



GLOBAL HEALTH E TUBERCOLOSI



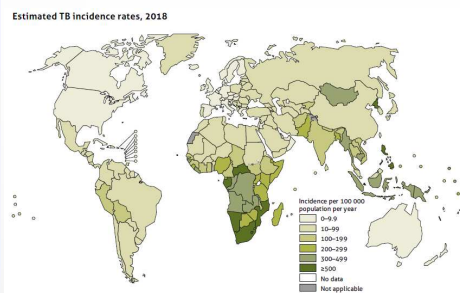
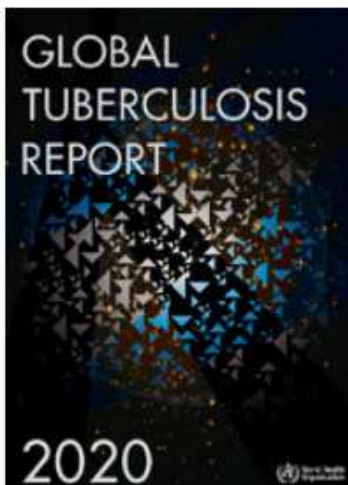
Alberto Matteelli e Gianluca Di Rosario
University of Brescia



**WHO Collaborating Centre
for TB/HIV and TB Elimination**

- 
- *Burden of disease*
 - *The End TB strategy*
 - *New technologies*
 - *TB and COVID-19*

THE GLOBAL BURDEN OF TB, LATEST ESTIMATES 2019



All forms of TB

10 million (130 per 100,000)

- 5.7 million males
- 3.2 million females
- 1.1 million children

Estimated number of deaths

1.5 million*

- 0.8 million in males
- 0.48 million in women
- 0.2 in children

** Including deaths attributed to HIV/TB*

HIV-associated TB

0.9 million (8%)

