

# The intersection of TB and COVID-19

- Elements of TB programs that are relevant to the COVID-19 response
- Maintenance of TB programs in the context of COVID-19 restrictions

USAID/Washington TB team

Note: Much still remains unclear about the novel coronavirus SARS-CoV-2 and the disease it causes (COVID-19). Hence, statements in this PPT are provisional and may change as more evidence comes to light.

# Overarching messages

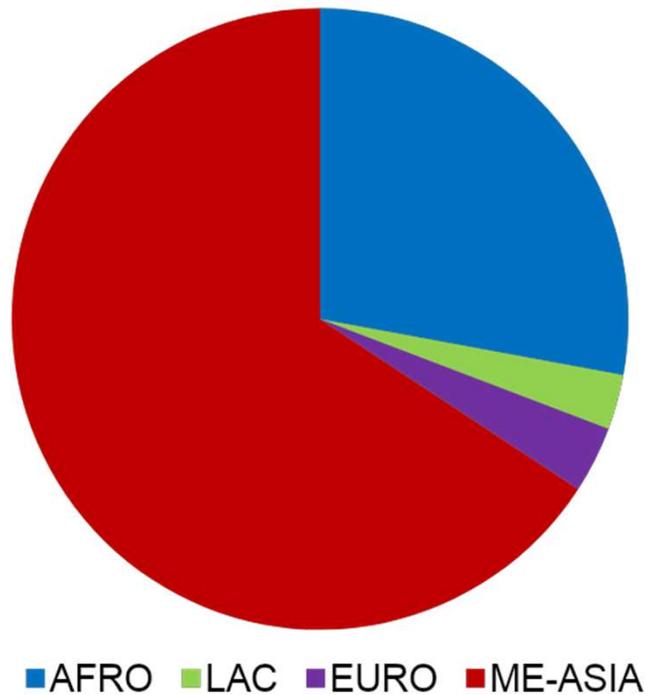
We need to:

- Put vulnerable people first in the fight against TB and COVID-19
- Protect and support health workers fighting TB and COVID-19
- End stigma against people affected with TB or COVID-19
- Fully fund health systems to protect the most vulnerable from TB and COVID-19
- Stand shoulder to shoulder fighting these two airborne diseases: TB and COVID-19

**Section 1: Elements of TB programs that are relevant to the COVID-19 response**

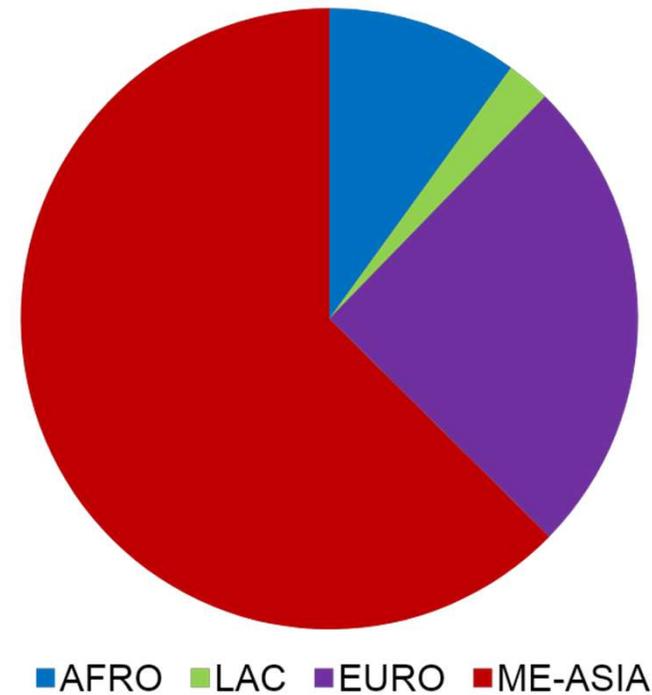
# The Global TB burden is large, with lessons for COVID-19

