence of malnutrition or comorbidities for patients on first-line TB treatment
	Duration		30 days
	Location		Regional and district hospitals
Health service use in 2018[c]	Typical number of facility visits		
	• TB (first-line treatment)		12 visits
	• Drug-resistant TB		196 visits
	Average duration of hospitalization		
	• TB (first-line treatment)		14 days
	• Drug-resistant TB		60 days

[a] Current value in 2018.

[b] Refers to a policy that mandates or encourages systematic hospitalization. This does not include occasional hospitalization of TB patients with a severe medical condition (medical indication).

[c] This only includes facility visits and hospitalization during TB treatment. Data source: Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).

Table 5. Survey methods

SAMPLING STRATEGY	
Sampling design	Single-stage cluster sampling using probability proportional to size
Stratification	None
Sampling frame	List of 1309 facilities with TB cases notified in 2016
Patient enrolment	Consecutive enrolment of eligible patients on first-line drug treatment attending health facilities and all eligible patients with drug-resistant TB attending health facilities
Assumptions for sample size calculation	
Estimated proportion	50%
Absolute precision	5%
Design effect	2
Adjustment for non-response	10%
Sample size	900
Clusters	
Number	60 clusters
Size	15 patients
DATA COLLECTION AND ANALYSIS	
Field data collection tool	Electronic (tablet-based) questionnaire and the ODK collect app (Get ODK Inc.)
Database	Ona (Ona Systems Inc.)
Statistical software	Stata 14.0 (StataCorp)
METHODOLOGY FOR KEY METRICS	
Measurement for ability to pay	Self-reported household income
Estimates for indirect costs	Output approach (difference in household income before and during TB episode)

[a] Current value in 2018.

Table 6. Characteristics of participants

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	N	%[a]	N	%[a]	N	%[a]
TOTAL	793	100	48	100	841	100
DEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	346	44	21	44	367	44
Male	447	56	27	56	474	56
Age group (years)						
0–14	46	5.8	0	0	46	5.5
15–24	93	12	4	8.3	97	12
25–34	197	25	20	42	217	26
35–44	259	33	15	31	274	33
45–54	113	14	7	15	120	14
55–64	50	6.3	0	0	50	6.0
≥65	35	4.4	2	4.2	37	4.4
Education level						
No education	35	4.4	1	2.1	36	4.3
Primary education	172	22	11	23	183	22
Secondary or higher	586	74	36	75	622	74
Insurance status[b]						
None	733	92	45	94	778	93
Employer reimburse schemes	23	2.9	0	0	23	2.7
Welfare	3	0.38	0	0	3	0.36
Other	34	4.3	3	6.3	37	4.4
Household size, median (min–max)	4 (1–20)		4 (1–9)		4 (1–20)	
CLINICAL CHARACTERISTICS						
Treatment phase						
Intensive phase	355	45	16	33	371	44
Continuation phase	438	55	32	67	470	56
HIV status						
Positive	295	37	13	27	308	37
Negative	491	62	35	73	526	63
Unknown	7	0.88	0	0	7	0.83
Type of TB						
Bacteriologically confirmed pulmonary TB	441	56	46	96	487	58
Clinically diagnosed pulmonary TB	272	34	1	2.1	273	32
Extrapulmonary TB	80	10	1	2.1	81	9.6
Diagnostic delay (>4weeks)[c]	84	24	6	38	90	24
Treatment support						
Self-administered	432	54	14	29	446	53
Directly observed therapy	361	46	34	71	395	47

HIV: human immunodeficiency virus; min–max: minimum to maximum.

[a] Numbers may not sum to exactly 100, owing to rounding.

[b] Based on self-reported data during patient interviews, in response to the question "Do you have any of the following health insurance types?". The options were "none", "reimbursement scheme", "medical allowance", "donor fund", "family/community fund", "private health insurance", and "other".

[c] Among patients in the intensive phase of TB.

