EDCTP

The power of sharing science

EDCTP2 portfolio: COVID-19 collaborative clinical research

2014-2020

Supported by the European Union

About EDCTP

The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public–public partnership between 14 European and 16 African countries, supported by the European Union.

EDCTP's vision is to reduce the individual, social and economic burden of poverty-related infectious diseases affecting sub-Saharan Africa.

EDCTP's mission is to accelerate the development of new or improved medicinal products for the identification, treatment and prevention of infectious diseases, including emerging and re-emerging diseases, through pre- and post-registration clinical studies, with emphasis on phase II and III clinical trials. Our approach integrates conduct of research with development of African clinical research capacity and networking.

The second EDCTP programme is supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation. Cofunding from the Swedish International Development Cooperation Agency (Sida, Sweden), the Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation (MESRI, France), the Department of Health and Social Care (DHSC, United Kingdom), the Medical Research Council (MRC, United Kingdom), the Swiss Agency for Development and Cooperation (SDC, Switzerland), the Swiss National Science Foundation (SNSF, Switzerland), and the South Africa Department of Science and Innovation (DSI, South Africa) for the projects highlighted in this publication is gratefully acknowledged.

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EDCTP response to COVID-19: collaborations for Africa

EDCTP has activated its emergency funding mechanism to support 22 international partnerships helping countries in sub-Saharan Africa prepare for and manage the COVID-19 pandemic.

Since January 2020, SARS-CoV-2 has spread in waves across the world. In March 2020, WHO categorised COVID-19 as a global pandemic. In the first phase of the pandemic, sub-Saharan Africa has been spared some of the first impacts of COVID-19, but there are grave concerns that, once established, it could wreak havoc in countries with underdeveloped health systems.

Given the potentially disastrous impact of COVID-19 in sub-Saharan Africa, in April 2020 EDCTP activated its emergency funding mechanism, with an open call for proposals from international consortia. Following accelerated peer review, 22 projects have been funded, 12 led by researchers based in sub-Saharan Africa.

Dr Michael Makanga
Executive Director

Why Africa-specific studies are needed

The research community globally has rapidly mobilised to gather information on SARS-CoV-2, its spread, clinical impact and control, gathering and sharing data at unprecedented speed. Much of this new information will be relevant to sub-Saharan Africa, but there are several reasons why specific data from the region are required:

Biological responses: Immune responses to SARS-CoV-2 are vital to protect against infection but can also be so powerful that they cause serious lung damage. Disentangling the complexity of immune responses to SARS-CoV-2 is vital, but these are likely to differ in different parts of the world, for example because of past exposure to coronaviruses or other infections.

Demographics: COVID-19 is more harmful to older people. Sub-Saharan Africa has a relatively young population, so may be less affected by COVID-19, but this is not guaranteed given other potential vulnerabilities, particularly widespread socioeconomic disadvantage and high levels of other infections such as HIV and TB. In addition, much of the population lives in urban and peri-urban areas, often informal settlements, or migrates between rural and urban areas. It is essential to understand the impact of these factors on COVID-19.

Control measures: COVID-19 control has focused on classic public health responses, including hygiene promotion, isolation, restrictions on movement and lockdowns. However, in many sub-Saharan Africa settings, social isolation and good hygiene may be difficult to practise, and lockdowns may be difficult to enforce when individuals need to earn money to survive.

Testing: Identification of cases relies heavily on molecular tests to detect SARS-CoV-2 genetic material, based on the polymerase chain reaction (PCR). However, PCR is expensive and limited capacity for PCR exists in sub-Saharan Africa.

More affordable and simple-to-use alternatives are therefore required.

Answering key questions in the region

The EDCTP-funded international collaborative projects address key COVID-19 challenges in the region:

COVID-19 epidemiology: Critical questions include how common SARS-CoV-2 is in populations and how it spreads within communities. This will be critical to the development of control measures.

Several EDCTP projects are focusing on tracking community and household spread of COVID-19, often building on existing cohort studies. The **AfriCoVER** project is taking advantage of a health and demographic surveillance site in a peri-urban setting in Mozambique, while the **COREP** project has adopted a similar approach to explore transmission in rural settings in Kenya and South Africa. Similarly, the **TREATS-COVID** project is working with an urban community in Zambia already contributing to the EDCTP-funded TREATS study of TB prevention.

The **AIDCO** project is making an important contribution by collecting harmonised data from communities in three different countries – Ethiopia, Gabon and Senegal, representing West, Central and East Africa. As well as sub-regional differences, the project is also exploring the impact of socioeconomic status and urban/rural life on disease risk and progression.

Several projects are exploring transmission and impacts in specific populations – **periCOVID** on pregnant women (again drawing on the infrastructure provided by an existing EDCTP project), **Covid-19 HCW** on healthcare workers, and **HALT_COVID** on a population badly affected by HIV and TB in South Africa.

