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# Insights From Africa's Covid-19 Response: Contact Tracing

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## Summary

An aggressive contact-tracing regime has been central to many African countries' achievements in slowing the spread of Covid-19. Drawing on experience responding to previous disease outbreaks and extensive networks of community health workers, among other assets, countries have been able to lean on robust tracing regimes and stringent isolation policies to control transmission despite limitations in testing. Important lessons on contact tracing can be learned from effective strategies deployed in Africa, especially as governments around the world seek to loosen mobility restrictions and safely reopen their economies.

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## The Importance of Contact Tracing

We are now more than nine months into the pandemic, and sub-Saharan African countries currently have among the lowest number of Covid-19 cases per million people globally. As of 23 November, Europe had recorded more than ten times as many cases and deaths, with 16 million cases and over 359,000 deaths compared to sub-Saharan Africa's 1.4 million confirmed infections and 31,600 deaths. The continent's peers in this category include numerous East Asian and Pacific countries such as South Korea, Vietnam and New Zealand, which have been hailed as exemplars for the world when it comes to controlling the virus. At the same time, many countries in Europe, the Americas and the Middle East continue to see surges in daily cases.<sup>1</sup> The WHO advises that to stop the chain of transmission, countries must have an effective "test, trace and isolate" strategy.<sup>2</sup> This entails deliberate testing to identify positive cases (who are considered to be infectious up to 48 hours before the onset of symptoms), tracing all contacts of positive cases (defined as anyone who came within one metre of an infected person for more than 15 minutes), and isolating those who are infected as well as quarantining their contacts in order to protect the public from possible exposure.<sup>3</sup> Taken together, this strategy is the most effective method to prevent transmission, save lives and safely reopen economies.

Fewer than half of all African countries have met the WHO's minimum containment threshold of ten tests per new confirmed case.<sup>4 5</sup> Although significant initiatives are underway to ramp up testing across the region, resource and logistical constraints have hampered countries' efforts to implement testing programmes on a sustained mass scale. Instead, targeted testing strategies that prioritise certain populations, such as symptomatic and high-risk groups, have been utilised to maximise scarce resources. Though this approach has been efficient, it is important to note that inadequate testing results in a lower number of infections being recorded, which may help to explain Africa's relatively lower case numbers. Yet cases in sub-Saharan Africa are still ten times lower than all other global regions, indicating that despite testing limitations, it is very likely that many African countries have managed to slow the spread of Covid-19 through effective implementation of other containment measures, principal among them an aggressive contact-tracing strategy.

The key to successful contact tracing rests in effective isolation and monitoring. In a viral epidemic, if response managers achieve the feat of ensuring that every new infected patient is already being monitored because they had already been identified as a contact of a previous positive case, they can be sure they have control of the chains of transmission and they know where the virus is. This is often impossible unless carried out at the very beginning of the outbreak where there are very few cases, or towards the end when infection rates have fallen significantly. In the middle of an outbreak, however, surveillance is likely to be overwhelmed by the sheer number of infections. Nonetheless, countries should continue to trace contacts as far as they can, because each distinct chain of transmission they

find and isolate makes a difference. This is especially true as a growing body of research shows the majority of Covid-19 cases have been spread by a small number of super spreaders. Good contact tracing has a significant role to play in helping to identify and contain those.

The early, rapid deployment of local, human-to-human contact tracers has been a crucial tool in breaking the chain of transmission in Africa. Countries like Senegal, South Africa and Nigeria were already familiar with best practices for contact tracing, having recently responded to other communicable disease outbreaks. Analysis by TBI of data from the Oxford Covid-19 Government Response Tracker, [highlighted in a separate case study](#), suggests that a majority of sub-Saharan African countries introduced a contact-tracing policy within two days of their first cases or earlier. In total, 61 per cent of countries have introduced a policy of comprehensive contact tracing for all confirmed cases. A smaller proportion of sub-Saharan African countries regressed from a policy of comprehensive to limited contact tracing (for only a subset of confirmed cases) at some point during the outbreak, compared to countries in the European Union. A majority of sub-Saharan African countries were well-positioned to activate a national contact-tracing workforce by leveraging their existing corps of community health workers (CHWs). CHWs play an essential role in supporting government health systems in lower-income countries by delivering basic health services to local communities, particularly those in harder-to-reach rural areas. Given that CHWs serve the communities in which they live and work, they are often trusted interlocutors for health advice and communication. This is an asset for contact tracing, as trust is a requisite when it comes to sharing personal information about one's health status, where one has been, and who one has had contact with. The existing CHW infrastructure that many African countries can draw from has been an important tracing advantage. Strict policies related to isolation of cases and quarantining of their contacts – once traced – have also contributed to stopping the spread of the virus. Working concurrently with tracing strategies, decisions to set up dedicated isolation centres or monitor contacts through regular check-ins is undoubtedly breaking threads in the web of transmission.