Table 7. Individual and household income (US$[a]) and poverty rate

	TB PATIENTS (FIRST-LINE TREATMENT)	PATIENTS WITH DRUG-RESISTANT TB	ALL TB PATIENTS
SELF-REPORTED MONTHLY INCOME: BEFORE ONSET OF TB SYMPTOMS, IN US$, MEAN[b] (95% CI)			
Individual patient	62 (48–81)	73 (38–141)	63 (48–82)
Household	157 (123–201)	157 (78–316)	157 (122–202)
SELF-REPORTED MONTHLY INCOME: AT THE INTERVIEW, IN US$, MEAN[b] (95% CI)			
Individual patient	26 (18–38)	14 (5.3–36)	25 (17–37)
Household	78 (57–107)	44 (16–120)	76 (54–105)
PATIENT WAS THE PRIMARY INCOME EARNER BEFORE ONSET OF TB SYMPTOMS, PERCENTAGE (95% CI)			
No	51 (46–56)	46 (32–61)	51 (46–56)
Yes	49 (44–54)	54 (39–68)	49 (44–54)
IMPOVERISHMENT: TB-AFFECTED HOUSEHOLDS BELOW POVERTY LINE,[c] PERCENTAGE (95% CI)			
Before onset of TB symptoms	37 (31–43)	24 (11–40)	36 (30–42)
At the interview	54 (48–60)	75 (60–88)	55 (49–61)

CI: confidence interval; PPP: purchasing power parity.

[a] Current value in 2018.

[b] Geometric mean.

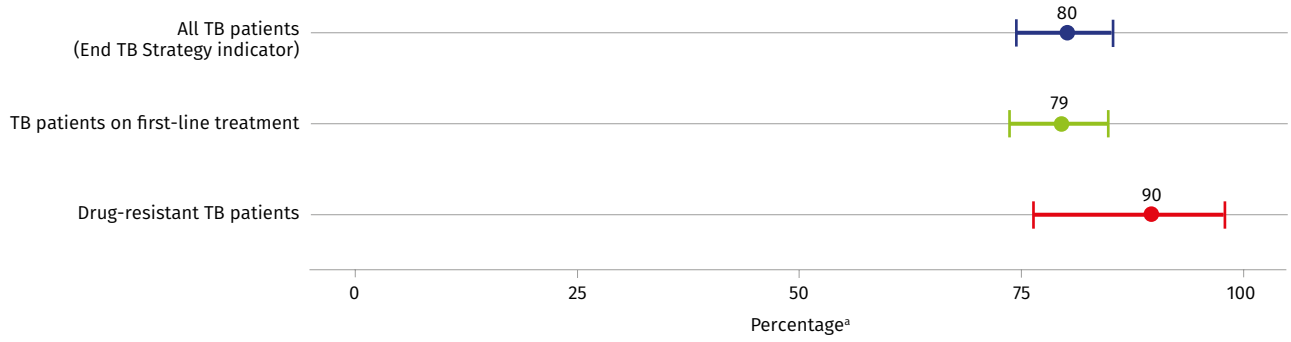
[c] Poverty threshold was defined as country's official total consumption poverty line (TCPL) at 100.58 US$ per month. Data source: Zimbabwe National Statistics Agency. Poverty datum lines – May 2017 (http://www.zimstat.co.zw/wp-content/uploads/publications/Income/Prices/2017/PDL/PDL_05_2017.pdf).

Table 8. Coping mechanisms and social consequences

	TB PATIENTS (FIRST-LINE TREATMENT)		PATIENTS WITH DRUG-RESISTANT TB		ALL TB PATIENTS	
	%	95% CI	%	95% CI	%	95% CI
COPING MECHANISMS						
Loan	38	32–44	58	42–73	39	34–45
Sales of assets	29	24–35	46	31–61	30	25–36
Any of the above	50	44–57	73	58–85	52	46–58
SOCIAL CONSEQUENCES						
Food insecurity	36	29–43	62	43–79	37	30–45
Divorce/separation	3.7	1.9–6.1	21	9.3–35	4.6	2.6–7.3
Job loss	27	22–32	47	30–65	28	23–33
Interrupted schooling	4.5	2.9–6.4	8.1	1.5–19	4.7	3.0–6.7
Social exclusion	27	21–33	48	28–68	28	22–34
Any of above	72	66–78	94	85–99	74	67–79
SOCIAL SUPPORT						
Sick leave	28	22–34	6.4	1.2–15	26	21–33
Social welfare	0.64	0.10–1.6	0	NA	0.60	0.094–1.6
TB–specific support	0.12	<0.01–0.47	0	NA	0.11	<0.01–0.44
Other	0.35	0.024–1.1	2.0	<0.01–8.1	0.44	0.069–1.1
Any of the above	1.1	0.26–2.6	2.0	<0.01–8.1	1.2	0.32–2.5