208,000

**Multidrug-resistant TB
MDR/RR-TB**

465,000

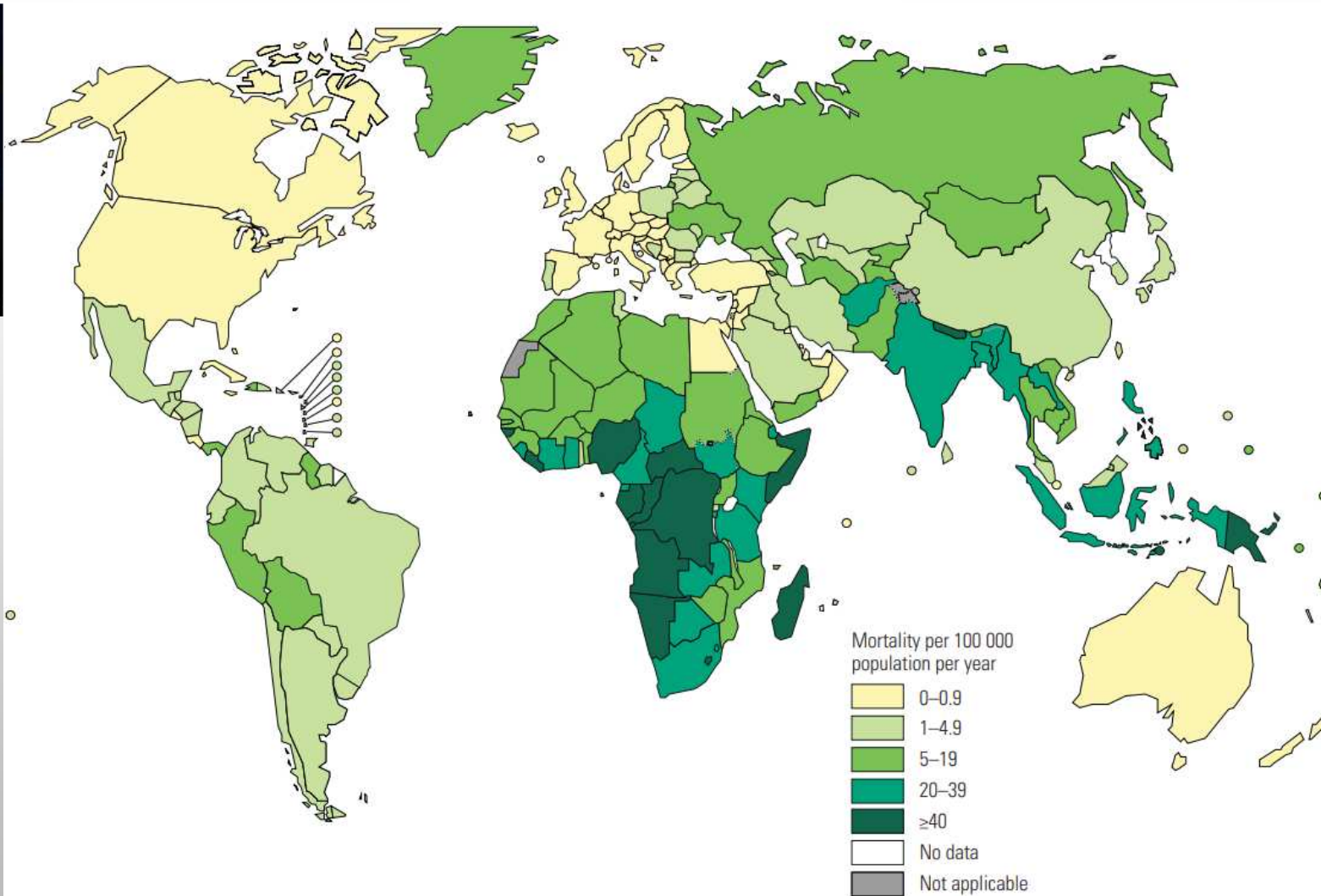
214,000

Latently infected

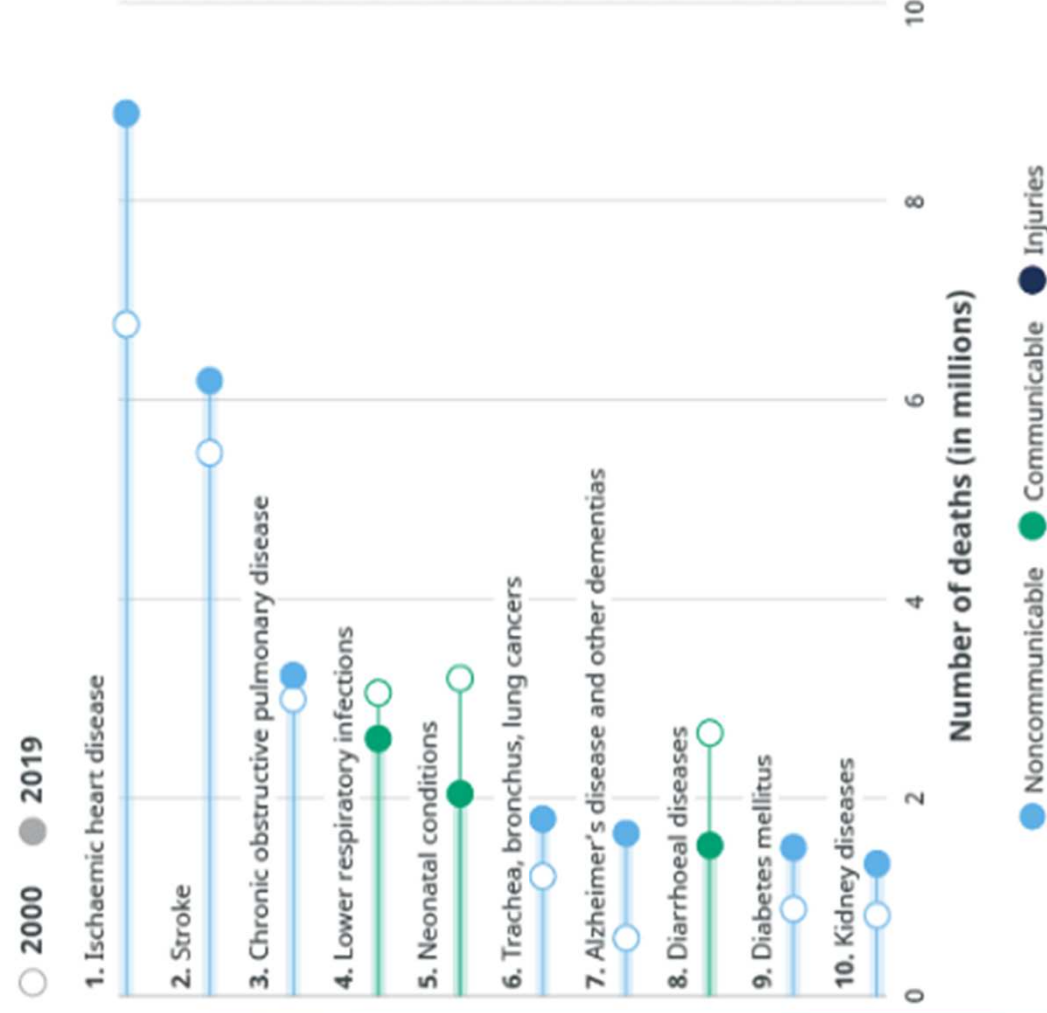
1.7 billion

Source: WHO Global Report, 2019

ESTIMATED TB MORTALITY RATES IN HIV-NEGATIVE PEOPLE, 2019

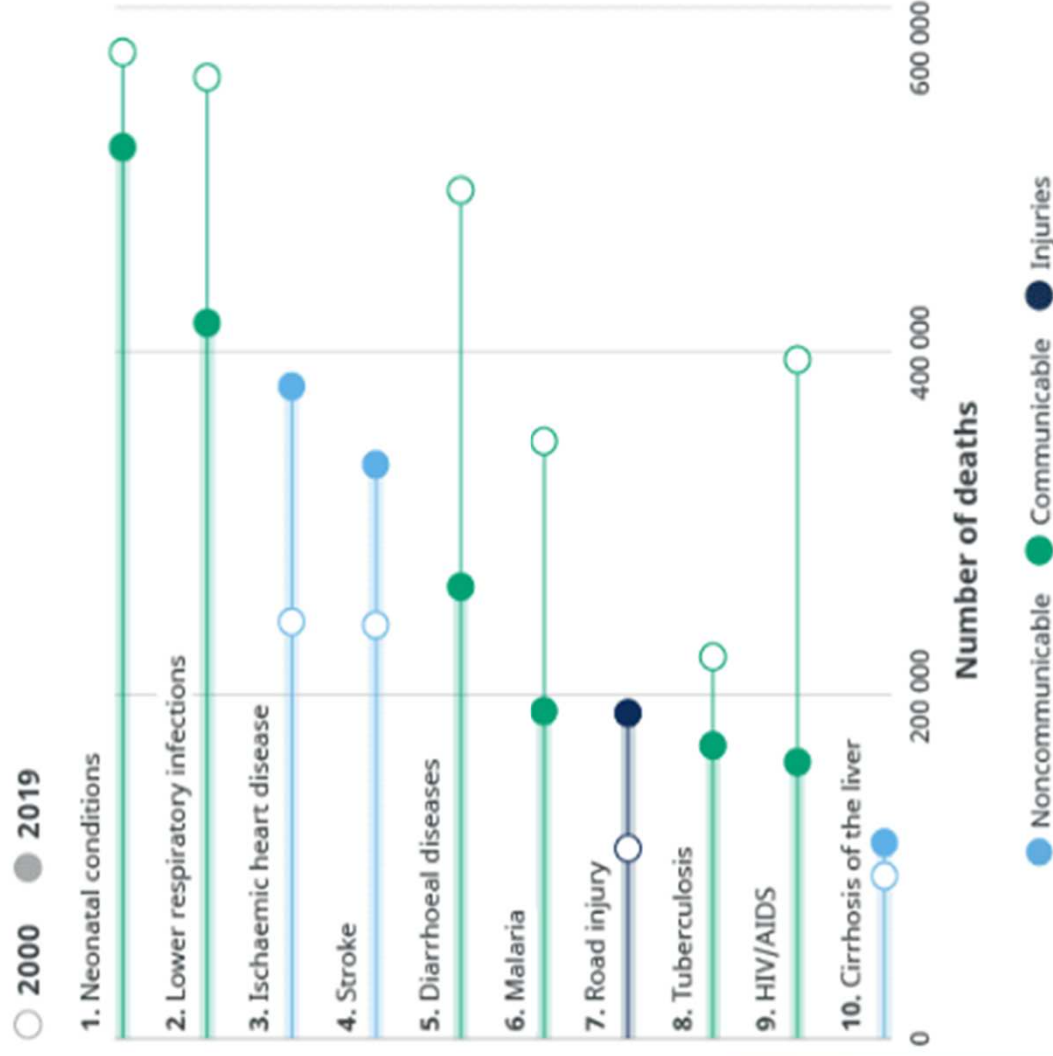


Leading causes of death globally



Source: WHO Global Health Estimates.

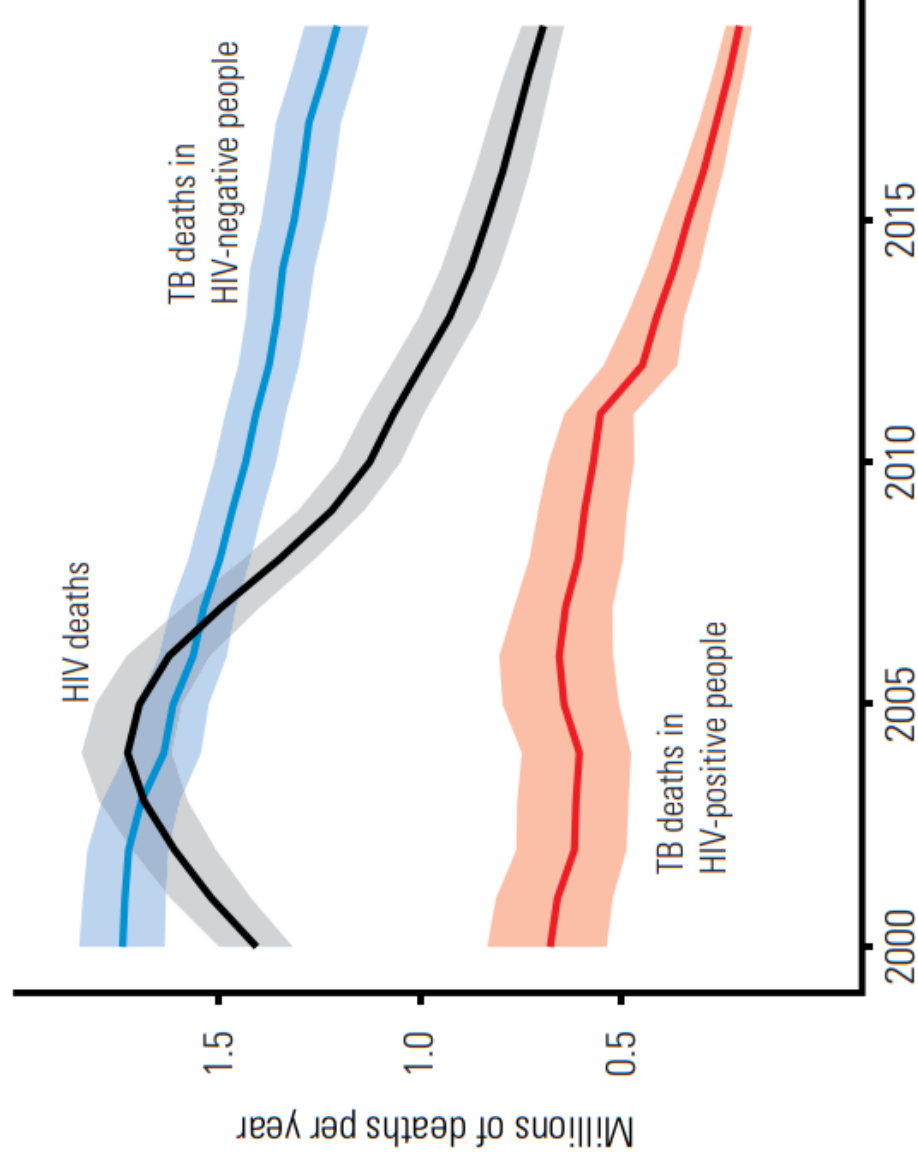
Leading causes of death in low-income countries

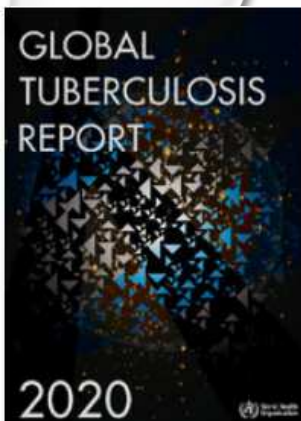


Source: WHO Global Health Estimates. Note: World Bank 2020 income classification.

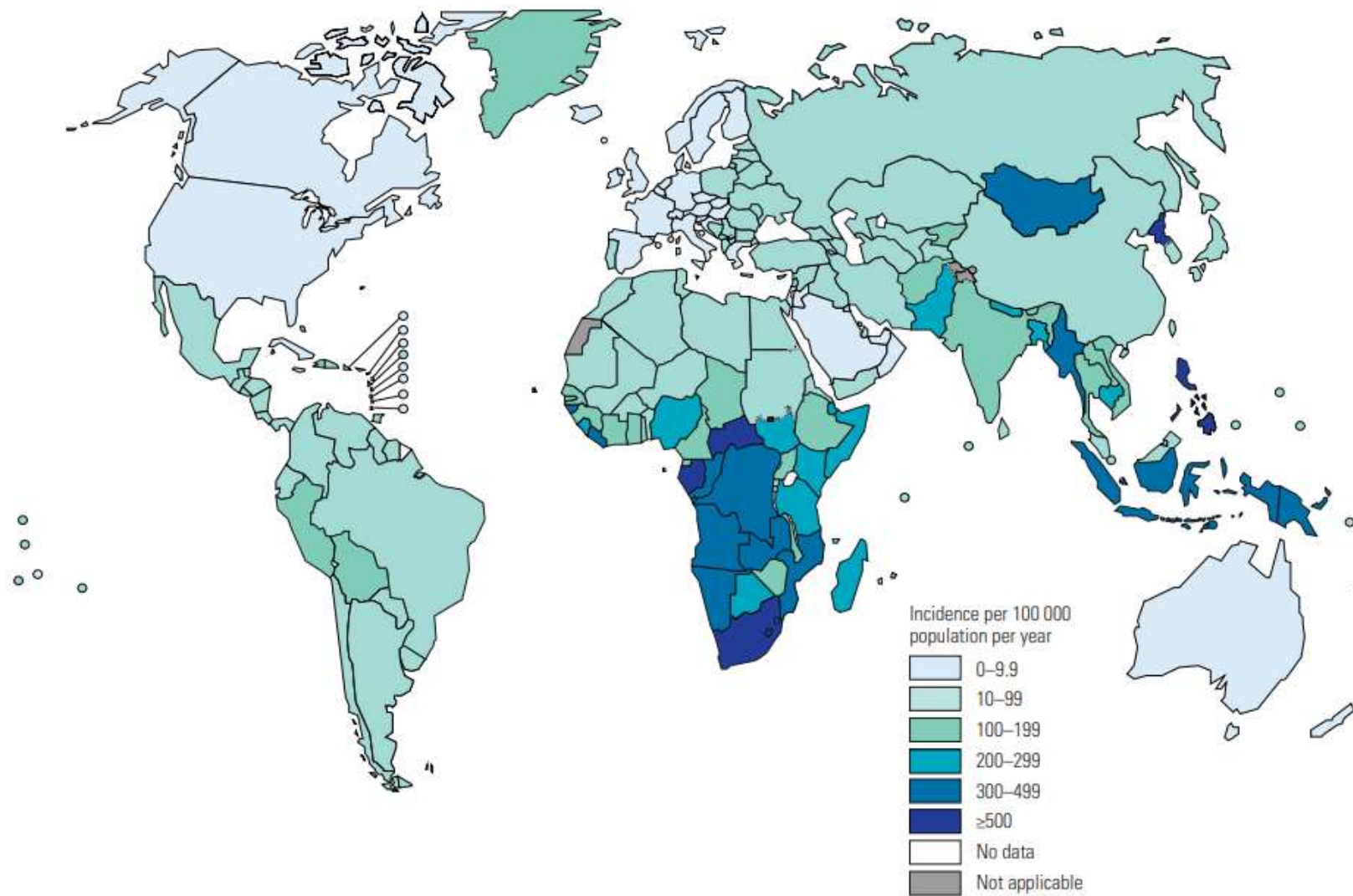
Global trends in the estimated number of deaths caused by TB and HIV (in millions), 2000–2019^{a,b}

Shaded areas represent uncertainty intervals.

