

Some Questions & Reflections
on SARS-CoV-2 & Covid-19
in sub-Saharan Africa

(enriched by reactions on previous versions)

== work in progress ==

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INTRODUCTION:

I am staff member of ITM-Antwerp, now based in Kinshasa during the corona crisis (rather by coincidence), and supporting DRC's "Riposte Corona".

Since 1 April, I shared successive versions of "some questions & reflections" among colleagues, which triggered many reactions. This update (v4) is informed not only by scanning and reading the scientific literature on corona, but also digests, newsletters and the lay press. This reading is fed and oriented by your reactions, by exchanges with colleagues, and most importantly, by 'participant observation' in the various streams of the Riposte Corona in Kinshasa.

This update certainly remains very incomplete and biased. I continue to focus mainly on topics which seem most relevant at this moment in DRC, and for sub-Saharan Africa in general. I hope my "Questions and Reflections" trigger further discussion and sharing, as new evidence and field experience emerge on a daily basis. Many controversies remain unsolved; there are still many unknowns.

At this moment the epidemic is still most intensive in highly urbanised parts of Europe and the US. We can only hope it doesn't come to that in an African mega-city, such as Kinshasa. The dominant opinion remains that it is mainly a question of time ... Scientific understanding and sense making is brewing intensively, but no consistent explanation for the diversity of corona transmission patterns across the globe is yet emerging.

Anyhow, "corona" is now an extremely dominant reality worldwide. Countries struggle to cope with a huge burden, or to prevent a fast increase. Response measures are local variations on a "global script" (social distancing, hand hygiene, lockdown, quarantine, ... now increasingly focused on mass masking); but these play out quite differently in different contexts. "Collateral damage" is increasingly recognised, both in the health sector, with disruption and decreased utilisation of non-covid essential health services, and in wider society.

I certainly welcome your further reactions, and leads for further reading and thinking.

P.S. to facilitate scanning of this document for differences between versions, I put in Bold significant changes in version 3, and highlight additions in version 4.

Kinshasa, 20 April 2020.

CONTAINMENT:

It seems increasingly clear that the spread of SARS-CoV-2 is unstoppable, and that it will progressively reach across the globe. If so, then it seems important to clarify in each context what is the objective of the corona response: Stopping the virus? Slowing down speed of transmission? Keeping case-management manageable? Protecting the most vulnerable? Avoiding "super-spreading events"? ...

- Similar measures are taken or considered as "everywhere" (China, Europe, US, ...)
- but feasibility doubtful in LMIC, given overcrowding, lack of water, day-to-day informal economy (and need to earn daily income to buy food)
- "collateral damage" (unintended consequences) increasingly prominent – How long can this last? What is the "exit strategy"?

The main messages conveyed worldwide, including in cities with large slums, such as Kinshasa, are:

- (1) Stay at home / limit going outside your home;
- (2) Social distancing; (probably a better name is "physical distancing")
- (3) Frequent handwashing.

Such advice is quasi-impossible to adhere to for slum dwellers, as they disregard the living circumstances of the majority of people living in slums:

- (1) informal employment (day-to-day activities to earn a daily income); no savings and impossibility to purchase food for several days, and also no fridge to keep food for several days;
- (2) overcrowding with many people sharing rooms;
- (3) poor access to water.

Such impractical advice may contribute to distrust of authorities ("the elite, who tries to rule us, lives in luxury and doesn't understand our conditions"); and may also contribute to the urban exodus of temporary urban migrants back to their rural areas of origin (such as observed in India, and also reported from Côte d'Ivoire).

The reactions I received from other LMIC confirm this overall picture, and many confirm that the social and economic consequences of confinement / lock down are extremely high for the poor in LMIC ("the unintended consequences of the containment measures may be worse than the disease, especially for those earning their daily living in the informal sector").

The reaction to the measures (acceptability, protest, etc) are strongly influenced by the (lack of) respect for the authorities.

Many people stress that it is crucial to assess acceptability and feasibility of such measures through trusted community leaders, involve them in informing the local communities, adapt the measures to local circumstances, counter fake news and make sure that trusted sources of reliable information exist, are widely available, and updated continuously.

Over the past week, “mass masking” has strongly come up as a possible strategy, including with home-made masks (designs and instructions are being widely shared). Whether this is effective, and if so, in which contexts, remains quite controversial. There are strong believers (mainly in Asia & Eastern Europe), but also many sceptics (Western Europe & US), and there is a lack of convincing evidence. But it seems likely that the practise will become more widespread in the near future.

Masking in public now compulsory in DRC, and in several other African countries. Rapid production of “home-made masks”.

TRANSMISSION: == VERY CONTROVERSIAL ==

In Kinshasa’s slums:

I wrote: “It is surprising that the number of confirmed cases stays low: 10s of cases per day; not 100s or 1000s; this is most intriguing; and this despite poor hygiene and overcrowding, especially in urban slums (lack of water!!)”. This is the case in Kinshasa, Nairobi, Cape Town, ...

