

# Monitoring the COVID-19 Pandemic in sub-Saharan Africa: paying attention to health facility admissions and deaths

Wednesday 10<sup>th</sup> June 2020

Chairpersons: Dr Riitta Dlodlo and Dr Jeremiah Chakaya

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## Presentation

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### **1. COVID-19:Origins, Global Pandemic, Diagnosis and Treatment.**

Leonardo Martinez, Stanford University, School of Medicine

### **2. Monitoring COVID-19 in health facilities in Africa**

Anthony D Harries, The Union, Paris, France, London School of Hygiene & Tropical Medicine, UK

Questions and Answers will follow the presentation.

# **COVID-19: Origins, Global Pandemic, Diagnosis, and Treatment**

**Leonardo Martinez**

**Stanford University, School of Medicine**

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# Origin of the COVID-19 pandemic

- First cases likely developed in late November to early December 2019 in Wuhan, China
- First reported case was reported in early January 2020
- Linked epidemiologically to a seafood and wet animal market

The NEW ENGLAND JOURNAL of MEDICINE

## BRIEF REPORT

### A Novel Coronavirus from Patients with Pneumonia in China, 2019

Na Zhu, Ph.D., Dingyu Zhang, M.D., Wenling Wang, Ph.D., Xingwang Li, M.D., Bo Yang, M.S., Jingdong Song, Ph.D., Xiang Zhao, Ph.D., Baoying Huang, Ph.D., Weifeng Shi, Ph.D., Roujian Lu, M.D., Peihua Niu, Ph.D., Faxian Zhan, Ph.D., Xuejun Ma, Ph.D., Dayan Wang, Ph.D., Wenbo Xu, M.D., Guizhen Wu, M.D., George F. Gao, D.Phil., and Wenjie Tan, M.D., Ph.D., for the China Novel Coronavirus Investigating and Research Team