Overall TB burden



10 million cases  
1.5 million deaths

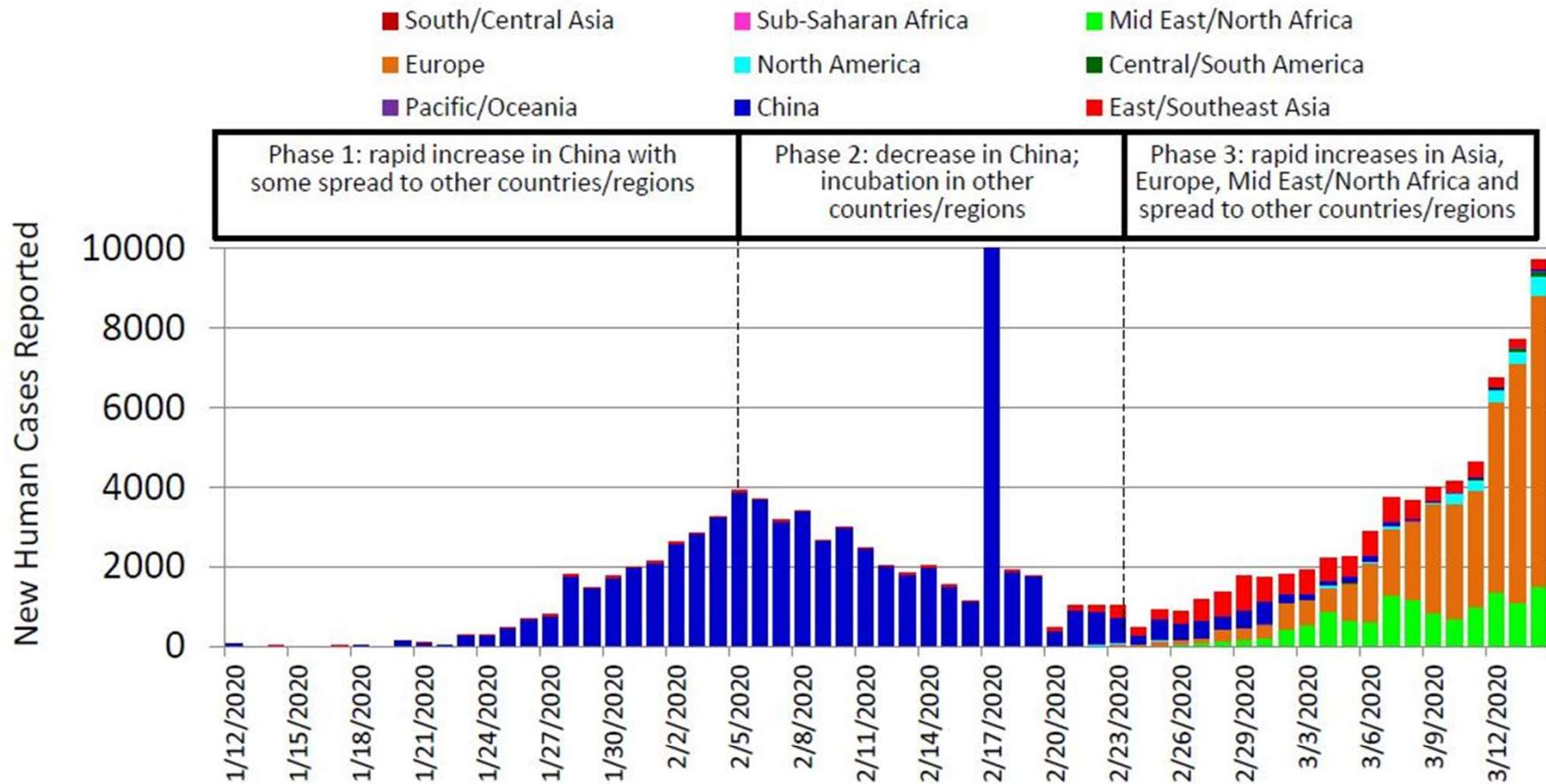
DR-TB burden



484,000 cases

Note: the dynamics of COVID-19 evolve quickly which changes the burden across region -