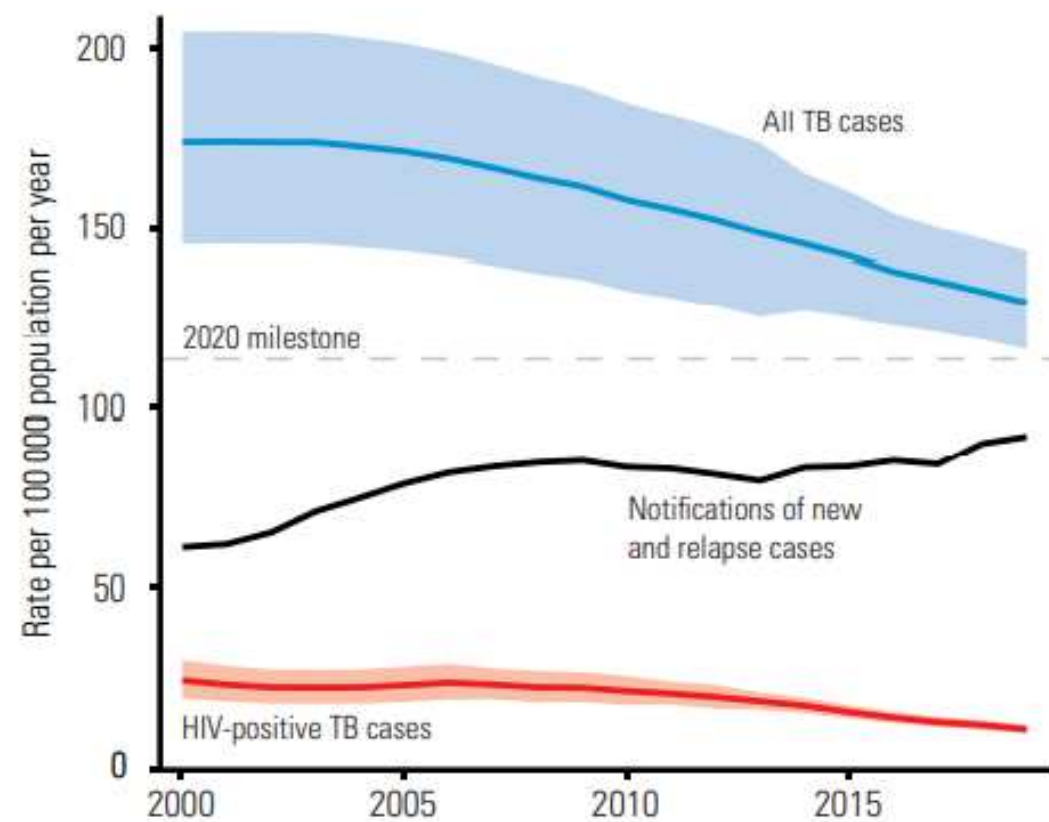
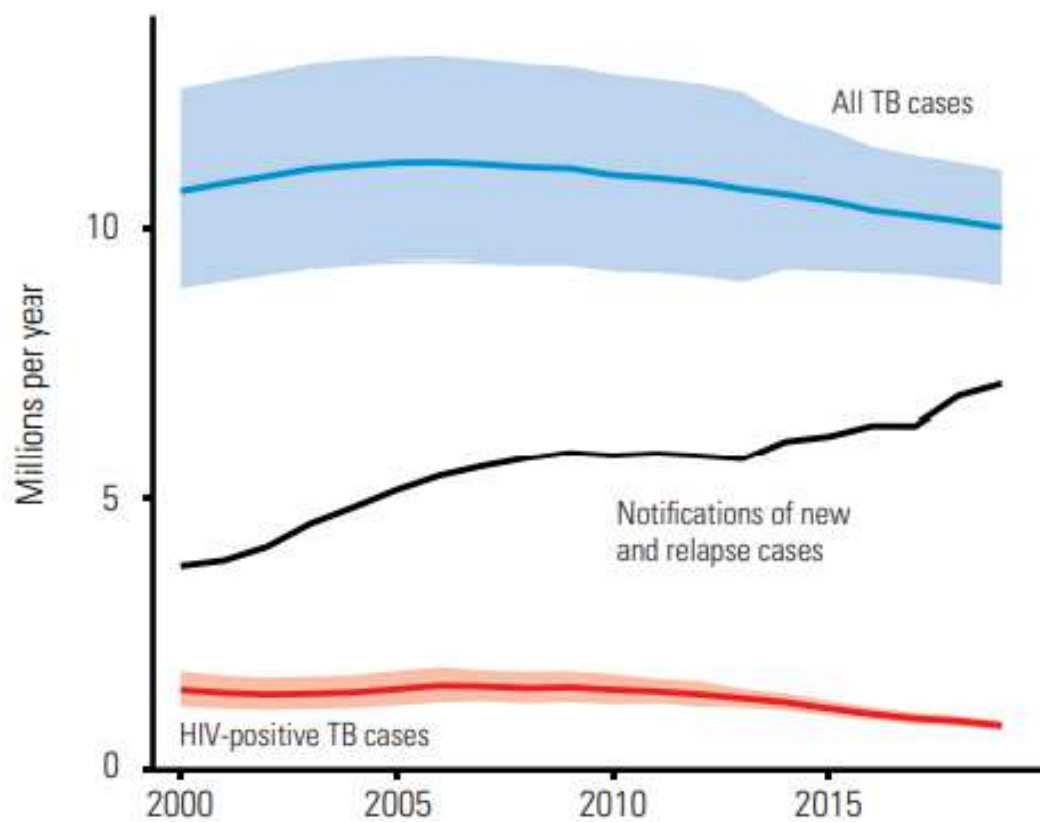




