

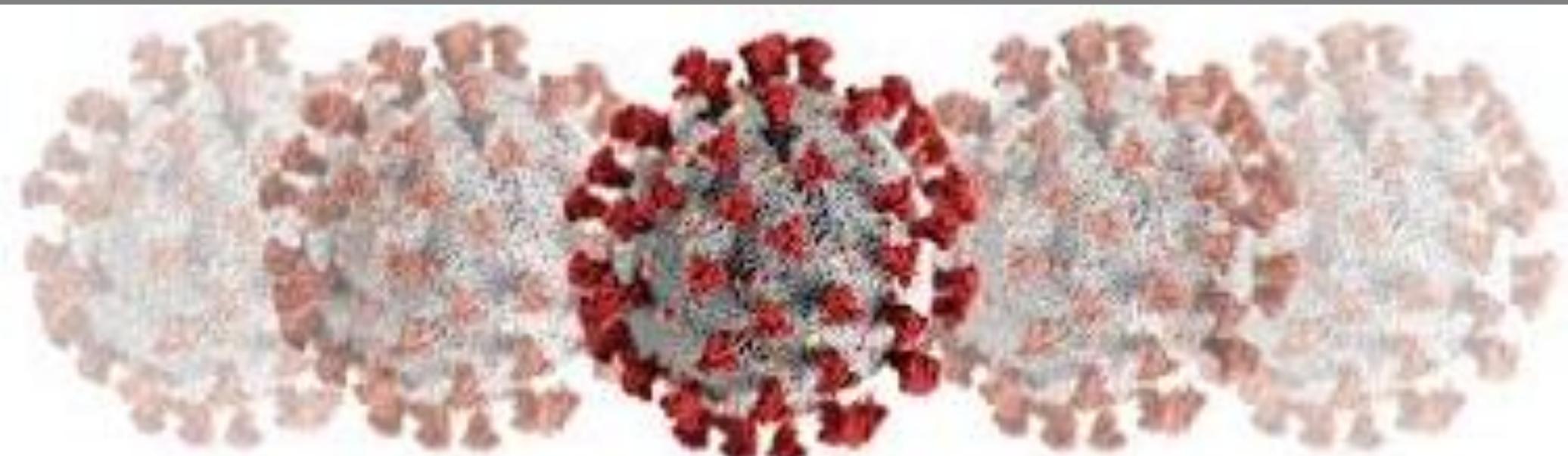


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COVID-19:

Surveillance and Testing: Emerging Case Studies

27 April 2020





South Africa is applying a **mass screening and testing strategy**, going door-to-door to identify and break chains of transmission



South Africa's coronavirus testing strategy is the most proactive on the continent, in part due to **concern that the high levels of immuno-suppression amongst the population (due to HIV and TB) makes South Africa more vulnerable to widespread transmission.**

The government has set out its **eight-stage Covid-19 strategy**. **Key principles for the current phase (stage four) are mass testing and widespread community surveillance** to identify and act where there are chains of transmission.

Mass testing has been **facilitated through the training and deployment of 28,000 field workers, who are conducting door-to-door screening**. The teams have a national reach (in both urban and rural populations). **So far, more than 6% of the population (3.6 million people) have been screened.**

Where people who meet the case criteria are found during door-to-door screening, rapid testing is undertaken.

South Africa's Eight-Stage Covid-19 Strategy

Stage 1: Preparation

- Community education
- Establish lab capacity
- Surveillance

Stage 2: Primary Prevention

- Social distancing and hand-washing
- Close schools and reduce gatherings
- Close borders to international travel

Stage 3: Lockdown

- Intensify curtailment of human interaction

Stage 4: Surveillance/ case-finding

- Community response: door-to-door screening, testing, isolation and contact tracing

Stage 5: Hotspots

- Surveillance to identify and intervene in hotspots
- Spatial monitoring of new cases
- Outbreak investigation and intervention teams

Stage 6: Medical Care (for peak)