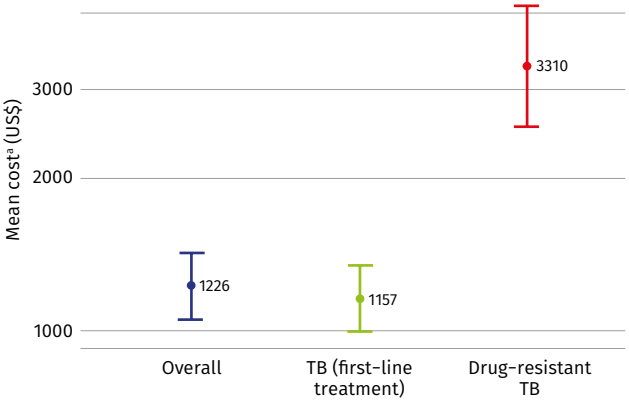
CI: confidence interval; NA: not applicable.

Fig. 1. Percentage of TB-affected households facing costs >20% of household income or expenditure due to TB



[b] Error bars represent 95% confidence interval.

Fig. 2. Total cost incurred by TB-affected households during one TB episode (current 2018 US$)



[a] Geometric mean in log scale. Error bars represent 95% confidence interval.

Fig. 3. Distribution of total costs by cost category

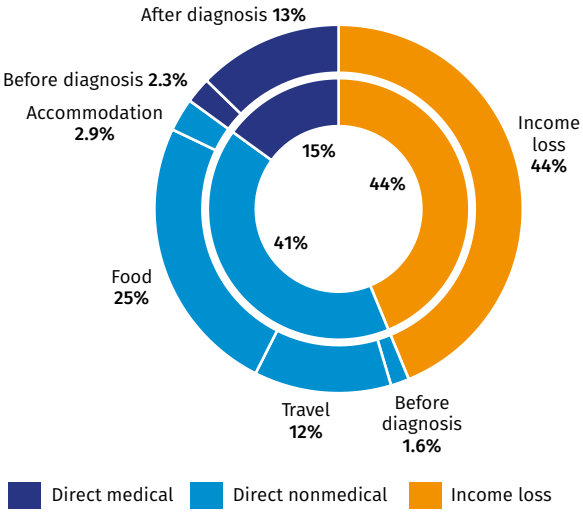
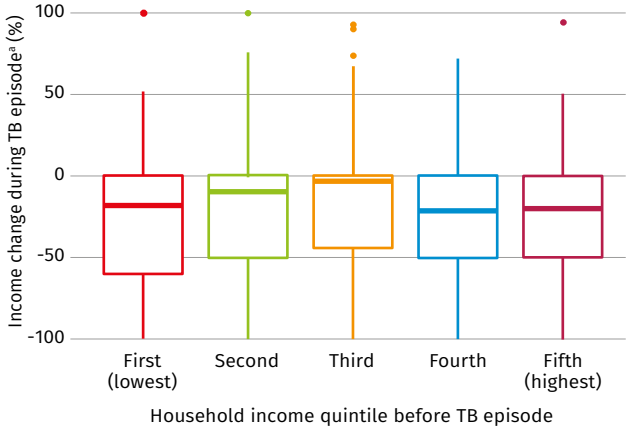
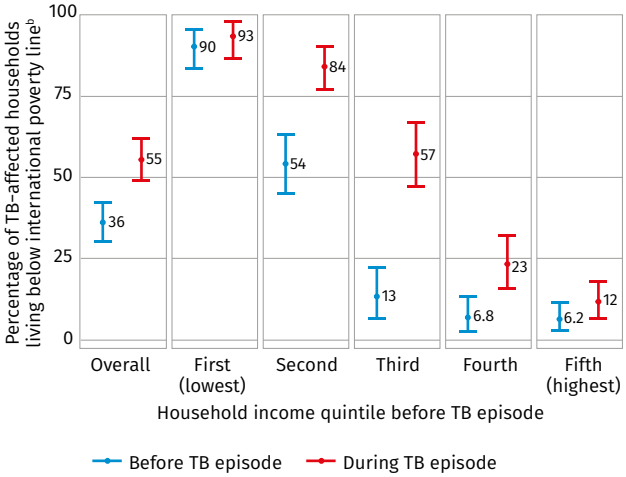