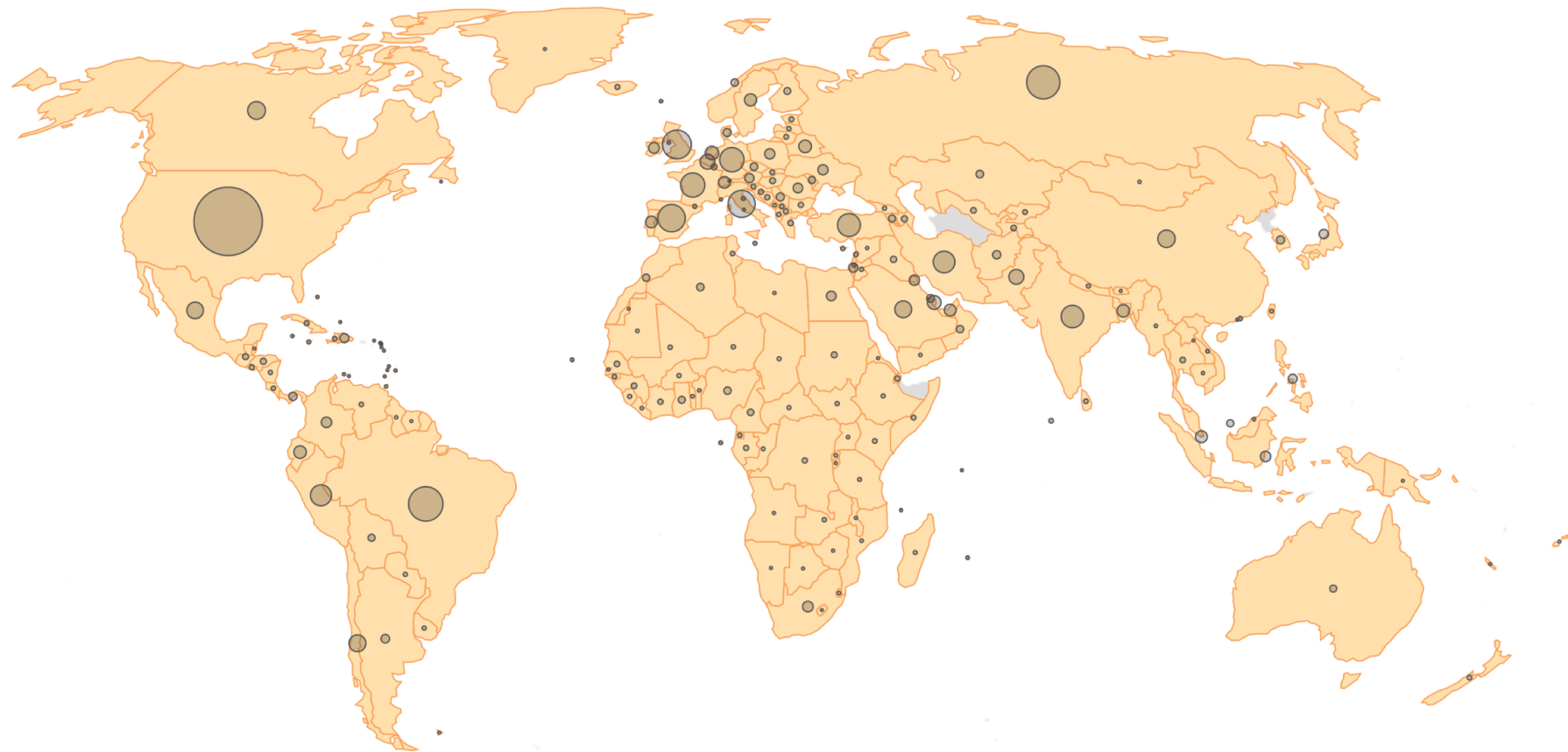


# Origin of the COVID-19 pandemic

- By January 7, 2020, scientists isolated the coronavirus
- Full genome sequence data enabled the rapid development of RT-PCR diagnostic tests specific for this novel coronavirus

# Global Spread

- By the end of January, cases were confirmed in >25 countries



- Currently, >7 million cases reported on all 6 continents

# World Health Organization

- Declared a Public Health Emergency of International Concern on January 30, 2020
- Declared a global pandemic on March 11, 2020

# Incubation Period of COVID-19

- Incubation: time from infection to disease onset
- ~ 4-5 days; however, different estimates (range is between 2 and 14 days)
- Among patients, 99% develop symptoms within 14 days

# Spectrum of COVID-19 disease

- Asymptomatic and paucisymptomatic disease is common
- Mild disease
- Severe and critical disease

# COVID-19 Diagnosis

- Nasopharyngeal, oropharyngeal, and nasal swabs are the preferred specimen type
- Some other sampling types (sputum, BAL) are also acceptable under certain circumstances
- Cepheid Xpert platform
- Antibody testing

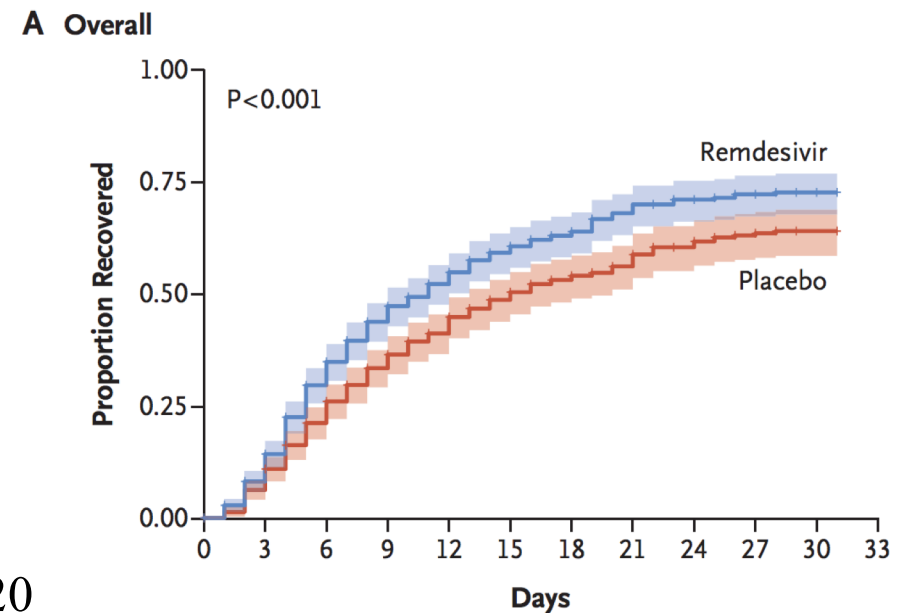
# Drug Treatments

- Many drugs for treatment being tested
  - Remdesivir
  - Hydroxychloroquine/chloroquine
  - Lopinavir/ritonavir