THE GLOBAL BURDEN OF TB, LATEST ESTIMATES 2019

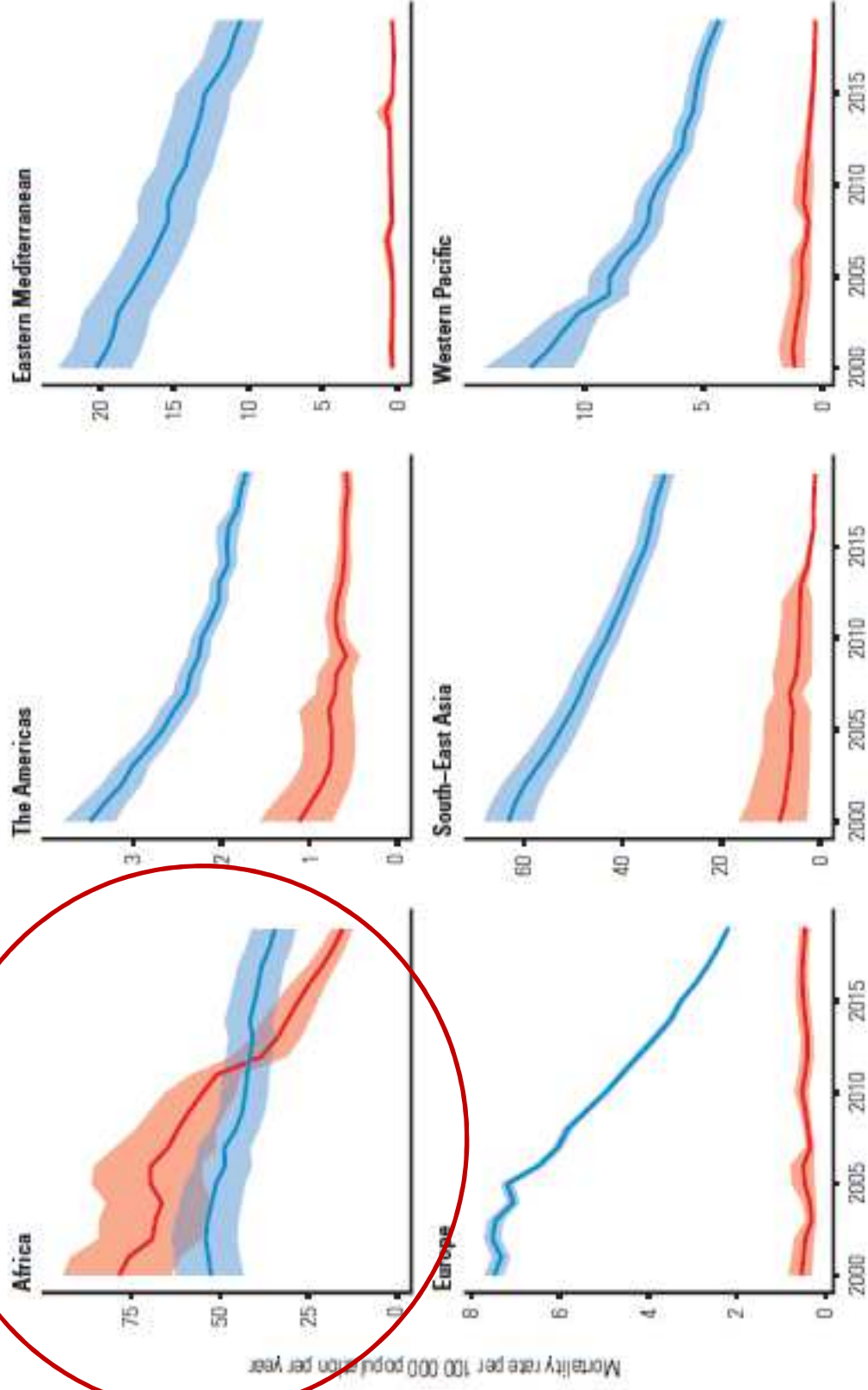


GLOBAL TRENDS IN THE ESTIMATED NUMBER OF INCIDENT TB CASES (LEFT) AND THE INCIDENCE RATE (RIGHT), 2000–2019

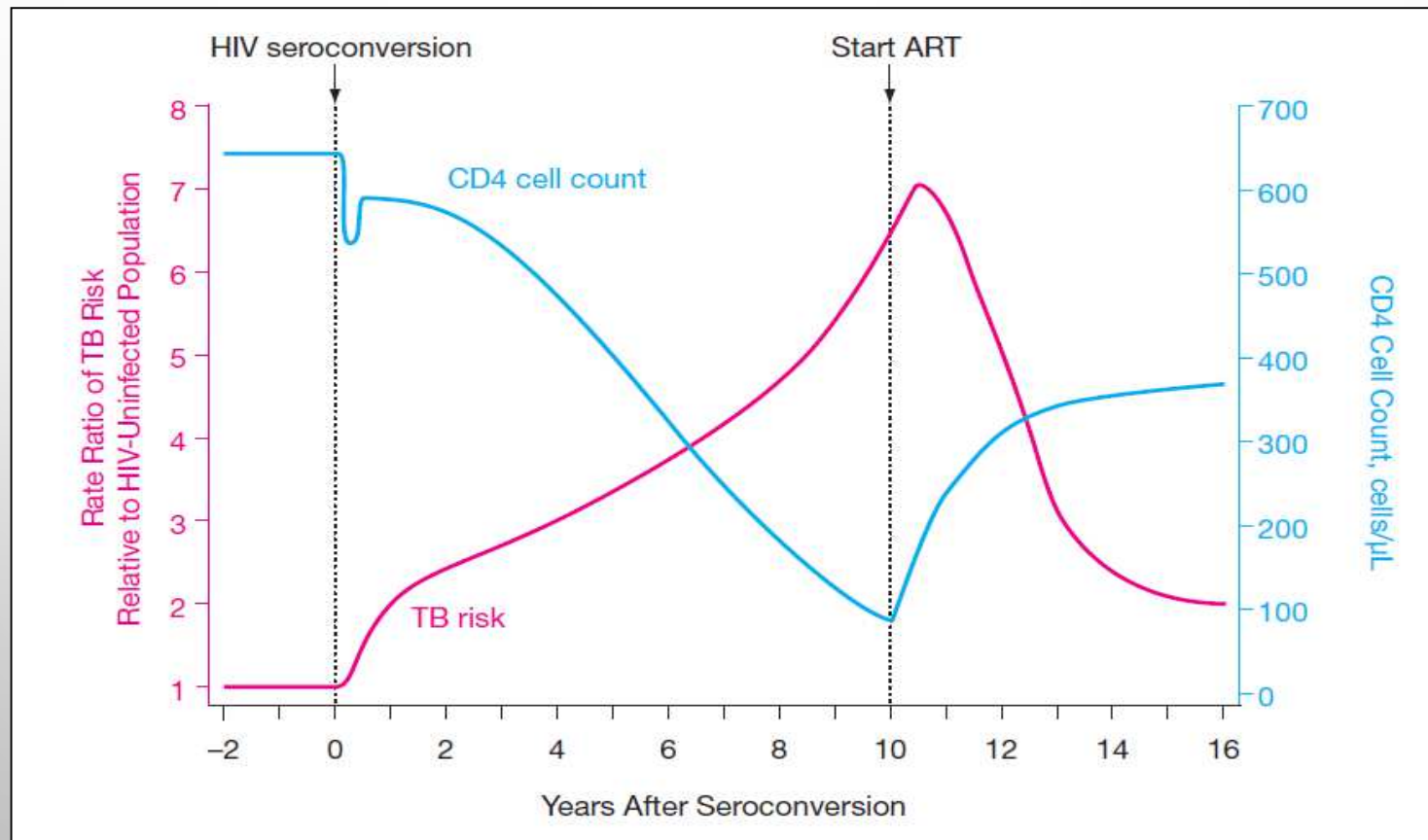


Trends in estimated TB mortality rates by WHO region, 2000–2019

Estimated TB mortality rates among HIV-negative people are shown in blue and estimated mortality rates among HIV-positive people are shown in red. Shaded areas represent uncertainty intervals.

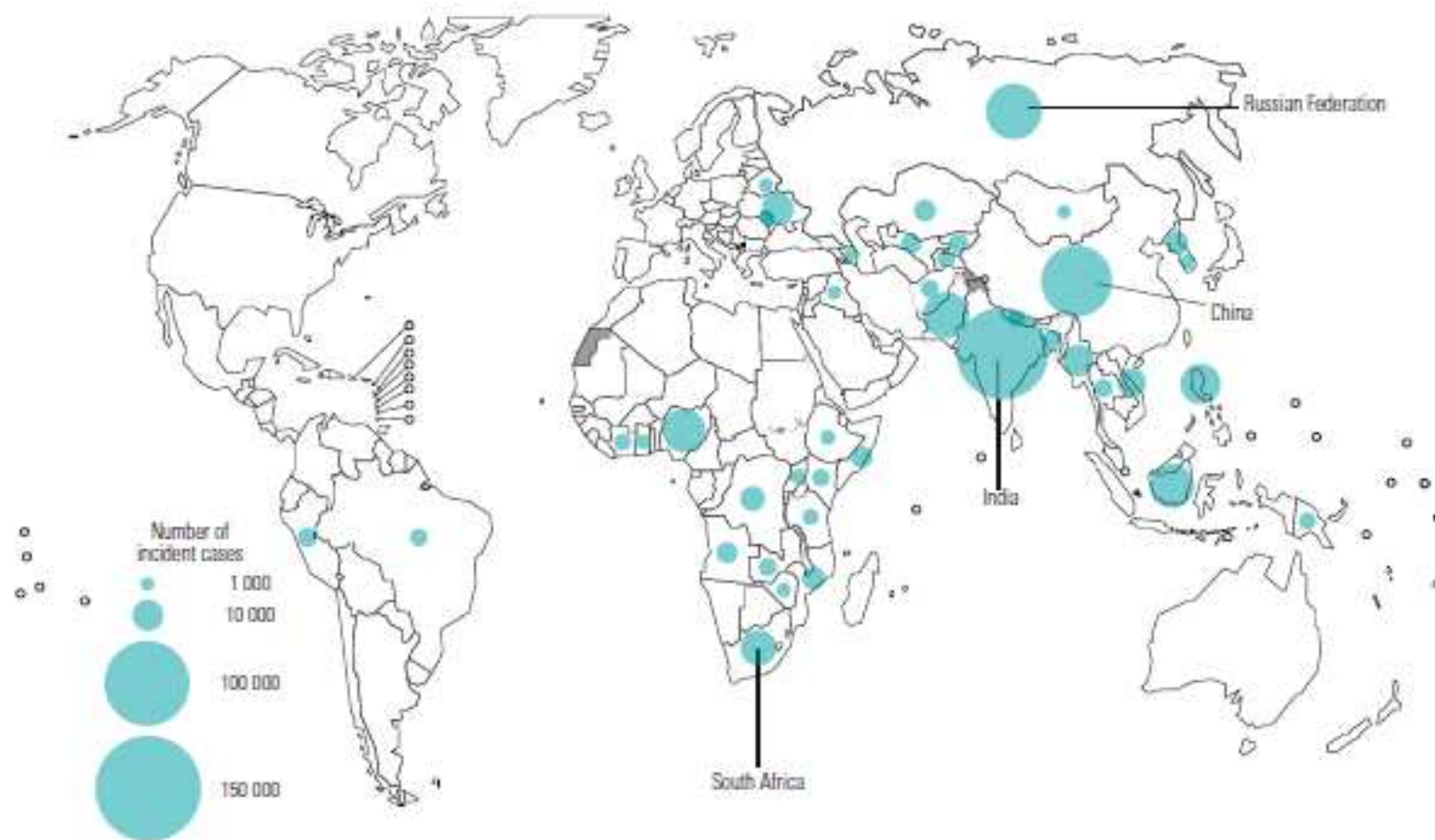


HIV INFECTION AND HAART



(Havlir et al 2008)

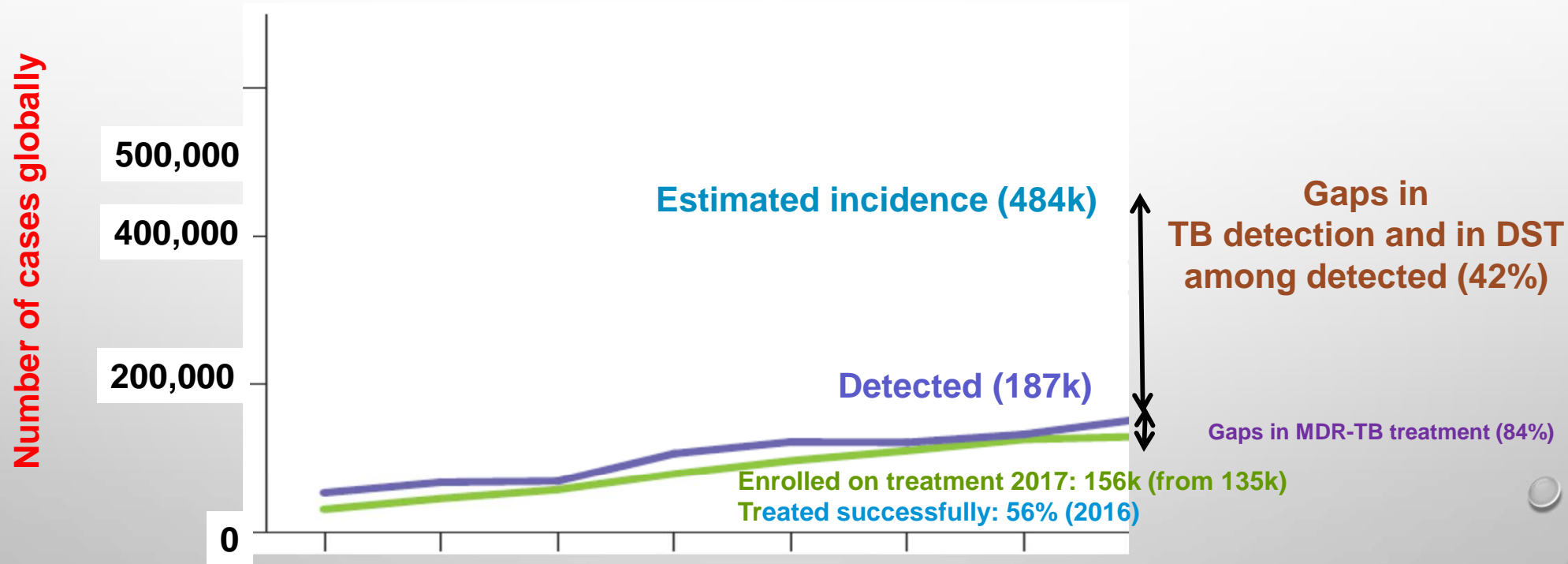
ESTIMATED INCIDENCE OF MDR/RR-TB IN 2019, FOR COUNTRIES WITH AT LEAST 1000 INCIDENT CASES