The dominant view among the reactions I received is that this is most likely because of a combination of later introduction, non-detection of cases without travel history abroad, reluctance to self-identify as potential case (hiding, because of stigma?) and low level of testing. Many experts expect that a full-blown massive epidemic will emerge in a few days, a few weeks.

Many people in DRC refer to a “severe flu epidemic” in December 2019 – January 2020 in Kinshasa and various provinces. This is now increasingly interpreted as “this must have been corona already”. == Might be interesting to explore further ==

Over the past weeks: the picture about the factors that might influence transmission dynamics became a bit clearer:

- Climate and seasonality? It is clearer that SARS-CoV-2 survives more easily outside the body in cooler and drier conditions than in hot and humid conditions.
- It may well be that, as with influenza, the covid-19 epidemic is less seasonal in tropical climates, and more continuous (speculative+++).
- But: awareness that air-conditioning creates cooler and dryer environment!!
- Cross-immunity with other infections and aspecific immunity??? Most scientists warn that it is quite unlikely that this plays a major role.
- Population structure / role of children? Now more thoughts go towards population structure with many more young populations across sub-Saharan Africa than in other continents. Epidemiologists wonder about the exact role children play in spreading the epidemic. Children, play a “special, yet poorly understood role”. Children consistently have much less severe disease after infection, but may transmit disease, potentially with a lower

initial viral inoculum (this should be explored further).

Different transmission dynamics thus remain quite unclear but very “intriguing”...

Various mathematical models are now circulating, to alert public authorities to the risk of an explosive epidemic to come, and the need to prepare for a massive increase in cases, and the disruption this will cause.

My personal take: even if “hoping for the best”, it is certainly indicated “to prepare for the worst”.

Provinces:

- Also, at the moment, most attention still focused on situation in Kinshasa, trying to contain epidemic in the capital (including very strict restrictions on travel in/out of Kinshasa). But some “seeding to other provinces” is happening, and will continue.
- Ongoing preparedness and early response in the provinces. For the moment all testing is centralised in Kinshasa. Big challenge to transport samples to Kinshasa.
- **Decentralised testing = needed.**
- And all other elements of a full-blown response have to be initiated.

TESTING:

PCR tests: growing awareness that tests may have low sensitivity, esp among patients with advanced disease (virus not present anymore);

Big hope for GeneXpert test;

- much more easy and rapid; equipment widely available across the country (for MDR-TB testing & Ebola testing), but ...
- still under development and early production, probably “available” soon, at least on the world market, but whether cartridges will become available in sufficient quantity early is doubtful (fear that US will embargo export), other production sites???

Other Rapid Diagnostic Tests (RDT):

- Estimated that already some 200 tests “exist”, validation of various tests ongoing (big international effort by WHO and FIND a.o. to validate tests asap);
- For the moment, results are difficult to interpret for individual patients;
- Probably quite useful for population studies, to assess how widespread transmission is / has been in diverse communities;
- Maybe useful to test whether frontline workers / relatives have been infected and have a certain degree of protection (but discussions still ongoing).

PRISE EN CHARGE = TREATMENT:

Most crucial: early oxygen therapy!!! And consequently need for production, storage, and distribution of oxygen; pulse oximeters; masks and tubes to administer oxygen!!

(Hydroxy)chloroquine (CLQ):

- authorities and population are very eager to use CLQ, but not easily available (and becoming very-expensive); CLQ in protocol for covid-19 treatment in DRC, for all cases (now available)
- Research being considered on use of CLQ as prophylaxis for frontline health workers (coordinated from Oxford Trop Dis Unit, Bangkok): maybe include Kinshasa hospitals as field site;
- Whether CLQ is effective remains very controversial (most evidence from studies without control group); many clinical studies ongoing worldwide.
- Increasing doubts about effect and concern about side effects (“need for ECG to identify QT prolongation”; feasible in LMICs??)

Other treatments??: antiviral drugs?? (hope for remdesivir; looks increasingly “promising”), convalescent plasma??, ivermectin???. A lot of scientific discussion – no strong evidence yet; but some “early indications” waiting confirmation through sound clinical trials.

Covid-19 in patients with “other diseases”:

- Patients with diabetes and/or hypertension: clearly at higher risk for severe disease;
- For patients with hypertension: treatment with ACE inhibitors is probably a risk factor (advice to discontinue ACE inhibitors and shift to other hypertension treatment in patients with severe covid-19); Now being questioned??
- Patients with other respiratory disease, including TB patients, probably at higher risk for severe disease; but needs confirmation;
- HIV patients: not entirely clear yet; but patients on ART may be a bit protected; needs confirmation; HIV patients not yet on ART may be at higher risk (??)

VACCINE??

- Some 100 candidate vaccines under development; 3 or 4 entering clinical trials;
- Whether a vaccine will be able to trigger ‘robust immunity’, while natural infection doesn’t, creates a lot of uncertainty and debate.
- Even an imperfect vaccine would be a big breakthrough. Would be needed at “massive scale”. Who would be prioritised?