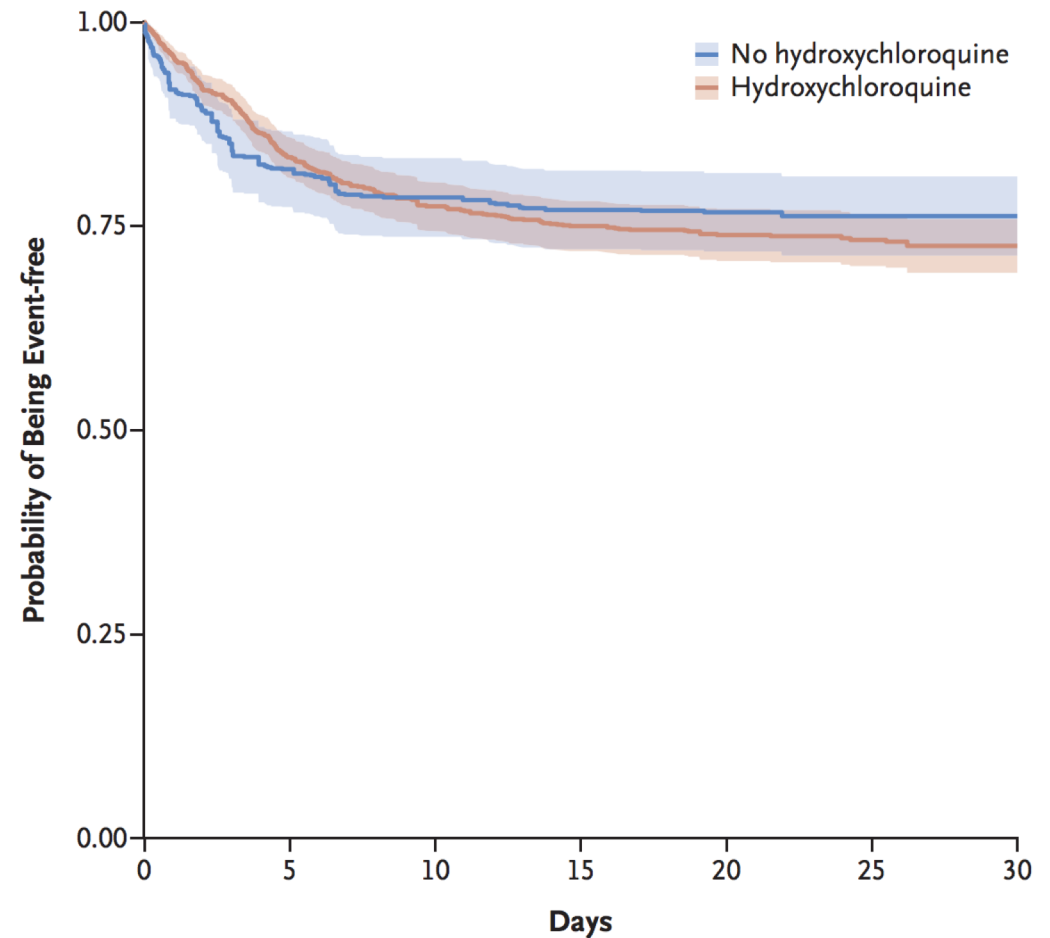
# Drug Treatments

- Recent positive randomized trial result for Remdesivir (200 mg day 1, 100 mg daily for up to 9 additional days) in hospitalized COVID-19 patients
- Reduced time to recovery (median, 11 vs 15 days)
- Reduced mortality (HR, 0.70; 95% CI, 0.47–1.04)



# Drug Treatments

- Hydroxychloroquine
- Observational study (N=1,446) suggests similar mortality risk in hospitalized patients
- Trials are needed



**Figure 2.** Freedom from Composite End Point of Intubation or Death.  
The shaded areas represent pointwise 95% confidence intervals.