Fig. 4. Changes in distribution of monthly self-reported household income



[a] The thick horizontal line represents the median, and the upper and lower lines of the box represent the 75% and 25% percentiles, respectively.

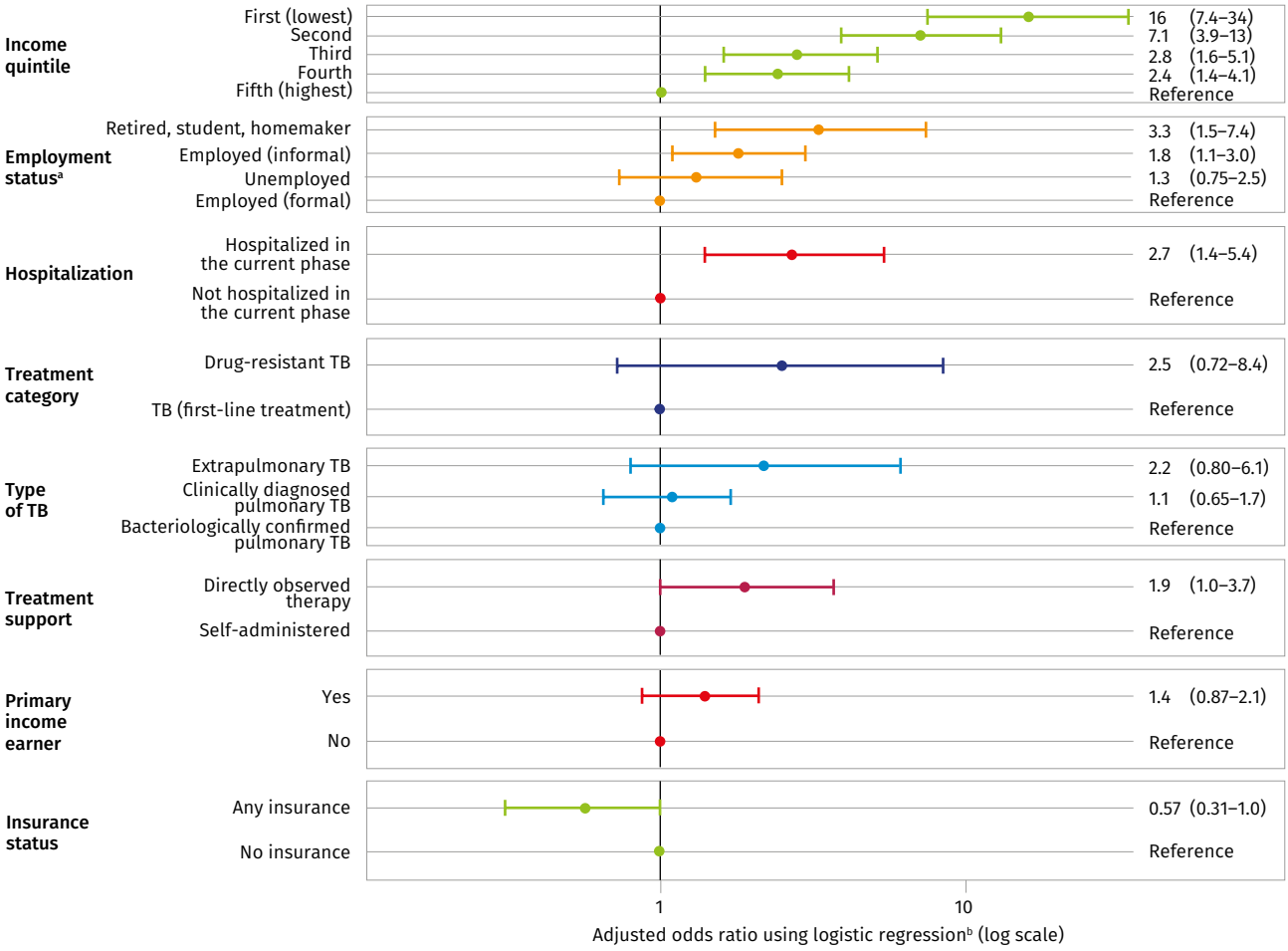
Fig. 5. Impoverishment of TB-affected households during TB treatment[a]