GLOBAL
TUBERCULOSIS
REPORT

2020

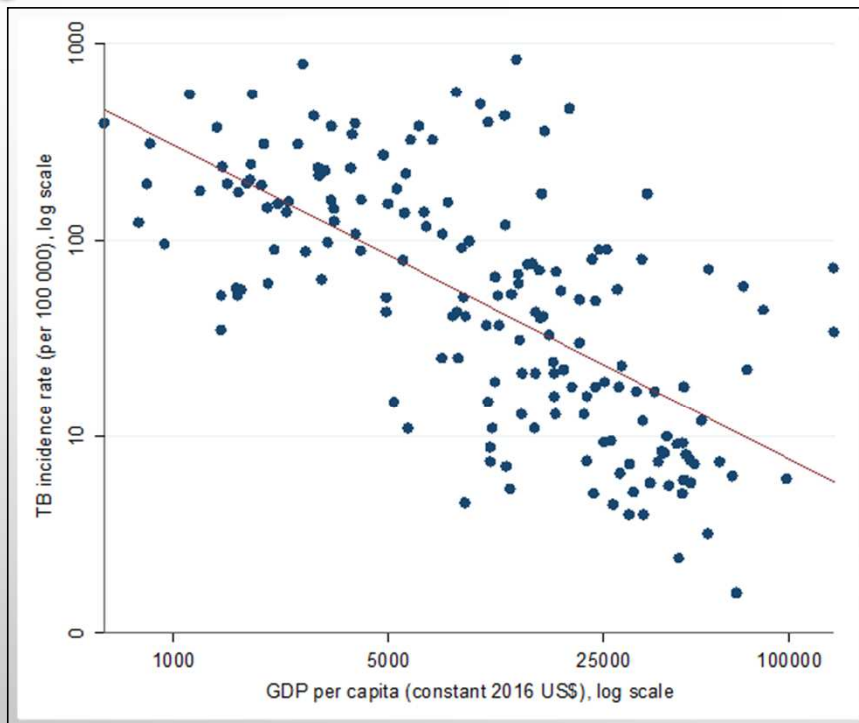
DRUG-RESISTANT TB: % DIAGNOSED AND TREATED, AND GAPS



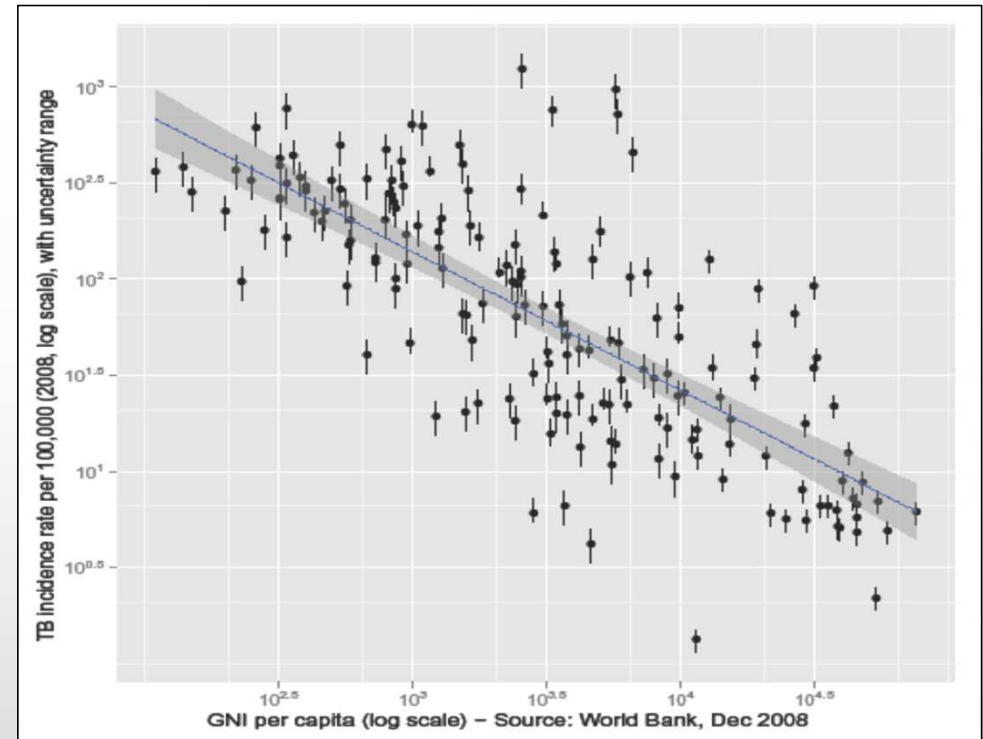
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Relationship Gross Domestic Product/capita and TB incidence

Relationship Gross National Income/capita and TB incidence



**THE LOWER THE GDP PER CAPITA
THE HIGHER TB INCIDENCE**



**The lower the GNI* per capita
the higher TB incidence**

*GNI = GDP + income of foreign residents

POPULATION ATTRIBUTABLE FRACTION: SELECTED RISK FACTORS & DETERMINANTS

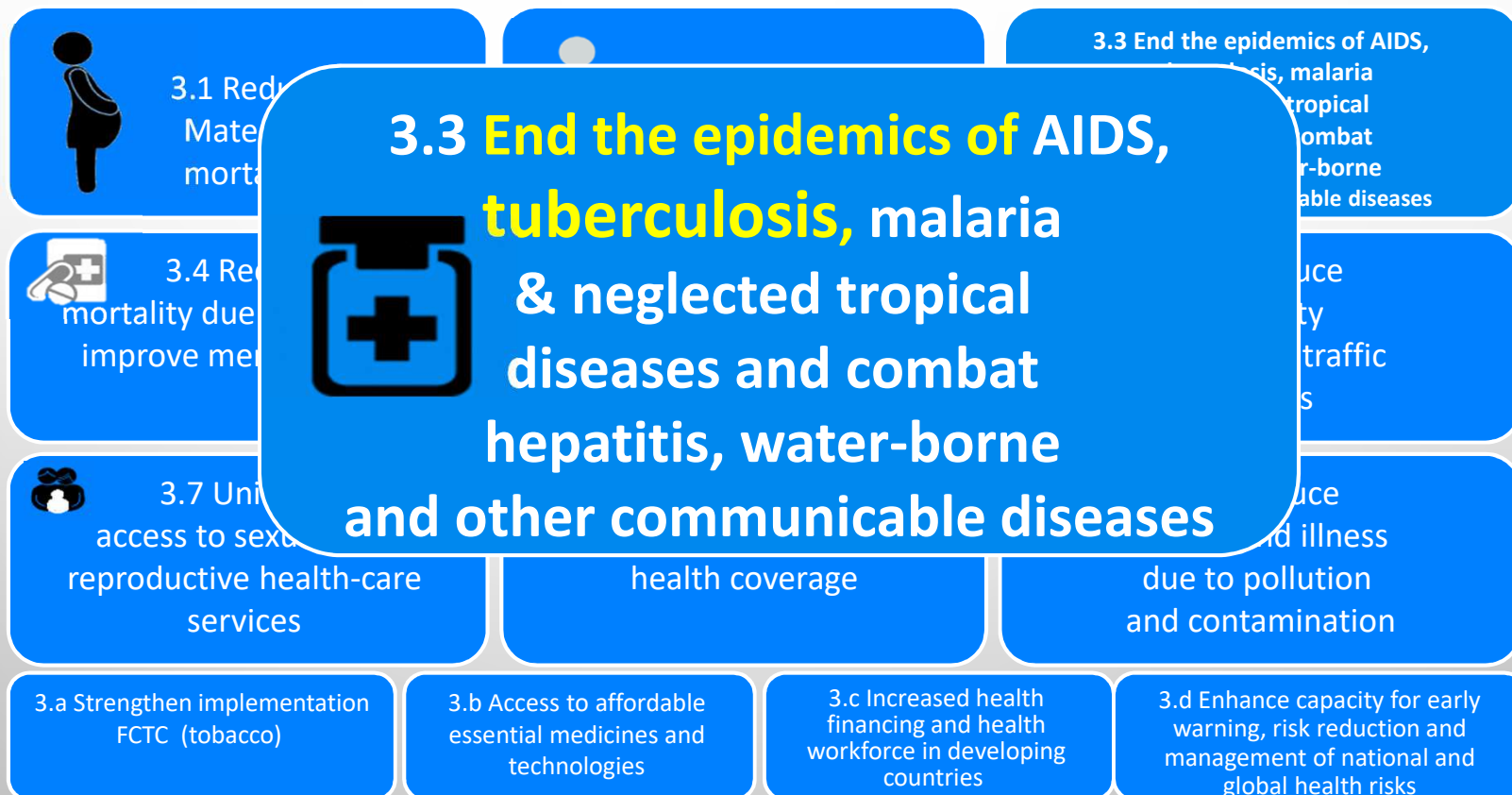
$$PAF = \frac{P \times (RR - 1)}{P \times (RR - 1) + 1}$$

RISK FACTOR	RELATIVE RISK (UNCERTAINTY INTERVAL)		EXPOSED (MILLIONS)	POPULATION ATTRIBUTABLE FRACTION (%)	ATTRIBUTABLE TB CASES (MILLIONS, UNCERTAINTY INTERVAL)	
Alcohol use disorders	3.3	2.1–5.2	288	8.1	0.72	0.30–1.3
Diabetes	1.5	1.3–1.8	489	3.1	0.35	0.14–0.65
HIV infection	18	15–21	38	7.7	0.76	0.68–0.86
Smoking	1.6	1.2–2.1	1 040	7.1	0.70	0.23–1.4
Undernourishment	3.2	3.1–3.3	812	19	2.2	1.5–3.1