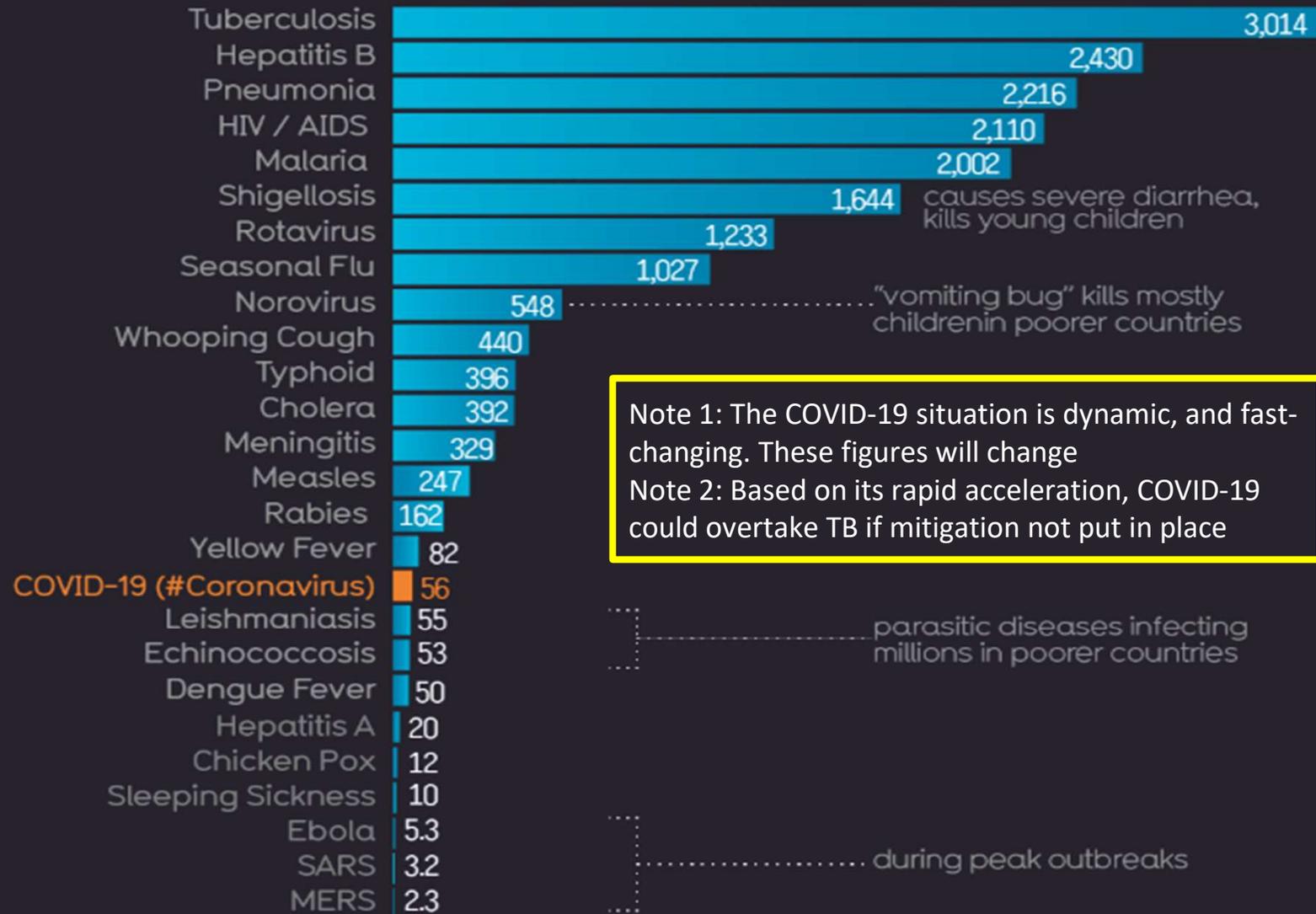
# Evolving Epidemics Over Time



After initial surge and then decline in new cases in **China** and then the rest of Asia, active epidemics now focused in **Europe** and the **Middle East/North Africa** with total new cases outside China now exceeding China's peak level.

Based on available information reported as of March 15, 2020. Source: WHO.