[a] Poverty threshold was defined as country's official total consumption poverty line (TCPL) at US$ 100.58 per month. Data source: Zimbabwe National Statistics Agency. Poverty datum lines – May 2017 (http://www.zimstat.co.zw/wp-content/uploads/publications/Income/Prices/2017/PDL/PDL_05_2017.pdf).

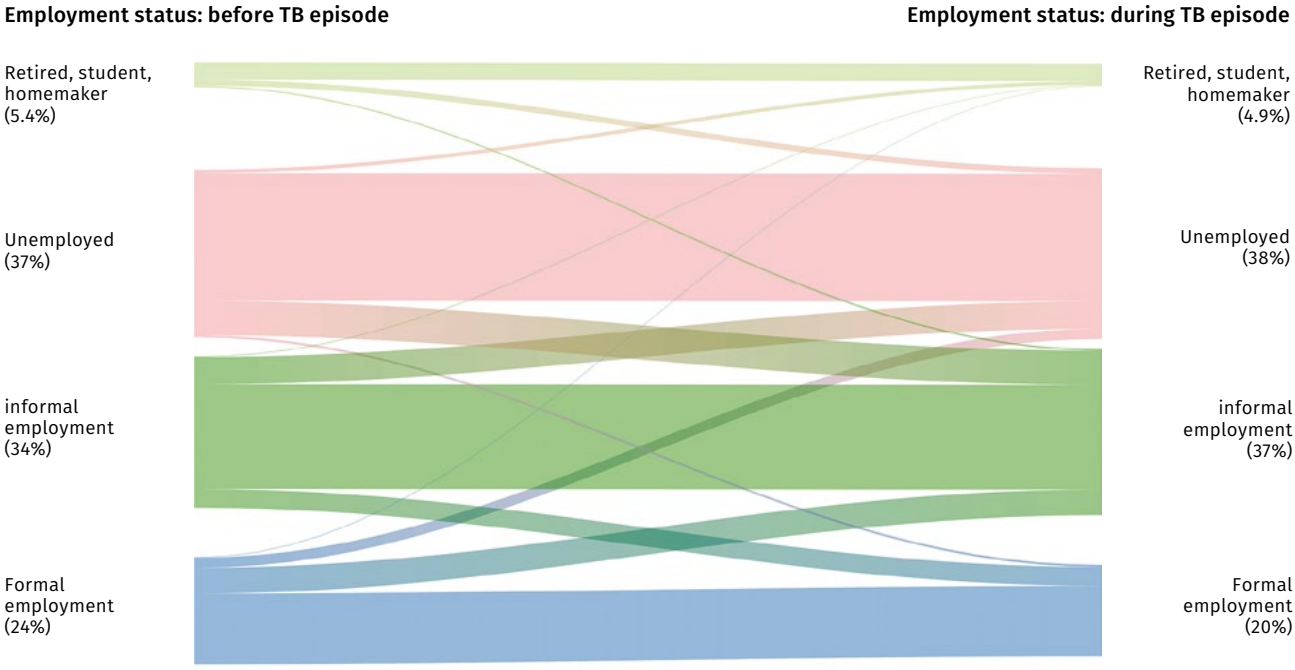
[a] Error bars represent 95% confidence interval.