- Surveillance on case load and capacity
- Manage staff exposures and infections
- Build field hospitals for triage
- Expand ICU bed and ventilator numbers

Stage 7: Bereavement & Aftermath

- Expand burial capacity
- Impose regulations on funerals
- Manage psychological and social impact

Stage 8: Ongoing Surveillance

- Monitor antibody levels
- Administer vaccines, if available
- Ongoing surveillance for new cases



The South African government has **ramped up testing capacity by introducing mobile clinics** and test sites



People are **tested in communities with the assistance of community health workers and contact tracers.**

Initially 993 high-risk wards have been prioritised for the Covid-19 Home Visits Programme using a social vulnerability index. **Hotspots** and priority areas **are typically townships and suburbs, with a high population density.**

Local testing capacity has been enhanced by the introduction of **67 mobile clinics** (09/04/20) which **will bring testing capacity to 36,000 tests per day.** Machines to test TB have been adapted for Covid-19 tests in some clinics.

There are **two vehicles for each mobile clinic**

- Van One: Laboratory connected to a central lab with Wi-Fi
- Van Two: For testing and sampling

Results can be available within 45 minutes.

Mobile clinics are used alongside **180 fixed test sites and 320 testing units** across the country. South Africa has made use of **private laboratories alongside government resources.** 143,570 test have been completed (23/04/20).

Mobile Technology for Enhanced Contact Tracing

- **A contact tracing system has been developed using mobile technology** through a partnership between Telkom, Samsung and the Council for Scientific and Industrial Research (CSIR).
- It intended to **enhance traditional contact tracing:** tracking those whom positive cases may have unknowingly exposed to the virus to by **using mobile and geo-data such as geographic information systems tracking.**
- It was developed **as it may be difficult for people to precisely remember where they were,** or who they contacted, after long periods of time.
- While contact tracers will continue to follow up contacts that are listed, **the app enables the CSIR to contact those who were in the vicinity of known cases** so they can be assessed.
- **Over 1,500 mobile handsets have been given to tracers** to support the tracking and tracing efforts.



Ghana has the **second-highest rate of community surveillance and mass testing in Africa**



Ghana is making progress in containing the spread of the virus, due to its efforts in **identifying potential cases and use of quarantine and isolation.**

The government strategy is based on three pillars, or “**3Ts**”: **(1) Testing, (2) Tracing contacts, and (3) Treatment.**

The current strategy was enacted when, having identified the significant risk from imported cases, its **government quarantined, in requisitioned hotel rooms, all 1,030 air passengers who entered the country between 21–22 March.** After 14 days 10% tested positive, signalling significant imports.

Government used border entry information to inform its community surveillance strategy and identify the geographic areas to start community surveillance to keep pace with the spread of the virus.

450 health teams have been deployed nationwide to identify (trace) and test everyone who has been in contact with a confirmed Covid-19 case.

100,622 tests have been conducted (as of 26 April). **Ghana now has the second-highest number of people tested in Africa, behind South Africa.**





Ghana has launched a **mobile contact-tracing app**, GH Covid-19 Tracker, to help trace transmission of coronavirus



There are **three categories for testing**:

- 1. Testing all people in mandatory quarantine (14 days)** in hotels. Travellers and all their contacts (*hotels fees are fully paid by the Ghanaian government*)
- 2. Routine surveillance:** People in contact with health services who are symptomatic and those who self-report symptoms that meet case criteria.
- 3. Enhanced contact tracing:** Teams of health workers go out to find contacts of all positive cases and suspected contacts. The team also conduct surveillance within suspected 'hotspots'

To support routine surveillance and enhanced contact tracing, **government has introduced the GH Covid-19 Tracker** – a mobile phone app which is available in six languages.