# Disease Deaths per Day Worldwide

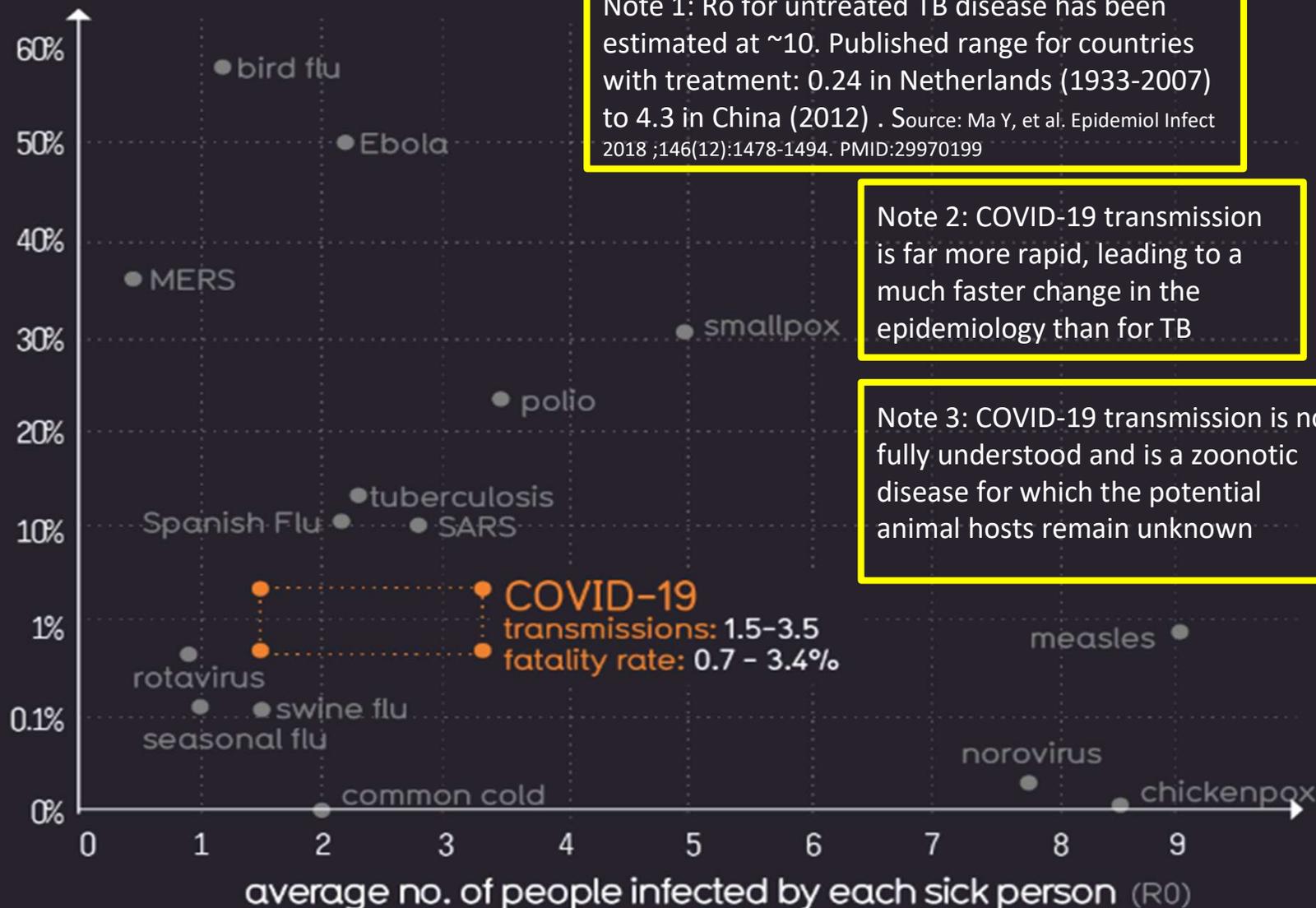


Note 1: The COVID-19 situation is dynamic, and fast-changing. These figures will change  
 Note 2: Based on its rapid acceleration, COVID-19 could overtake TB if mitigation not put in place

# How Contagious & Deadly is It?

We don't fully know yet but it's in **this range**

% who die (CASE FATALITY RATE)



Note 1:  $R_0$  for untreated TB disease has been estimated at  $\sim 10$ . Published range for countries with treatment: 0.24 in Netherlands (1933-2007) to 4.3 in China (2012). Source: Ma Y, et al. Epidemiol Infect 2018 ;146(12):1478-1494. PMID:29970199

Note 2: COVID-19 transmission is far more rapid, leading to a much faster change in the epidemiology than for TB

Note 3: COVID-19 transmission is not fully understood and is a zoonotic disease for which the potential animal hosts remain unknown