Fig. 6. Risk factors for TB-affected households facing costs >20% of household income or expenditure due to TB



[a] Categories of employment status are those used in the survey.
[b] Error bars represent 95% confidence interval.

Fig. 7. Changes in employment status[a] before and during TB episode



[a] Categories are those used in the survey. In the International Labour Organization (ILO) classification, the category of "homemaker" would be included in the definition of "employed".

Key policy recommendations

KEY POLICY AREAS	RECOMMENDATIONS	EXPECTED IMPACT
TB services delivery	Minimize diagnostic delays and shorten patient journeys by expanding access to quality services for TB diagnosis, in collaboration with local government authorities.	Direct nonmedical expenditures and indirect costs
	Increase cash transfer reach for all patients with drug-resistant TB by facilitating registration with mobile money service providers.	
Wider health sector	Advocate for universal health insurance coverage.	Direct medical expenditures
	Increase linkages for TB/HIV patients to food support via the Nutritional Support for Antiretroviral Therapy (NSART) programme.	Direct nonmedical expenditures
Non-health sector	Engage ministry of labour and social welfare to reintroduce social protection for people with TB (e.g. food and transport vouchers or warrants, and school fees for affected children) and to have policies that cushion the affected workforce.	Direct nonmedical expenditures and indirect costs
	Coordinate civil society organizations to lobby for employee protection against job loss due to TB care (e.g. legislation for employee protection and sick leave entitlement).	Indirect costs

HIV: human immunodeficiency virus.

Dissemination

Event

- Dissemination of the first national tuberculosis (TB) patient cost survey, organized by the Ministry of Health, Zimbabwe, 26th March 2020.

Publication

- *TB patient cost survey report*, national report. Harare: National TB Programme, Ministry of Health and Child Care, Zimbabwe; 2019.
- Timire C, Ngwenya M, Chirenda J, Metcalfe JZ, Kranzer K, Pedrazzoli D et al. Catastrophic costs among tuberculosis-affected households in Zimbabwe: a national health facility-based survey. Trop Med Int Health. 2021;26(10):1248–55 (https://pubmed.ncbi.nlm.nih.gov/34192392/).

Other references and data sources

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2. Global TB database. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 20 October 2021).
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Annex

The difference between “catastrophic total costs” for TB patients and their households, and the SDG indicator of catastrophic expenditures on health care

The difference between “catastrophic total costs” for TB patients and their households, and the SDG indicator of catastrophic expenditures on health care

It is important to distinguish between the indicator of “the proportion of the population with large household expenditures on health as a share of total household expenditure or income”, which is used within the SDG monitoring framework (SDG Indicator 3.8.2), and the indicator of “the percentage of TB patients and their households facing catastrophic costs due to TB”, which is part of the WHO End TB Strategy.

The SDG indicator is for the *general population*. Household expenditures on health are defined as *direct expenditures* on health by all household members who seek any type of care (preventive, curative, rehabilitative, long term care) for any type of disease, illness or health condition, in any type of setting (outpatient, inpatient, at home). They include both formal and informal expenditures. The indicator attempts to capture the impact of household expenditures on health on household ability to spend on other basic needs. The denominator of the total population includes many people who had no contact with the health system and thus had zero expenditures on health. Although these people did not experience financial hardship as a consequence of direct expenditures on health care, they may nonetheless have faced financial barriers to accessing health services that they needed.

Due to the nature of the illness, TB patients and their households can face severe direct and indirect financial and economic costs. These pose barriers that can greatly affect their ability to access diagnosis and treatment, and to complete treatment successfully. Costs included in the TB-specific indicator include not only *direct medical payments* for diagnosis and treatment, but also *direct non-medical payments* (e.g. transportation and lodging) and *indirect costs* (e.g. lost income). In contrast to SDG indicator 3.8.2, the TB-specific indicator is restricted to a particular population: *people diagnosed with TB who are users of health services that are part of NTP networks*.

Given these conceptual differences, the percentage of TB patients facing “catastrophic total costs” (defined as costs that account for >20% of their household income) is expected to be much higher than the percentage of the general population facing catastrophic expenditures on health care. Hence, the two indicators cannot and should not be compared directly.

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