According to the WHO, tracing and isolating of contacts are two of three essential mechanisms for getting a communicable disease under control. As testing continues to fall short in many countries all over the world, important lessons in effective contact tracing and isolating can be learned from Africa, especially as governments seek to loosen mobility restrictions and safely reopen their economies.

## Case Study: Drawing on Past Experience in Senegal

With Covid-19 surfacing globally in January, Senegal pre-emptively began drawing on lessons from its experience fighting Ebola from 2014 to 2016. When the first positive Covid-19 case was detected in Senegal in March, the government was already prepared to immediately begin implementing its response plan, including a comprehensive test, trace and isolate strategy.

Manual contact-tracing teams led by local staff were set up in 78 district-level health centres.<sup>6, 7</sup> Although tests are reserved for at-risk and symptomatic people only, many of those tested received their results within a 24-hour period, enabling swift identification of contacts and mobilisation of tracers.<sup>8</sup> Well-resourced and clear protocols were established for contacts of positive cases once traced: Both symptomatic and asymptomatic people were placed in designated isolation facilities (hospitals or hotels) for 14 days. For the duration of their isolated stays, contacts were observed by health workers.

These vigorous trace and isolate practices are credited with slowing the transmission of the virus and allowing authorities to focus on the most severe and vulnerable cases.<sup>9, 10</sup> In July, the government adjusted its policy to allow for at-home isolation under supervision of district health authorities who follow up regularly by phone or visit. This freed hospital capacity either to focus on those with Covid-19 who needed medical attention, or to stand down some of the additional beds that were reserved or occupied for Covid-19 needs in order to start to restore other health services. Buttressed by effective targeted testing and a continued focus on tracing, this policy change did not lead to an increase in cases. Senegal began to flatten its curve in early July, maintaining an average of 100 daily new cases for weeks until confirmed cases per day began sharply declining after peaking on 12 August at 207. Daily cases maintained an average of 12 until 2 Dec when cases started rising alongside a global second wave.<sup>11</sup> Notably and in a nod to the country's robust surveillance, Senegal did not experience a spike in infections after allowing the annual Grand Magal of Touba religious pilgrimage to take place in early October. To offset the risks associated with the mass gathering, 5,000 health officials were deployed to the city to monitor the festival. The government also worked with religious leaders to encourage elderly and at-risk populations to stay home and participants to wear masks.<sup>12</sup> The country's proactive surveillance mechanisms enabled the annual event to safely take place, without a significant impact on overall transmission rates.

Dr Alioune Ly, deputy director of Senegal's Operations Centre for Health Emergencies (known as "Cous") largely attributes the success of Senegal's Covid-19 response to the extensive emergency preparation work, simulations, and training programmes undertaken as a result of the country's

experience with the Ebola crisis, including critical lessons in contact tracing. Senegal continues to have among the lowest per capita case numbers of Covid-19 in the world.

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## Case Study: Door-to-Door Screening in South Africa

When South Africa imposed a stringent lockdown in March to curtail the spread of Covid-19, it also deployed nearly 30,000 community health workers to begin active manual door-to-door screening, testing and tracing in the most vulnerable areas. These areas were mapped using a social vulnerability index which identified 993 priority zones.<sup>13</sup> In one month, nearly 15 per cent of the total population was screened.<sup>14</sup> Having been originally trained and deployed for HIV and tuberculosis disease control, these workers were already in position with years of experience conducting contact tracing, and were particularly sensitised to working in vulnerable communities.<sup>15</sup> South Africa's early, aggressive approach differs from many other tracing regimes around the world in that it proactively screened its population – a process known as active case finding – rather than relying exclusively on tracing the contacts of symptomatic people who report to testing centres.<sup>16</sup> Active case finding coupled with traditional tracing strategies ensured identification of both symptomatic and asymptomatic cases.