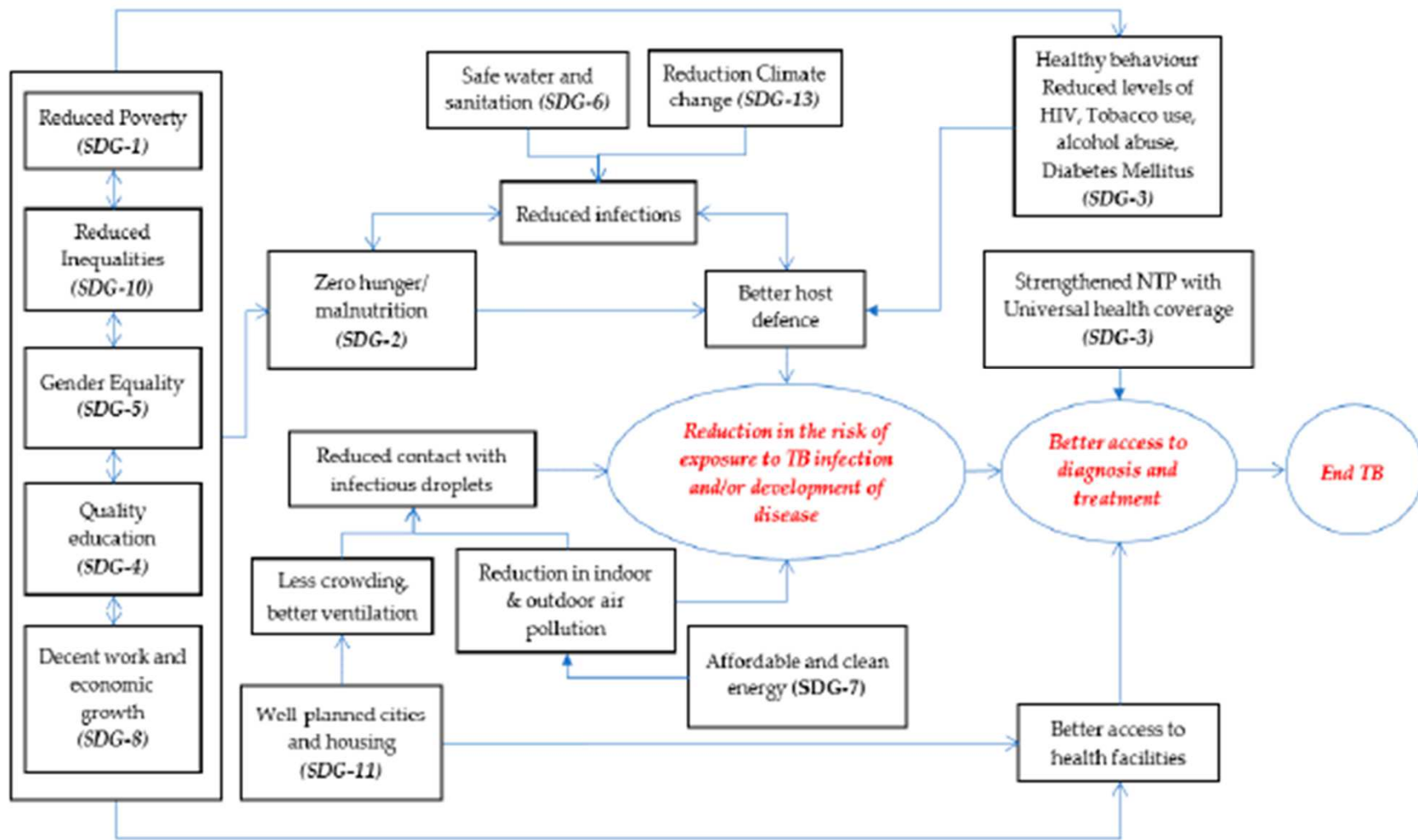
Sources: Imtiaz S et al. Eur Resp Jour (2017); Hayashi S et al. Trop Med Int Health (2018); Lönnroth K et al. Lancet (2010); World Bank Sustainable Development Goals Database (<http://datatopics.worldbank.org/sdgs/>, accessed 15 June 2020); WHO Global Health Observatory (<http://www.who.int/gho/en/>, accessed 15 June 2020); and WHO Global TB Programme.

Sources: Lönnroth K, Raviglione M. Global Epidemiology of Tuberculosis: Prospects for Control. Semin Respir Crit Care Med 2008; 29: 481-491. *Updated data in GTR 2009. RR=26.7 used for countries with HIV <1%. **Updated data from Lönnroth et al. A consistent log-linear relationship between tuberculosis incidence and body-mass index.

SDG 3 and its 13 targets by 2030



LINKAGES BETWEEN TB AND SEVERAL SDG





The End TB Strategy: Vision, Targets and Pillars



Vision:

A world free of TB

Zero TB deaths, Zero TB disease, and Zero TB suffering

Goal:

End the Global TB epidemic



	MILESTONES		TARGETS	
	2020	2025	SDG* 2030	END TB 2035
Reduction in number of TB deaths <small>compared with 2015 (%)</small>	35%	75%	90%	95%
Reduction in TB incidence rate <small>compared with 2015 (%)</small>	20%	50%	80%	90%
TB-affected families facing catastrophic costs due to TB (%)	0%	0%	0%	0%

PILLAR 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



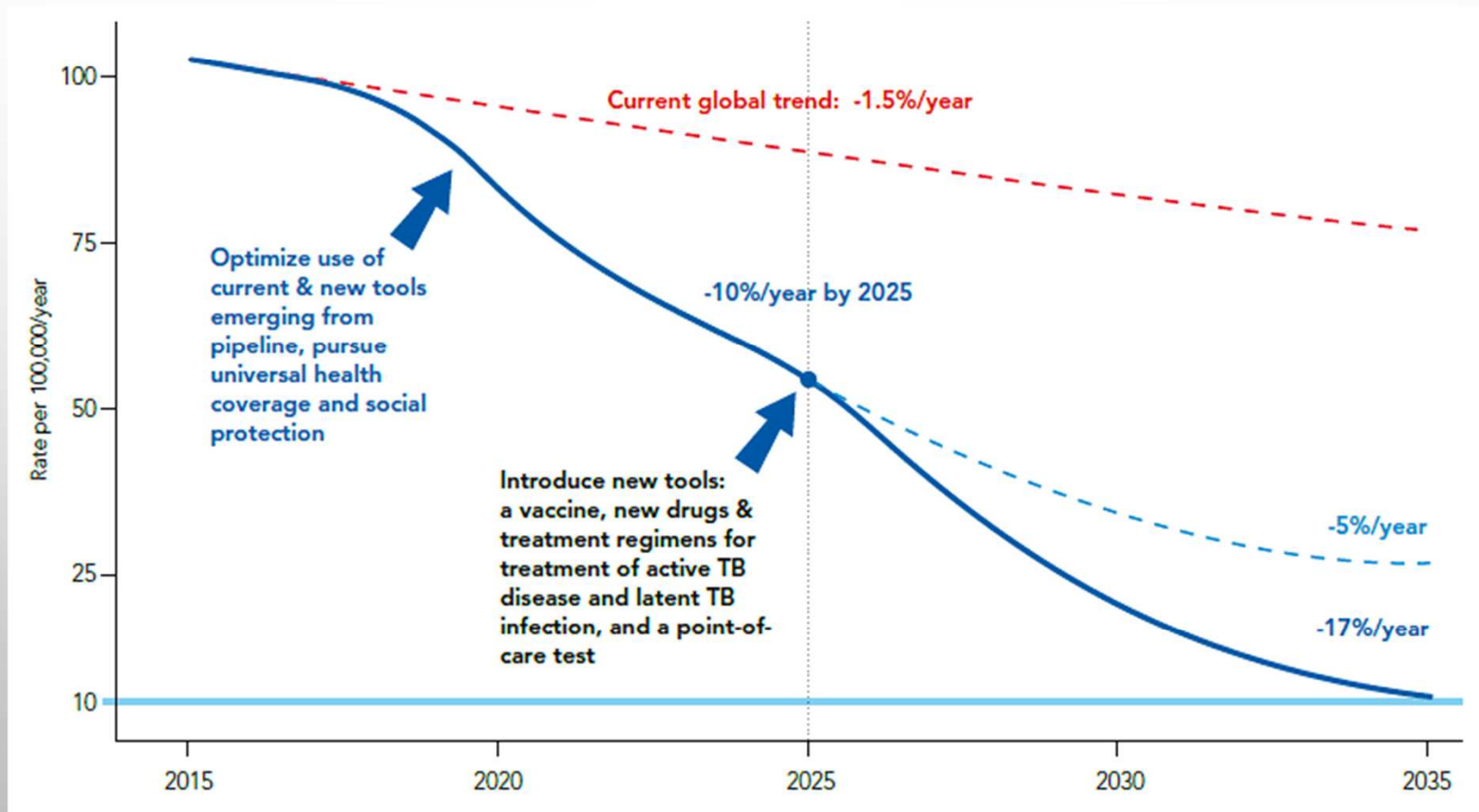
D. Preventive treatment of persons at high risk; and vaccination against TB



C. Collaborative TB/ HIV activities; and management of co-morbidities



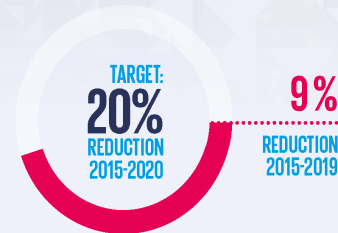
TB TREND: a step change is needed



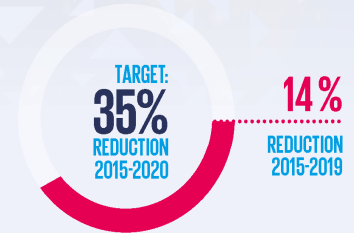
END TB
PROGRESSES:
MORE EFFORTS
ARE NEEDED