# TB vs COVID-19 (1/4)

	Similarities between TB and COVID-19	Differences
<b>Epidemiology</b>	Significant burden	TB burden is very high: 10 million cases/year; 484,000/year DR-TB), and declining at ~2% per year. COVID-19 burden: 179,836 as of March 16th, but climbing fast.
<b>Transmission</b>	<p>Droplet transmission through the air for both TB and SARS-CoV-2</p> <p>A proportion of spread is from asymptomatic individuals</p>	<p>SARS-CoV-2 also thought to be transmitted through <a href="#">surface contamination</a>, possibly the <a href="#">fecal-oral route</a>, and there may be <a href="#">some limited aerosol transmission</a>.</p> <p>The proportion of transmission occurring from asymptomatic individuals may be less for <a href="#">TB</a> (see ) than for <a href="#">COVID-19</a>. And bacterial burden builds up slowly during TB disease, vs SARS-CoV-2 viral load can be higher in those without (vs with) symptoms (<a href="#">S Cisek</a> )</p>

There is ongoing speculation of the likely animal origin of SARS-CoV-2; to date, the spread and development of the current human epidemic is due to human to human transmission. For more information about risks to pets and animals, see the [FAO](#) and [CDC](#) websites.

# TB vs COVID-19 (2/4)

	Similarities between TB and COVID-19	Differences
<b>Containment measures</b>	<p>Contact investigation and outbreak investigation; identify hotspots</p> <p>Patients wear masks while infectious</p> <p>Use of PPE by HCW</p>	<p>The COVID-19 response has featured more aggressive containment measures, including rapid patient isolation and quarantine, and quarantine of contacts. This has been shown to reduce the time from symptom onset to isolation in hospital or quarantine. But to be effective, it must start early and fast due to the rapid transmission cycle for SARS-CoV-2 (see <a href="https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e1.htm">https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e1.htm</a> )</p> <p>More extensive PPE use in COVID-19 response, based on increased concern around transmission via surfaces</p>
<b>Mitigation</b>		<p>While not used for TB, mitigation has been necessary for COVID-19 in many countries (curfews, closing businesses, etc) due to failure of containment measures and rapid shift to community transmission. See <a href="https://jamanetwork.com/journals/jama/fullarticle/2763187">https://jamanetwork.com/journals/jama/fullarticle/2763187</a></p> <p>Risk communication and efforts to counter misinformation are a large part of the COVID-19 mitigations efforts</p>

# TB vs COVID-19 (3/4)

	Similarities between TB and COVID-19	Differences
<b>Infection control</b>	<p>Administrative measures, including patient triage based on respiratory symptoms (FAST: Find Actively, Separate, and Treat), and placing masks on patients immediately</p> <p>Environmental measures (outdoor spaces for triage and sample collection; adequate ventilation and airflow in waiting, consultation, and inpatient areas, etc)</p> <p>Use of personal protective equipment (PPE), particularly masks</p> <p>SBCC on cough etiquette</p> <p>Contact investigation</p>	<p>For COVID-19, additional critical measures include frequent disinfection of surfaces and WASH (frequent and thorough hand washing by all) and more complete PPE</p> <p>As noted above, contact investigation for COVID-19 is only practical if initiated very rapidly, at the very start of the epidemic, before community transmission is entrenched (see <a href="https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e1.htm">https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e1.htm</a> )</p>
<b>Surveillance</b>	<p>Critical for both TB and COVID-19 responses.</p>	<p>TB is a slow-moving epidemic; quarterly data is the norm at national level. COVID-19 requires daily data updates</p> <p>COVID-19 must be reported to WHO International Health Regulation (IHR) within 24 hours</p>

A quick side trip into a critical topic:

# Principles of infection control (IC)

## The Wells-Riley equation

Minimize # particles by

- Teach cough hygiene
- Giving people who cough a surgical mask

**Risk of infection following exposure depends on**

$\frac{\text{Particles}}{\text{Volume}}$

x

Exposure time

Reduce each person's exposure by

- Early screening of cases
- Triaging and seeing patients who cough first

Decrease the concentration of particles in the air by

- Increasing the ventilation rate
- Opening windows
- Standing >1m from a person with productive cough

Particles:

Volume:

Exposure time:

Production of infectious droplet nuclei

Volume of air and ventilation

Duration of exposure to contaminated air

IC is critical for respiratory pathogens, including both TB and SARS-CoV-2

Credit: Dept of Health, Republic of South Africa

# Principles of infection control

## Reduce risks of transmission



- Reduce formation of infectious particles

**Administrative Controls**



- Remove infectious particles

**Environmental Controls**

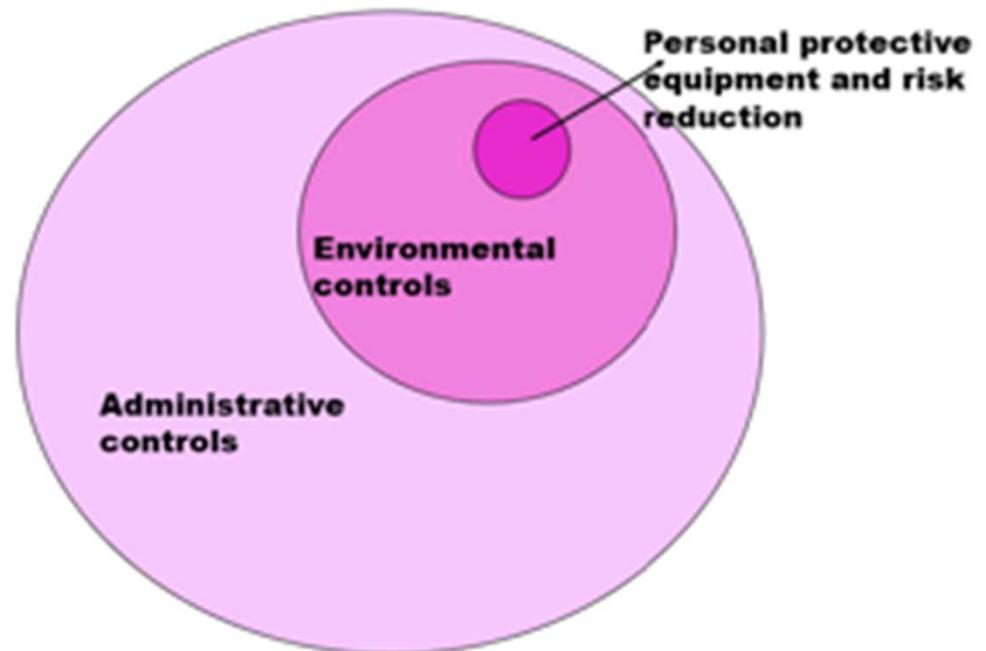


- Reduce risk of inhaling infectious TB particles and developing TB disease

**PPE and risk Reduction**

# Methods to prevent transmission of infectious organisms

- The relative impact of each component of infection control is shown by the size of the circle
- Administrative controls (e.g., screening and triage) are most important
- Environmental controls (e.g., adequate ventilation) are important
- PPE is the least effective



Credit: Dept of Health,  
Republic of South Africa

# TB vs COVID-19 (4/4)

	Similarities between TB and COVID-19	Differences
<p><b>Diagnosis</b></p>	<p><a href="#">RT-PCR-based assays are the gold standard</a>. Primers for SAR-nCoV are limited can be obtained through WHO and COVID-19 reference laboratories - such as <a href="#">CDC</a>. If countries cannot test in-country they can be sent to a WHO reference lab to test.</p> <p>BSL-2 labs required for some or all diagnostic steps</p> <p>Specimen transport is an essential element of the diagnostic network</p>	<p>Main diagnostic tool for TB is GeneXpert, which is PCR-based but contained and automated after sample collection, allowing safe use in decentralized sites. BSL-2 labs are used only for culture/DST. In contrast, SARS-CoV-2 testing requires considerable sample manipulation for PCR, necessitating a BSL-2 containment laboratory for any testing.</p> <p>GeneXpert can test for a limited number of pathogens; currently, SARS-CoV-2 test is in development and seeking an emergency FDA approval (estimated time is mid-April)</p> <p>Viral outbreaks are typically monitored by non-TB labs (e.g., global influenza network labs). SARS-CoV-2 diagnostic kits are limited globally and prioritized to these labs</p> <p>In most emergencies, including COVID-19, emergency specimen transport services are hired to enhance speed and meet biosafety (triple packaging) requirements</p>
<p><b>Treatment</b></p>	<p>Some overlap in the infection control measures during treatment (see above)</p> <p>Some patients in home care</p>	<p>No proven or widely available treatment available for COVID-19. Supportive care for COVID-19 requires ICU care with isolation and ventilators. Higher proportion (~20%) of COVID-19 patients require hospitalization.</p> <p>COVID patients with mild symptoms, contacts of COVID-19, need to self quarantine for 14d and report to State Public Health</p>