In September, the South African government introduced COVID Alert SA, a smartphone app, to supplement its manual tracing regime. When within a two-metre radius of another smartphone, a person's phone signal generates a code that is exchanged with the other user. If a user tests positive for Covid-19, they can voluntarily and anonymously report the diagnosis to the app, which in turn alerts other users who came within two metres of that case, prompting those contacts to go get a test and quarantine, if needed, to avoid spreading the disease.<sup>17</sup> The digital-tracing tool closes gaps in manual contact tracing associated with incomplete recollection of contacts and the speed at which tracers can locate all contacts named. As of 12 November, 700,000 people had downloaded the app, though the extent to which it has augmented manual contact-tracing efforts is unknown.<sup>18</sup>

Although South Africa experienced exponential spread of the virus and accounts for over 50 per cent of total confirmed cases in sub-Saharan Africa, experts say the country's contact-tracing regime – alongside other containment measures – helped to curb early exponential growth, allowing the health system, though strained, to get a handle on community transmission and reducing the overall burden of disease. Despite predictions that South Africa's daily infections would not peak until September, after recording its highest count with 13,944 daily new cases on 24 July, the country saw a significant decline in infections, averaging 2,000 per day from 1 September to late November.<sup>19</sup>

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## Case Study: Decentralising the Test-and-Trace Regime in Nigeria

In Nigeria, contacts of confirmed cases are categorised into two groups: high risk (direct physical contact with a positive or probable case) and low risk (no direct contact). This classification is in line with the Africa Centres for Disease Control and the Nigeria Centre for Disease Control's guidelines.<sup>20, 21</sup> According to Nigeria's procedures, contacts evaluated as low risk self-isolate at home for 14 days, supervised via phone calls. Contacts evaluated as high risk self-isolate at home, if possible, or quarantine at a state-designated facility for 14 days, during which period they are monitored by a health team that reviews daily temperature logs and conducts at least three physical visits. This approach is similar to Vietnam's, where classifying and then quarantining traced contacts according to epidemiological risk of infection (high or low), rather than by whether the contact is symptomatic, is credited with helping to control the country's community transmission early.<sup>22</sup>

Though tracing guidelines were established at the national level, given Nigeria's federal system of government, each state has the authority to implement its own regime. The experience of Lagos State, which accounts for about one third of all positive cases in Nigeria, offers lessons in the importance of decentralised tracing. After finding that initial state-level execution was impeding contact tracers' ability to effectively reach grassroots contacts, Lagos State decentralised its regime and shifted to active case surveillance, retaining coordination of policy centrally but leaving implementation to the local government areas (LGAs) and ward levels. This was implemented in line with recommendations made by the Nigeria CDC to decentralise activities to the lowest level and leverage existing structures at the LGA and community levels. Local contact tracers received training by the state to ensure uniformity of strategy, but the tracing operations themselves were managed locally. In addition, approximately 4,000 community mobilisers and volunteers were invited into the regime.<sup>23, 24</sup> While state-level efforts had been hampered by lack of thorough community knowledge, resulting in problems related to locating addresses and navigational delays, the community mobilisers had detailed knowledge of the local geography and also served to facilitate community entry and acceptance of tracing efforts.<sup>25</sup> Decentralising the regime and integrating a force of local members into the strategy led to an accelerated tracing response and increase in case detection.<sup>26, 27</sup> This lesson of decentralisation of the response was a key one countries like Sierra Leone learned from the West Africa Ebola outbreak of 2014-2016.

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## Lessons Already Learned in Massachusetts

Massachusetts was the first state in the US to create a collaborative state-wide Covid-19 contact-tracing programme.<sup>28</sup> On 3 April, after discussions with Partners in Health (PIH), a global non-profit that has experience with community-based outbreak interventions related to Ebola in West Africa, tuberculosis in Lesotho, and HIV in Rwanda, the governor of Massachusetts announced the hiring of over 1,000 people and soliciting of hundreds of volunteers in order to increase its contact-tracing efforts.<sup>29</sup> Drawing on effective manual contact-tracing practices employed in Africa, the decision to form an army of human-to-human tracers was central to the state's strategy to control the virus as cases surged.

In collaboration with PIH, local health departments and private-sector experts, the state implemented a robust regime that, while cases peaked in late April, consisted of 1,700 contact-tracing staff who made up to 10,000 calls per day between them, following patients through the quarantine and treatment periods.<sup>30</sup> In early June, the programme reported a contact response rate of about 90 per cent.<sup>31</sup> Since recording over 2,000 daily new infections at its April peak, by late June Massachusetts was considered one of only four US states to have contained the virus.<sup>32</sup> The state has among the most effective contact-tracing regimes in the country, largely attributed to the size of its workforce, traditional human-to-human approach, and state-local partnership.