ACCELERATED ACTION URGENTLY REQUIRED TO REACH SDGs AND END TB STRATEGY TARGETS

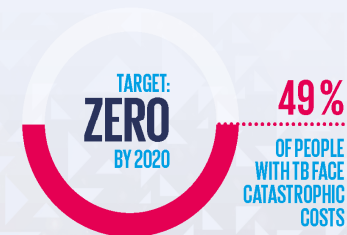
TB INCIDENCE



TB DEATHS

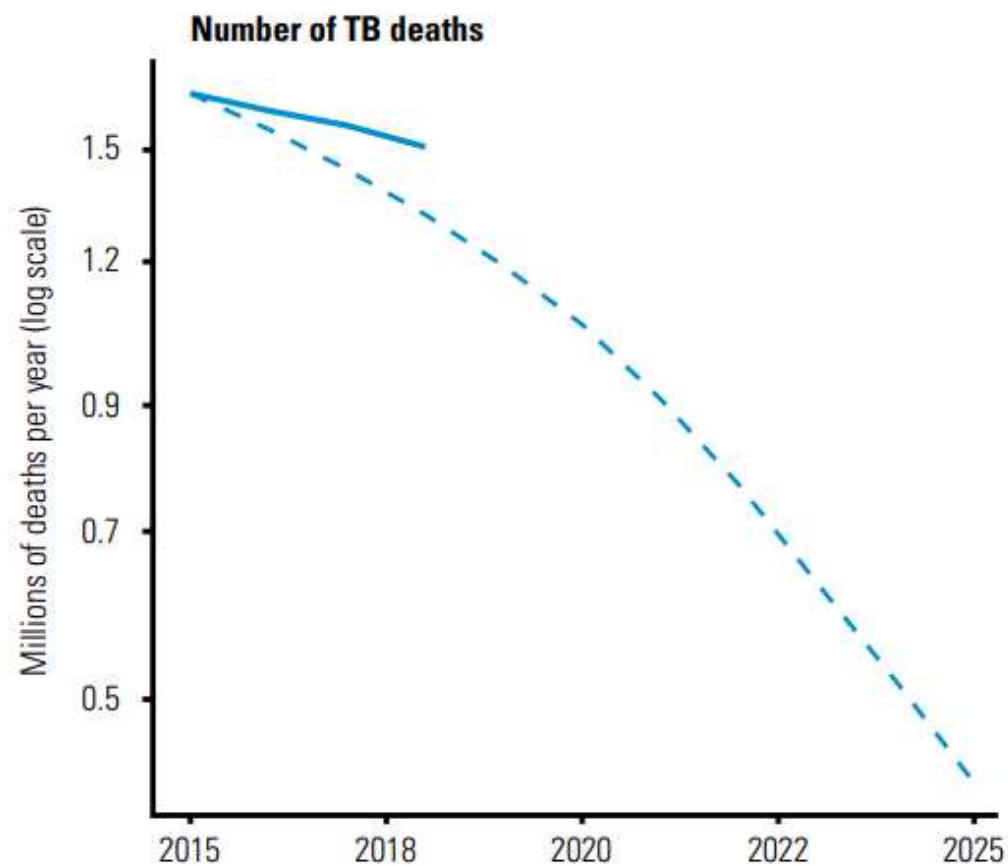
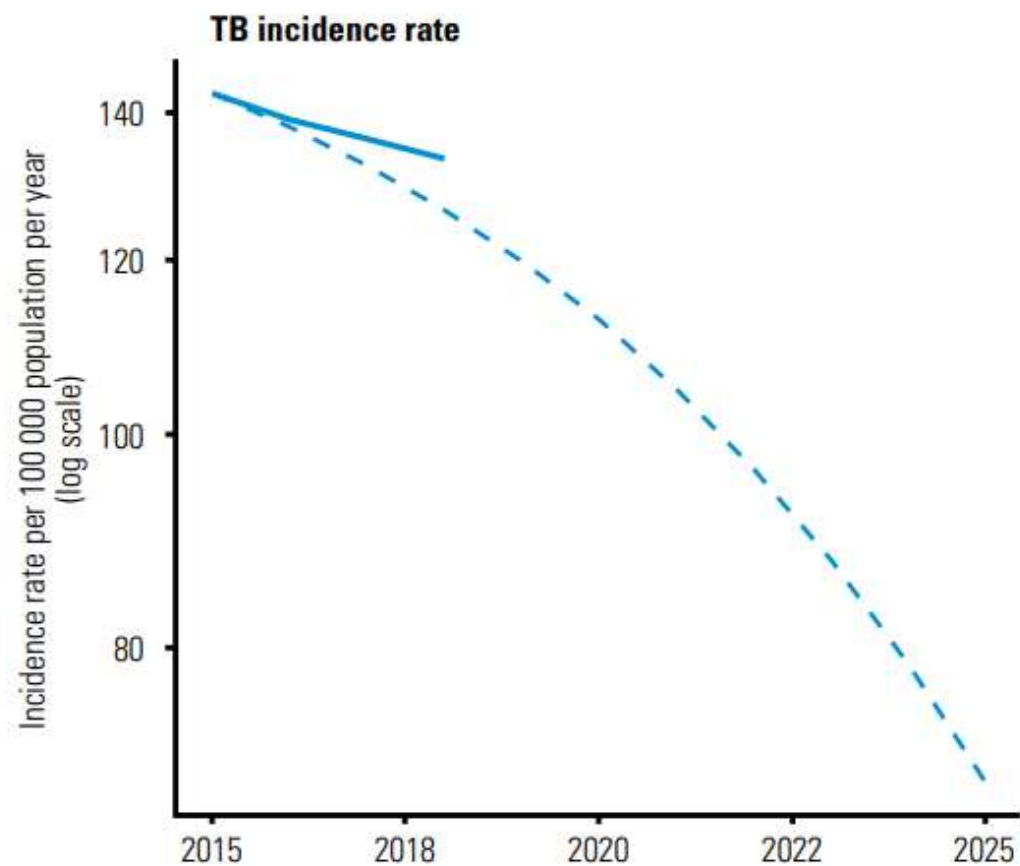


% OF PEOPLE WITH TB FACING CATASTROPHIC COSTS



World Health
Organization

STRATEGY (DASHED LINES) GLOBAL TRENDS IN THE TB INCIDENCE RATE AND THE ABSOLUTE NUMBER OF TB DEATHS (SOLID LINES) COMPARED WITH THOSE REQUIRED TO ACHIEVE THE 2020 AND 2025 MILESTONES OF THE END TB



GLOBAL PROGRESS IN THE NUMBER OF PEOPLE TREATED FOR TB IN 2018 AND 2019 LAGS BEHIND

WHAT IS NEEDED TO REACH THE UN GLOBAL TARGETS, ESPECIALLY FOR DRUG-RESISTANT TB

TB TREATMENT (ALL AGES)



TB TREATMENT (CHILDREN)



MDR/RR-TB TREATMENT (ALL AGES)



MDR/RR - TB TREATMENT IN CHILDREN



GLOBAL PROGRESS IN PROVISION OF TB PREVENTIVE TREATMENT LAGS BEHIND

WHAT IS NEEDED TO REACH THE OVERALL UN GLOBAL TARGET

TB PREVENTIVE TREATMENT (ALL AGES)



PEOPLE LIVING WITH HIV



HOUSEHOLD CONTACTS AGED < 5 YEARS



HOUSEHOLD CONTACTS AGED ≥ 5 YEARS



**TB IS DEEPLY ROOTED IN POPULATIONS
WHERE HUMAN RIGHTS AND DIGNITY ARE THREATENED, AFFECTING THE MOST
VULNERABLES: 95% OF DEATHS IN DEVELOPING COUNTRIES**

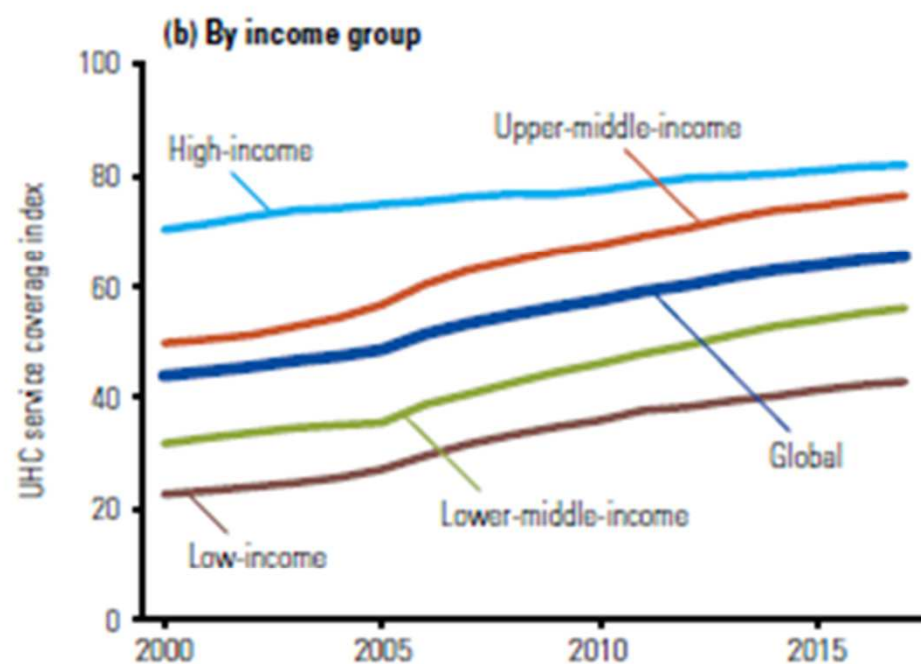
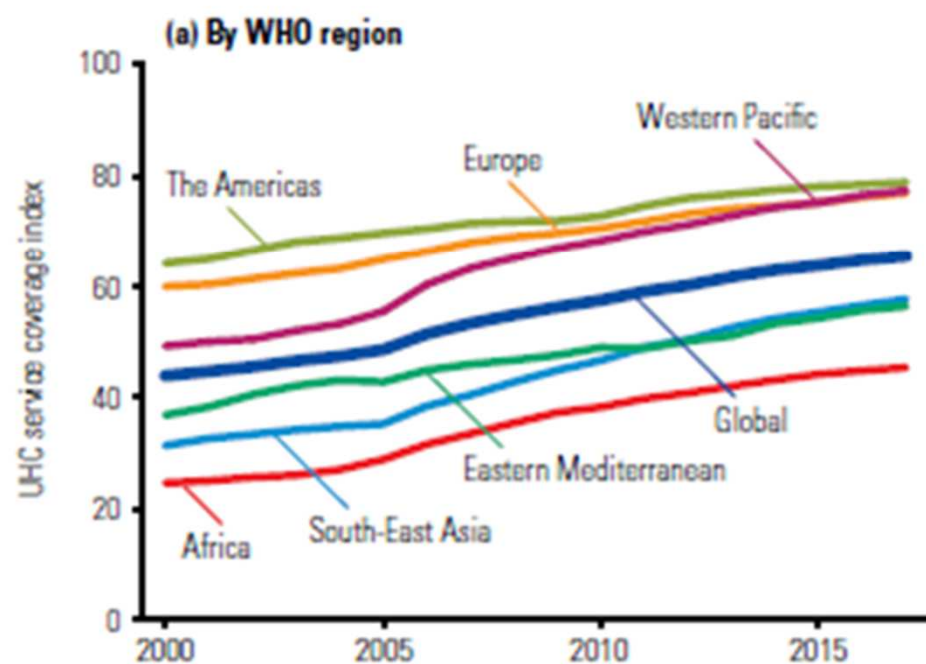
“At least half the world’s population still misses out on essential health services”.