# Drug Treatments

- Lopinavir/ritonavir
- Randomized trials



## A Trial of Lopinavir–Ritonavir in Adults Hospitalized with Severe Covid-19

### CONCLUSIONS

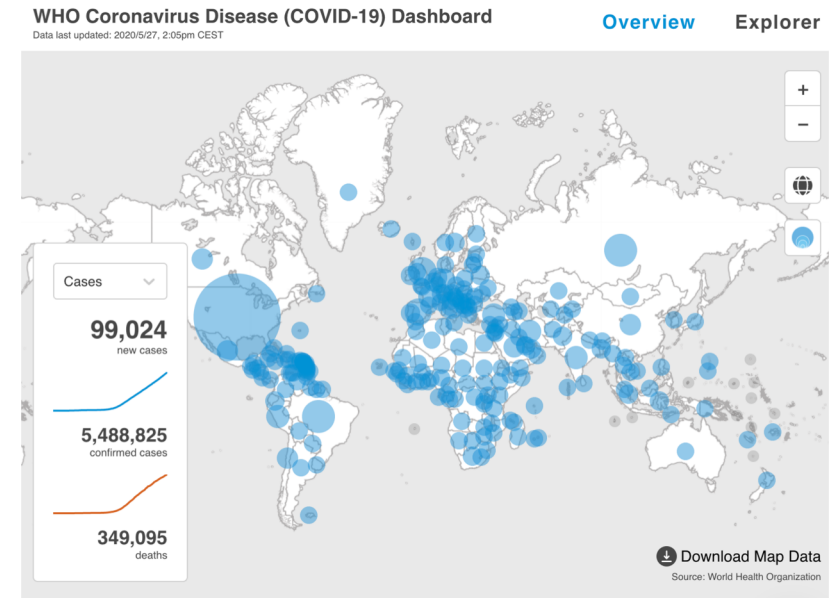
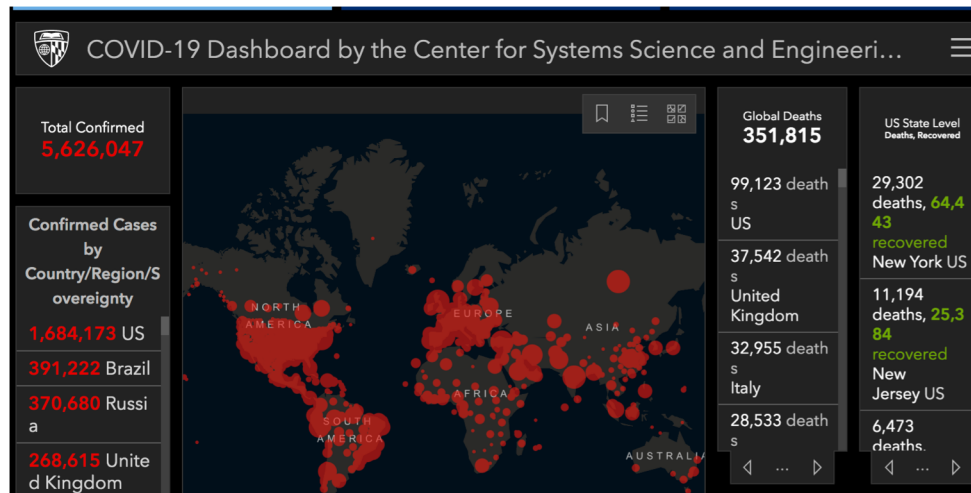
In hospitalized adult patients with severe Covid-19, no benefit was observed with lopinavir–ritonavir treatment beyond standard care. Future trials in patients with severe illness may help to confirm or exclude the possibility of a treatment benefit.