- The **GH Covid-19 Tracker** can **trace contacts of known Covid-19 cases** once downloaded. It can be accessed through a USSD code so is suitable for use without a smartphone.
- **The app uses mobile data to** show where a positive case may have been and whom they may have been in contact with over the past 15 days, using geo-located phone data and phone records.
- It can also **track whether a user has recently been to a Covid-19 affected country**, provide advice and link them to register for self quarantine.
- It also allows citizens to **self-refer**, without stigma, if they are unwell. If they meet case criteria, **details are sent to health workers** to arrange local tests.
- Government has reassured Ghanaians that the app is safe to download and that other personal data is not collected. **However, phone numbers and locations can be given** so that the Ghana Health Service can find/contact people efficiently.



Pooled testing can be used to significantly increase testing capacity while also being cost effective and saving time and supplies

Sample pooling, or pooled testing, originated in the 1940s. New studies have shown **the successful application of pooled testing to detect Covid-19.**

Pooled testing **involves combining swabs from a number of people and testing en masse, with one test**, to rule in or out the presence of Covid-19. Research and mathematical analysis has shown that **up to 64 samples could be effectively pooled at a time.**⁵

Examples of application could include testing entire households, all staff at a medical facility, or random samples from across an area under surveillance as a potential hotspot. This method can **rapidly assess the reach of the virus; inform wider surveillance, testing and isolation/quarantine efforts; and estimate prevalence within a population.**

Countries that have conducted pooled testing for Covid-19 have shown effects of **saving supplies, time and significantly increasing testing capacity.**



Professor William Ampofo, Head of Virology, briefed reporters that the **pooling method is being used to test up to 10,000 samples a day.** Swabs are arranged into pools of 10 and tested together. If a 'pool' returns a positive result each swab can be tested separately to identify which individual(s) are positive.²



In Israel the ability to significantly increase samples per test is being **seen as a potential way to identify when to ease restrictions for certain subsets of the population**, without overwhelming lab capacity. This includes, as a low risk method, moving people who are isolating as a precaution out of quarantine, by quickly assessing if they have the virus.



Nebraska's Chief Medical Officer, said the state's public health lab is implementing pooled testing by dividing 60 tests into groups of five, therefore **allowing the state to quadruple its capacity.** Procedure started end of March 2020.³



The Indian Council of Medical Research (ICMR) gave permission for pooled testing in Uttar Pradesh state in order to help maximise the testing of samples on a daily basis. **Pooled testing began 17 April 2020.**⁴



Testing wastewater is a cheap, non-invasive tool that can be used as an early detection method to target community testing and surveillance

Wastewater-based disease monitoring (also known as wastewater epidemiology) is a relatively new strategy. **It has already been successful in predicting potential outbreaks of illnesses before cases appear.**

Research indicates that the **genetic material of the coronavirus**, its RNA, can be identified in untreated sewage and **can survive at a detectable level for several days.**

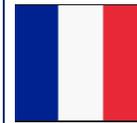
Early indications suggest Covid-19 can be detected in faeces within three days of infection, whereas it can take up to a week for a person to become symptomatic.

Wastewater testing can be a potential early warning sign of Covid-19 within a population and therefore could be an ongoing part of early surveillance.

It could be used to rule out infections within communities when considering easing social distancing restrictions.



Researchers in the Netherlands discovered the pathogen that causes Covid-19 present in the sewage system of a Dutch city weeks before the first cases of coronavirus were confirmed through testing. It has also been used with similar effect to **test whether patients with Covid-19 could be entering the country by testing at Schiphol airport.** ⁴



By sampling sewage across greater Paris for more than one month researchers noted **the technique can detect a sharp rise in viral concentrations in sewage before cases rapidly increase in hospitals.** This points to its potential use as a **tool to warn against outbreaks.** ¹



Finnish epidemiologists have decided to track the spread of Covid-19 by monitoring waste water for the virus. The Finnish National Institute for Health and Welfare explained the wastewater study **will show the level of contagion among the population in different localities.** ²



Health Minister Greg Hunt identified **wastewater testing as a potential tool for gauging when to relax social distancing measures** and said the study had the potential to **improve Australia's rapid response capability.** Scientists are currently trying to assess whether wastewater sampling can give an approximate estimate of the volume of potential cases in an area. ³