# Investing to help health care systems respond to COVID-19 and other respiratory pandemics

- Important to have a short-term, very rapid infusion of financial and human resources to mitigate the overwhelming of health care systems by COVID-19
- Longer-term, continued investments in TB/MDR-TB will
  - Help reduce health system vulnerabilities that are shared between TB and other respiratory pandemics
  - Strengthen core behaviors and functions such as health seeking behaviors for respiratory symptoms, clinical management of respiratory infections, and disease surveillance
  - Help maintain political support for pandemic control efforts by addressing an ongoing population concern

## **Summary (1/2): How elements of TB programs could help in the COVID-19 response**

- Contact investigation lessons from TB are directly relevant to the COVID-19 response. To be effective, they must be implemented early and rapidly, before significant community transmission
- Both responses require comprehensive Infection and Prevention Control measures (administrative, environmental, personal) in facility and community settings, all transferable lessons
- TB partners and programs can be ideal entities to promote awareness of COVID-19 preventive measures and health seeking recommendations
- For patients who present with cough, fever, and shortness of breath, well-functioning TB diagnostic networks critical to determine whether caused by TB or COVID-19 to ensure appropriate treatment

## **Summary (2/2): Added elements needed for the COVID-19 response, beyond existing TB programs**

- Mitigation would be new for TB programs. Surface decontamination and WASH interventions would also need to be added, since TB programs are focused on respiratory precautions
- Diagnostic and treatment options differ between TB and COVID-19, though both could use TB BSL-2 labs for diagnosis, monitoring, and surveillance. Future availability of GeneXpert SAR-CoV-2 would leverage TB diagnostic facilities capacity.
- Supply Chain Monitoring - PPE and other basic medical and laboratory commodities are limited and could become increasingly unavailable. Important to consider leveraging GDF to address gaps and shortfalls for TB and COVID-19.

## **Section 2: Maintenance of TB programs in the context of COVID-19 restrictions**

# Prioritizing essential elements of TB services during COVID-19

- FAST (Find Actively, Separate, and Treat), including symptom screening of both outpatients and inpatients, is more important than ever. It reduces transmission and is a single action to detect both possible TB patients and possible COVID-19 patients
- A TB program is lost without TB drugs. Drug quantification and forecasting, and ongoing communications with GDF or other relevant procurement agents to prevent shortages are critical
- Ensure that TB patients have sufficient medications, which may require longer duration prescriptions and instruction on where to seek care and meds if social distancing for prevention of COVID-19 transmission is instituted

For more details, please see the accompanying Word document

## Prioritizing essential elements of TB services during COVID-19 (cont)

- If a significant reduction of mission operations is imminent (e.g., announcement of authorized or ordered departure of FSOs; telework required for FSNs who lack reliable home-based internet), it will be particularly important to communicate the priorities mentioned on the previous slide to NTPs and local partners who are still able to operate
- Make TB team and implementing partners aware of plans to manage projects from abroad and remotely.
- If countries have quarantine or lock-down, work with Missions and Gov't to make sure implementing partners have approval to continue urgent health activities.
- Work with partners to postpone all non-essential activities (workshop, etc) to focus on maintaining essential, time-sensitive activities

# Maintaining MDR-TB services during the COVID-19 outbreak

- MDR-TB is responsible for nearly one-third of the estimated 700,000 annual deaths from AMR. Ensuring case detection and continued treatment for MDR -TB patients is paramount. MDR-TB CANNOT be temporarily ignored.
- It is **essential** to monitor both TB and MDR-TB programs for any adverse outcomes attributable to COVID-19. NTPs should consider gathering and evaluating data more frequently from subnational sites in order to detect case detection, adherence, or treatment outcome issues more quickly. Missions should alert backstops quickly if such issues arise and develop strategies to mitigate the impact of the COVID-19.
- Leverage partners including Global Fund and WHO to reinforce this message with Government.