Monitoring the COVID-19 Pandemic in sub-Saharan Africa: paying attention to health facility admissions and deaths
Wednesday 10th June 2020
Chairpersons: Dr Riitta Dlodlo and Dr Jeremiah Chakaya

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Presentation

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

Zhu et al, *NEJM* 2020
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
- \(\sim 4-5\) 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

Wu et al, *JAMA* 2020
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)

Beigel et al, NEJM 2020
Drug Treatments

• Hydroxychloroquine

• Observational study (N=1,446) suggests similar mortality risk in hospitalized patients

• Trials are needed

Geleris et al, NEJM 2020
Drug Treatments

- Lopinavir/ritonavir
- Randomized trials

Cao et al, *NEJM* 2020

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

Cao et al, *NEJM* 2020
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

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<th>Sex</th>
<th>HIV status:</th>
<th>ART</th>
<th>TB Treatment</th>
<th>Previous TB</th>
<th>HTN</th>
<th>DM</th>
<th>CVD</th>
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<td>23 June</td>
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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
- ¾ 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 (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
- LPV/r; remdesivir
- Chloroquine (hydroxy-CQ)
- Steroids – anti-inflammatories
- Antibiotics
- Heparin/ aspirin

- Cough
- Pneumonia
- Respiratory failure
- Cytokine storm
  - Clotting disorder
  - Multi-organ failure
- Death

Day 0
Day 7
Day 14
Day 21
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

<table>
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<tr>
<th>Date</th>
<th>Number of new cases (suspected and confirmed)</th>
<th>Number of new deaths</th>
<th>Number of cumulative cases (suspected and confirmed)</th>
<th>Number of cumulative deaths</th>
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2. Monthly reporting: cohort analysis

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<th>Year</th>
<th>Monthly cohort</th>
<th>Number admitted with COVID</th>
<th>Number discharged/absconded</th>
<th>Number died</th>
<th>Number still in hospital</th>
<th>Date of report</th>
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<td>50</td>
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<td>48</td>
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<td>80</td>
<td>65</td>
<td>13 (16%)</td>
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<td>1 May</td>
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<td>2020</td>
<td>April</td>
<td>80</td>
<td>60</td>
<td>15 (19%)</td>
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<td>1 June</td>
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<tr>
<td>2020</td>
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<td>100</td>
<td>60</td>
<td>25 (25%)</td>
<td>15</td>
<td>1 July</td>
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### 3. Six-month reporting on COVID: Risk factors for death in COVID admissions

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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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