HEALTH SYSTEM TRANSFORMATION

Growing awareness that if covid-19 will not disappear any time soon (maybe it will stay with us for ever), there is a need to think ahead how a health system can be transformed, so that it can

- (1) cope with covid-19 cases (maybe massive numbers, periodically, during “waves”);
- (2) continue to cater for all other health problems;
- (3) while avoiding health facilities becoming “super-spreading sites”; and
- (4) regaining trust of the population and health workers.

This calls for preparedness of all levels of the health system (from community-care, over peripheral clinics, to hospitals), including

- triage to separate covid patients from non-covid patients;
- clear functions for each level of care; and referrals between them;
- inclusion of all sub-sectors (public, confessional, NGO, private-for-profit, formal and informal);
- overall governance of the transformed system;
- due consideration for supply chains (and volumes needed), health workforce (safety and remuneration), health information systems; testing capacity and surveillance at scale;
- and much more.

Need to think in “steps”: how to cope, if 100 new covid cases per day? If 500 cases per day? ...

Preparedness of health facilities:

Hospitals (getting all attention for the moment): Big doubts whether hospitals in Kinshasa can deal with large number of cases;

- need to analyse capacity, including surge capacity, in view of potentially important covid caseload;
- If insufficient, need to think of “low care- high volume” options (interesting to read “Fangcang shelter hospitals” – Lancet).

Oxygen therapy (= most essential):

- Even oxygen is not widely available; if increased demand, oxygen supply unable to keep pace;
- Often oxygen concentrators are used, but serve only 1 patient at a time; and very few are available (often only a few per hospital)...
- Certainly very few respirators; very few people trained in using them;
- Some voices that ‘respirators may do more harm than good’ in low-resource settings, including high risk of infection of staff introducing intubation. (There is some anecdotal evidence that clinicians may get very severe covid-19. This might be related to high viral inoculum from close contact with very sick patients; e.g. during invasive procedures, such as intubation – to be confirmed!!!);

Infection Prevention and Control (IPC)

- **Big fear that IPC will be inadequate, with major risk for nosocomial outbreaks of covid-19 ("super-spreading events"), exposing both non-covid-19 patients and staff;**
- **Rationale for trying to separate covid-19 patients from other patients (different wards, different patient flows); but difficult on clinical basis alone, because clinical picture quite aspecific, needs PCR-test (without delay).**
- Non-covid-19 patients may flee the hospital (already observed);
- Many patients may be reluctant to attend hospitals with covid-19 patients;
- Need to do good "triage" of patients, but screening / triage algorithms not very good, if absence of travel history. Need to be adapted to clinical picture of covid-19 in sub-Saharan Africa (not clear yet, whether significant differences, e.g. in terms of presence of diarrhoea, and gastro-intestinal involvement).

Health workforce:

- If not enough Personal Protective Equipment (PPE) available, some staff may be reluctant to care for covid-19 patients;
- **Some suggest to "avoid exposing older staff (>50? >60?)"**, as they are at much higher risk for severe disease, if infected;
- Staff training +++

Hospital organisation:

- **Systematic use of oximeter would be useful (not commonly used yet), even if patient not dyspnoeic, because some anecdotal evidence of "low oxygen saturation, early on, even before clinically obvious".**
- **Maybe also consider taking systematically glycemia in patients (>40 y?) as undiagnosed diabetes is relatively frequent and strongly related to severity of diseases;**

First-line facilities

- For the moment not involved. Need to be prepared, if large numbers of patients, so that referral system can be functional, so that hospitals can concentrate on severe cases.
- Need for good triage algorithm, including risk assessment for severity, based on age, other morbidities (see above). Probably oximeter more useful than thermometer.
- Staff training +++
- Referrals by ambulance, to prevent further spread in taxis or public transport.

Functional health zones / health districts

- Important that district health authorities have oversight of entire health system, including confessionnal and private-for-profit facilities; which may care for bulk of patients, and need to be involved in correct response.

- Free care = good, but needs guarantees for adequate supplies of medicines and commodities, and due considerations for remuneration of staff (primes based user fees is at present dominant mode; staff will not / cannot work for "free", if no more patient fees);
- Need to manage huge overstaffing in certain facilities in Kinshasa.

"COLLATERAL DAMAGE":

Early signs, but quite worrying, that overall utilisation of health facilities is decreasing; revealing fear and lack of trust of the population, lack of preparedness.

- All attention focused on corona; population may fear to use health facilities where there are corona cases; health workers may fear to go to work if PPE not available. Many "other pathologies" may go untreated? (not yet documented now, but certainly the case during Ebola epidemics).
- In DRC: measles, malaria, obviously still much bigger morbidity and mortality. But prevention measures "on hold", because mobility is constrained: no more travel outside Kinshasa; strict limitations on travel.
- **Much attention also for "collateral damage" of containment measures, especially for the poor (socio-economic consequences) == see above**
- **More attention for effects of "corona fear", fear for the disease and fear triggered by draconian containment measures;**
- **More attention for mental health aspects of corona crisis; as livelihoods and income generation is disturbed, as social roles change, as children don't go to school, etc.**

"Free care" = announced: for covid-19 patients? Or for all?