- No benefit in time to clinical improvement
- Lower mortality (19.2% vs. 25.0%) but low sample size precludes meaningful conclusions

# Other therapies under evaluation

- BCG vaccination
  - BCG has non-specific effects on several diseases other than tuberculosis possibly through ‘trained immunity’
  - Several ongoing clinical trials in Australia, Germany, and the Netherlands
- Plasma therapy
- Heparin, other antiviral drugs and anti-inflammatory drugs

# Limitations of Global Case and Mortality Reporting



- Includes only reported diagnosed COVID-19 patients
- Underestimate of true burden; many undiagnosed cases are asymptomatic or paucisymptomatic or never reported

# Monitoring COVID-19 in health facilities in Africa

**Anthony D Harries**

**The Union, Paris, France**

**London School of Hygiene & Tropical Medicine, UK**

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# Case definition of COVID-19

- New onset dry cough
- AND New onset fever
- AND new onset shortness of breath
- Maybe supplement this with alterations in smell and taste [*G Spinato et al, JAMA 2020*]



# Health facility monitoring tool

Date of Admission	COVID ID no.	Suspected Confirmed	Age	Sex	HIV status:	ART	TB Treatment	Previous TB	HTN DM CVD	Smoker	Given O <sub>2</sub>	Given Medication <sup>a</sup>	HDU ICU	Mechanical Ventilation	Date of Discharge	DIED	Date of Death
10 June	1	S	50	M	Neg	NA	No	Yes	No	Yes	Yes	No	No	No	20 June	No	N/A
10 June	2	S	45	F	Neg	NA	Yes	No	No	No	No	No	No	No	15 June	No	N/A
11 June	3	C	65	M	Neg	NA	No	No	DM	Yes	Yes	Yes	Yes	No	N/A	Yes	19 Jun
11 June	4	C	62	M	Neg	NA	No	No	HTN	No	Yes	Yes	Yes	No	22 June	No	N/A
11 June	5	C	53	M	Pos	Yes	Yes	No	No	No	No	No	No	No	18 June	No	N/A
11 June	6	S	25	M	Neg	NA	No	Yes	No	No	No	No	No	No	19 June	No	N/A
12 June	7	S	32	F	Neg	NA	No	No	HTN	No	No	No	No	No	18 June	No	N/A
12 June	8	S	72	M	Neg	NA	No	No	No	Yes	Yes	Yes	Yes	No	N/A	Yes	16 Jun
12 June	9	C	68	F	Neg	NA	No	Yes	No	Yes	Yes	Yes	Yes	No	N/A	Yes	22 Jun
13 June	10	C	61	M	Pos	Yes	No	No	No	No	Yes	No	No	No	23 June	No	N/A

# Recording Dates

## Dates of:

- Hospital admission
- Onset of illness
- Confirmed diagnosis
- Clinical recovery
- Hospital discharge
- Death

## Provides information on:

- Duration of illness
- Bed occupancy
- Time to death

# Demographics, pregnancy, source of infection

- Gender
- Age
- Pregnancy
- Source

- **Males** more affected than females
- **Case fatality in China (JAMA 2020):**
  - age <70 years, CF=<1%
  - age 70-79 years, CF=8%
  - age 80 + years, CF=15%
- **Case fatality in New York (JAMA 2020):**
  - age <60 years, CF=7%
  - age 60-69 years, CF=16%
  - age 70-79 years, CF=32%
  - age 80+ years, CF=54%

# Risk factors and co-morbidities

- Hypertension
- Cardiovascular disease
- Diabetes mellitus
- Chronic lung disease
- Asthma
- Cancer
- Other (renal)
- Smoking

- **Case fatality China (JAMA 2020):**  
10% cardiovascular disease; 7% diabetes mellitus; 6% chronic lung disease; 6% hypertension; 6% cancer
- **Risk of death in UK (17,000 pts)**  
increased risk with cardiovascular disease (37%); lung disease (17%); kidney disease (25%)

# Co-morbidities and death

Data from one large Italian Hospital:

- No comorbidity 1% of the deaths
- 1 comorbidity 26% of the deaths
- 2 comorbidities 26% of the deaths
- 3+ comorbidities 47% of the deaths

*Lorenzo G et al, JAMA 2020*

# Tuberculosis and HIV/AIDS

- BCG at birth
- Previous history of TB
- Currently with TB
- HIV-positive
- On ART
- First-line / second-line
- CPT / IPT