From June to October, Massachusetts maintained control over transmission. With a positivity rate consistently below 3 per cent, the state ultimately decided to let hundreds of its tracers go. By 9 November, however, daily cases once again surpassed the 2,000 mark, amid a wave of new infections nationally.<sup>33</sup> Contact tracing continues to be central to the state's containment strategy and Massachusetts' early investment means it is more likely to have the tracing workforce and infrastructure in place to rapidly scale up its operations once again to meet demand.

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## Lessons Still to be Learned in the UK

The UK has struggled to implement a successful contact-tracing strategy throughout the pandemic, significantly impacting the country's ability to control the spread of the virus. With no blueprint for how to contact trace, the government took a highly centralised, tech-dependent approach to identify contacts of positive cases which centred on the development of an NHS-branded test-and-trace app. Local public-health teams were given authority to trace outbreaks in settings such as schools and care homes, while the tracing of individuals sat with a central team.

The app became a source of political consternation. The government opted to make its own, rather than rely on the decentralised infrastructure of Apple or Google, leading to a failed first attempt. This led to significant delays before the government announced that it would switch to a more standard, decentralised contact-tracing mobile app, and the new system was introduced to the confused public late into the outbreak. Since then, the contact-tracing system – a combination of app and central test-and-trace teams – has failed to warn over 723,000 contacts since its inception of possible exposure and the need to quarantine.<sup>34</sup> This conceivably implicates millions of cases. The central system reaches on average just 60 per cent of contacts, well below the 80 per cent needed to be effective, and is further hindered by delays in testing.<sup>35</sup> As cases increased, the burden on test and trace continued to grow and lockdowns – which resulted in the number of cases coming down – were widely seen as being missed opportunities to fix contact tracing.

In contrast, local health-protection teams have been filling the gaps by tracing contacts manually within their small municipalities. These teams consistently reach over 95 per cent of contacts, prompting calls for the government to ditch the national mobile service in favour of locally run person-to-person tracing regimes.<sup>36</sup> Public trust has been a key factor associated with the success of the local teams compared to the performance of the national government's app. The number of new cases in the UK is currently surging at over 15,000 per day on average, significantly more than the first wave in the spring.<sup>37</sup> Until the government is able to implement an effective tracing strategy that includes an incentive for traced individuals to isolate (whether financial or otherwise) combined with frequent and mass testing, current lockdown measures to control the spread of infections are unlikely to lead to the step change necessary to contain transmission.

## Features of Effective Contact Tracing

Despite the diverse contexts under which each of these countries operate, from an analysis of the contact-tracing regimes several important common features emerge:

1. **Importance of preparedness.** Taking stock of and acting on lessons from prior crises ensures a smarter, faster response when dealing with the next one. Early, evidence-based action is crucial.
2. **Manual, person-to-person outreach.** Despite global trends toward digital contact-tracing apps, the UK's Centre for the Mathematical Modelling of Infectious Diseases found that an app-based strategy reduced Covid-19 transmission by 44 per cent (based on the assumption that 53 per cent of the population uses the app), whereas a manual contact-tracing strategy reduced transmission by 61 per cent.<sup>38</sup> The effectiveness of manual tracing is partly attributed to the complexity of the mission: The personal, human aspect can ease the reception of negative news, allow entry into more vulnerable communities, and ensure that those without access to smartphone apps (or who are concerned about data sharing) are still covered. However, manual tracing is inevitably slower than digital tracking. Therefore, a manual contact-tracing strategy that is supplemented by mobile technology may be the best approach where possible.
3. **Role of community health workers and volunteers.** Mobilisation of CHWs and local volunteers has enabled governments to scale up contact-tracing efforts rapidly, which is especially important given that time is a critical factor in crisis response. Furthermore, access to and trust of local communities on a national scale cannot be achieved without community participation.
4. **Decentralisation.** Contact tracing can be more effective and efficient when designed with central expertise but implemented with localised knowledge and speed.
5. **Quarantine monitoring.** Once traced, supervision of quarantined contacts is a key feature of these countries' programmes. Checking in on contacts is important to ensure access to medical treatment, should symptoms develop, and to safeguard against contacts violating quarantine and inadvertently infecting others, if positive.

Although contact tracing is best deployed alongside a vigorous testing programme and lower rates of viral spread, limited testing resources on the African continent are not obstructing the ability of many countries to break threads in the web of transmission. By leveraging their assets, such as experience responding to previous health crises, extensive community-health-worker systems, and flexibility in adapting strategies to local contexts, countries across Africa have been able to build robust tracing regimes and implement stringent isolation policies that work in tandem with targeted testing in order to reduce the spread of Covid-19. As cases continue to surge in many parts of the world, numerous lessons can be learned from the success of African countries' responses.

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