UNIVERSAL HEALTH COVERAGE (UHC) is defined by SDG 3.8

- 3.8.1 - **Service Coverage Index (SCI):** 0 to 100
- 3.8.2 - **Incidence of catastrophic health expenditure** (>10%)

TRENDS IN THE UHC SERVICE COVERAGE INDEX IN WHO REGIONS AND WORLD BANK INCOME GROUPS 2000 - 2017



Source: WHO Universal Health Coverage data portal (<http://apps.who.int/gho/portal/uhc-overview.jsp>, accessed 15 June 2020)

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TB AND NEW FR


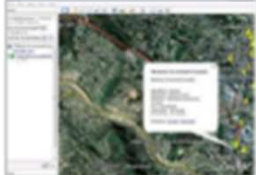


Digital monitoring

Prompt and real time access to local and national data, population groups, data analysis.

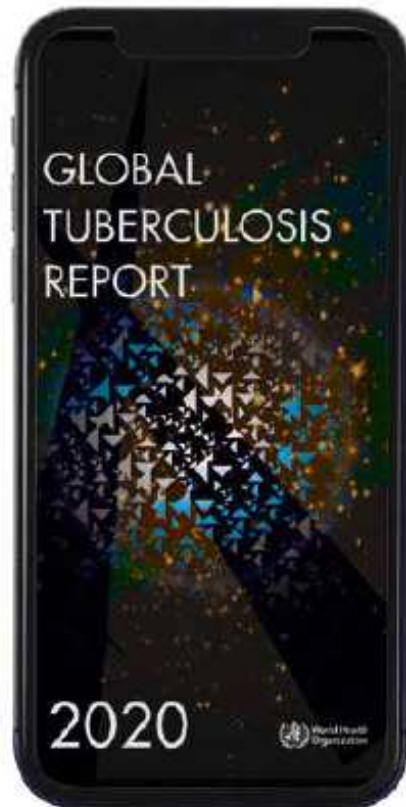
Mobile-health: sms, reminders, calls, VOT.

APP Prevent Tb: Outreach Worker use: Register, Screen contact patients & basis the symptoms recorded to refer TB or LTBI testing facility.

A framework on the role of digital health in TB prevention and care

Functions	Possible interventions	Some innovative examples
Patient care & "eDOT"	Drug administration monitoring devices	Kenya- Cash transfers through mobile banking to MDR-TB patients: Kenya's extensive mobile communications network and widespread use of cellular phones enable, among other things, cash transfers through mobile banking to MDR-TB patients in support of their treatment. 
	Video (virtual) supported treatment (VOT)	
	SMS communication for treatment & follow ups	
	Telephone-based, web-based interventions, SMS for smoking cessation in TB patients	
	Enablers/incentives for adherence (cash transfers, free airtime)	
Surveillance and Monitoring	Notification of TB episodes to existing electronic surveillance systems	Swaziland- Matching MDR-TB patients' residence to treatment supporters : In Swaziland, health managers can see maps of treatment facilities and how they relate to the location of MDR-TB patients and treatment supporters' homes (as captured on GPS-enabled phones). 
	Reporting of drug safety concerns	
	Studies of social determinants	
	Client satisfaction polls	
	Operational research on transactions between community health workers, patients and facilities	
Programmatic management	Stock levels of drugs, medical devices and reagents	Drug forecasting- Avoiding drug stock outs using software: To make sure no patient's treatment is interrupted due to lack of medicines, the QuanTB program creates a dashboard for managers to see how long current drug stocks are forecast to last and when new drug orders should be placed. 
	Management and coordination of logistics	
	Drug ordering and management systems	
	Database of patient location, contacts and health care facilities	
	Access to medical files via mobile devices	
eLearning	Texting of laboratory results on TB and comorbidities (eg, HIV, diabetes)	Health professional education- Online platforms on clinical and public health topics including TB. 
	Self-teaching utilities	
	Online courses and information on healthy lifestyles (eg, smoking cessation, diabetes control)	
	Applications proposing content, such as guidelines and diagnostic aids	
	Social networking tools, news forums	


THE GLOBAL TUBERCULOSIS REPORT APP



6 Gennaio 2020

Global, regional and country data (including profiles) are available at your fingertips with the Global TB Report app. It can be downloaded free of charge and content is available in multiple languages.

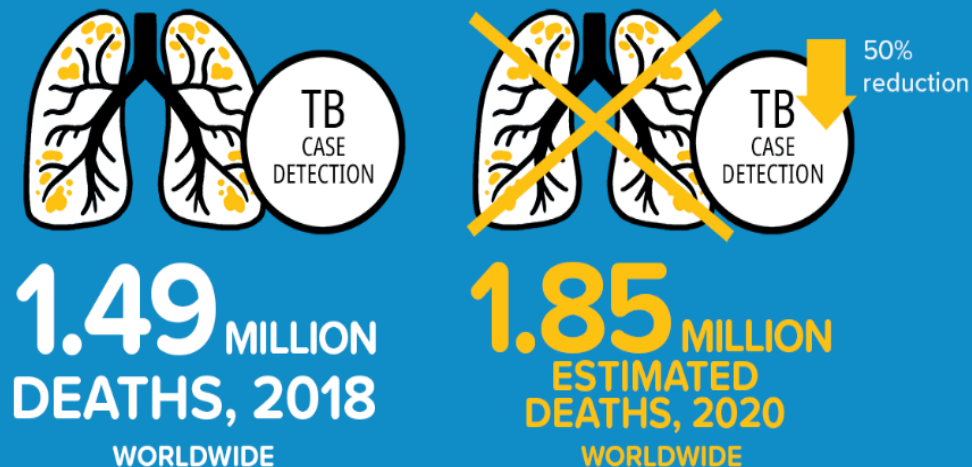


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COVID-19 AND TB: LONG LASTING IMPACT

- 1) **Health determinants:** unemployment, malnutrition, poverty, access to healthcare, stigma
- 2) **Reconversion** and fewer health facilities for TB
- 3) **The burden of** comorbidities

A major disruption in TB case detection could result in an additional 400 000 lives lost.



20 May 2020

INFORMATION NOTE WHO:

Continuum of care for TB is essential

- **Prevention:** limiting transmission
- **Diagnosis:** laboratories, logistics and concurrent test TB and Covid-19 is suggested
- **Treatment:** shared expertise in contact tracing, use of digital technology, community outpatient services
- **Human resources:** TB specialists, pneumologist and staff, HCW

A RETROSPECTIVE OBSERVATIONAL STUDY IN BRESCIA: IMPACT OF THE SARS-COV-2 EPIDEMIC ON TUBERCULOSIS TREATMENT OUTCOME

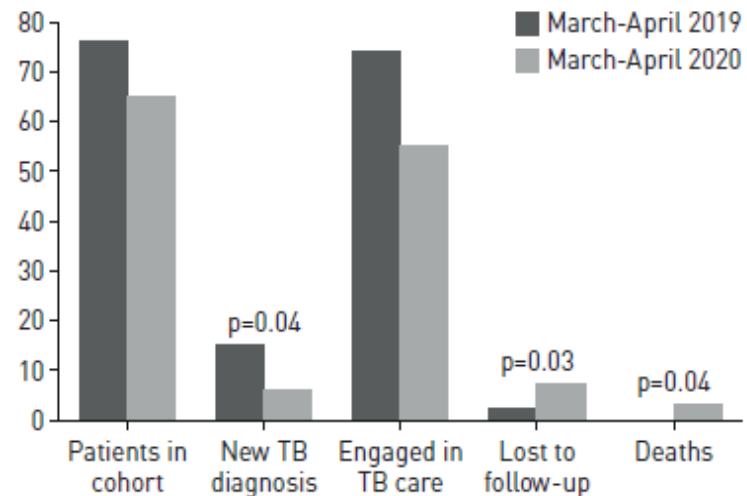


FIGURE 1 Tuberculosis (TB) treatment outcome during the coronavirus disease 2019 (March to April 2020) and control (March to April 2019) periods.

OBJECTIVE

To evaluate cascade of TB care between Q1 2019 (n=76) and Q1 2020 (n=65)

RESULTS

1. Less TB diagnosis → 6 (9,2%) vs 15 (19,7%) p=0,04;
2. More lost to follow-up (10.8% versus 2.6%; p=0.03);
3. More TB deaths 3 vs 0 (p=0,04)

SOME USEFUL LINK

- SDGs specific values for country:

<HTTPS://APP.POWERBI.COM/VIEW?R=EYJRIJOINDE5Y2EZNZQTZDMXYY00ZMFLWWEWMJMTZDA0NMUZYTLKZDAZIIWIDCI6IMY2MTBJMGI3LWJKMJQTNGIZOS04MTBILT NKYZI4MGFMYJU5MCISIMMIOJH9&PAGENAME=REPORTSECTIONBB9ACC102D62977ADA64>

- Data on Universal Health Coverage – countries

<https://www.who.int/data/gho/data/major-themes/universal-health-coverage-major>

- OMS data:

https://www.who.int/tb/features_archive/en/