## Comments:

- BCG protective? Clinical trials underway
- Previous TB – chronic respiratory disease and cardiac disease
- Active TB increased risk of COVID-19 (China)
- PLHIV – immune-suppressed
- ARV drugs – LPV/r said to possibly work but clinical trial in China showed no benefit (NEJM 2020)

# Presenting symptoms

- Fever
- Night sweats
- Cough – dry, blood-stained
- Chest pain
- Shortness of breath
- Headache
- Other – “COVID Toes”





# Alterations in smell and taste

130 patients interviewed:

- 64% with altered sense
- More common in women
- Median score 4 (max =5)
- 1/3 had blocked nose
- $\frac{3}{4}$  at same time/after first symptoms

- virus invades CNS through olfactory system and replicates in olfactory bulb
- nasal epithelial cells have highest expression of ACE2 receptors

*Spinato G, et al. JAMA 2020, April 22*

# Physical examination

- One of the key things is to measure height and weight and obtain BMI ( $\text{Weight/height}^2$ )
- BMI of 25-30 = overweight  
BMI > 30 = obese
- UK: Obesity associated with 37% increase risk of death

# Medical interventions in hospital

Oxygen +/- CPAP

*Cough*

*Day 0*

LPV/r; remdesivir

*Pneumonia*

*Day 7*

Chloroquine (hydroxy-CQ)

*Respiratory failure*

*Day 14*

Steroids – anti-inflammatories

Antibiotics

*Cytokine storm*  
*Clotting disorder*  
*Multi-organ failure*

*Day 21*

*Heparin/ aspirin*

*Death*



# Further specialised services

- High dependency unit
- Intensive care unit
- Mechanical ventilation
- ICU services (dialysis)



*New York City  
Mechanical ventilation  
mortality:  
18-65 years = 76%  
>65 years = 97%*

# Progress

- Clinically recovered
- Hospital discharge *[readmission]*
- Absconded
- Hospital death

# 1. Daily reporting: cross-sectional analysis

<b>Date</b>	<b>Number of new cases (suspected and confirmed)</b>	<b>Number of new deaths</b>	<b>Number of cumulative cases (suspected and confirmed)</b>	<b>Number of cumulative deaths</b>
<b>10 June</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>1</b>
<b>11 June</b>	<b>6</b>	<b>2</b>	<b>10</b>	<b>3</b>
<b>12 June</b>	<b>10</b>	<b>2</b>	<b>20</b>	<b>5</b>
<b>13 June</b>	<b>6</b>	<b>2</b>	<b>26</b>	<b>7</b>
<b>14 June</b>	<b>4</b>	<b>0</b>	<b>30</b>	<b>7</b>

## 2.Monthly reporting: cohort analysis

Year	Monthly cohort	Number admitted with COVID	Number discharged /absconded	Number died	Number still in hospital	Date of report
2020	January	50	40	10 (20%)	0	1 March
2020	February	60	48	10 (17%)	2	1 April
2020	March	80	65	13 (16%)	2	1 May
2020	April	80	60	15 (19%)	5	1 June
2020	May	100	60	25 (25%)	15	1 July



# 3.Six-month reporting on COVID:

## Risk factors for death in COVID admissions

Category	Variable	Total COVID n	Died n (%)	RR (95% CI)
Gender	Female			reference
	Male			> 1.0
Age in years	<60			reference
	≥60			>1.0
Comorbidity	Normal BMI			reference
	Obese BMI			>1.0
	No diabetes			reference
	Diabetes			>1.0
Smoking	No			reference
	Yes			??
Ventilation	No			reference
	Yes			>1.0

# Conclusion

- Standardised and regular health facility monitoring and reporting
- Sentinel surveillance in hot spots / high-risk groups:
  - care homes for the elderly
  - congregate settings – e.g., prisons
  - health care workers

# Poll Question

# Questions?



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# THANK YOU

**Register now for next week's webinars: Thursday 18 June,  
14:00 - 15:00 CEST**

## **COVID-19 and TB: Personal perspectives**

This open discussion will focus in particular on the mental health challenges of dealing with TB and COVID-19 and issues around the stigma which so many survivors of both diseases face. Other topics will include how the TB response has been affected by COVID-19 and community responses to this.

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