These studies will reveal much about COVID-19 levels and how it spreads in African settings, as well as the importance of factors such as asymptomatic infection. This will also enable models to be developed of COVID-19 transmission that better reflect how the virus behaves in sub-Saharan Africa.

Surveillance: Several projects are building national capacities in COVID-19 surveillance, to enable countries to better detect and respond to outbreaks. The **CSIGN** project is extending existing flu surveillance infrastructure in Ghana to cover COVID-19. The **STREESCO** project is strengthening surveillance systems in key areas of Benin and Burkina Faso, while the **ITAIL-COVID-19** project is building testing capacity in Republic of Congo.

Diagnostics and testing: Several of the projects above are also assessing novel approaches for detecting current SARS-CoV-2 infections (molecular or antigen tests) or a past history of infection (antibody tests). Molecular or antigen tests are essential for identifying who needs to be treated and isolated, while antibody tests give an idea of how the infection has spread through a population (and may identify individuals protected against infection).

The **RADIATES** consortium is testing an innovative form of molecular testing, known as 'loop-mediated isothermal amplification' (LAMP), which is likely to be cheaper and easier to use than PCR. Similar technology is being used in the **Suitcaselab** project, which is based on a portable 'laboratory in a suitcase', plus a biosecure 'glove box' for inactivating clinical samples. These methods bring diagnosis closer to the community and support more rapid diagnosis.

The **AfriDx** project is adapting an innovative molecular testing platform, known as PATHPOD, that is accurate, easy to use at point of care, and gives results within an hour. It is also developing novel 'dipstick' tests for detecting different types of SARS-CoV-2-specific antibodies. To promote sustainability, the project is also looking to establish manufacturing capacity for the tests in the region.

The Foundation for Innovative Diagnostics (FIND) is an important partner on several projects. It has unrivalled global expertise in diagnostic development and in navigating pathways to regulatory approval and implementation. For example, the **Profile-Cov** project is working with FIND to identify the most suitable antigen and antibody tests being evaluated globally for validation in an African setting.

Both antigen and antibody tests are also being evaluated in the **COVADIS** project. These include a novel rapid point-of-care antigen test developed by Belgian partners. By contrast, the **ASCENT** project is equipping laboratories in three sub-Saharan African countries to carry out a highly

sensitive, rapid and high-throughput assay for detection of SARS-CoV-2 antibodies developed by project team members in Switzerland.

Immune responses: Understanding the dynamics of antibody responses through an infection, and their association with symptoms, is essential for interpreting the results of antibody tests, predicting the likely course of infection, and in informing the design of vaccines.

Antibody responses are being investigated in several epidemiological studies. In addition, the **Profile-Cov** project is studying them in an Ethiopian population, already known to show distinctive features in response to infections. The **ImmunoCov** project is undertaking a detailed analysis of both antibody and T-cell-mediated responses to SARS-Cov-2 infection, and validating tests that could be used to investigate them further in African populations. The evolution of antibody responses will also be tracked by the **COVAB** project, which will compare responses in UK and Ugandan patients.

Therapeutics and other interventions: Two projects – **RE-BCG-COV-19** and **BCG-COVID-RCT** – are investigating the potential of BCG revaccination to protect healthcare workers from COVID-19. Primarily used to protect against TB, BCG may have non-specific stimulatory effects on the immune system. Although unlikely to offer full protection, it could reduce the incidence or severity of disease and could readily be rolled out if beneficial.

The **ImmunoCov** and **COVAB** projects both aim to identify antibodies with strong virus-neutralising abilities that could have potential therapeutic use. The CAB project is also establishing an innovative 'ex vivo challenge model', based on cultured mucosal tissue samples, for investigating the impact of infection and testing of interventions. Along similar lines, the **RE-BCG-COV-19** project is establishing a novel 'organoid' model – cultured three-dimensional lung tissue – for assessing immune responses and the impact of vaccines and other interventions.

Relatively few clinical trials for COVID-19 therapeutics are being carried out in sub-Saharan Africa. The **ANTICOV** project is establishing a platform that could facilitate the rapid initiation of multicentre international trials in the region. It is focusing on affordable and accessible treatments for mild disease, to limit progression to severe illness that could swamp health systems.

As well as exploring COVID-19 transmission in an urban environment in South Africa, the **TraCE** project is also organising a trial of a practical community intervention based on advice on infection control, supplies of masks and hand sanitiser, and regular telephone calls and text messages.

Prospects

The international collaborations have been able to launch with remarkable speed, often building on existing collaborations and demonstrating the value of research infrastructure that can act as a springboard for new studies in emergency situations. Similarly, EDCTP-funded epidemic preparedness networks, ALERRT and PANDORA-ID-NET, have been rapidly able to orient towards COVID-19, while EDCTP-funded regional Networks of Excellence have been able to foster collaborations between institutions internationally.

Collectively, the projects will enable teams in Europe and sub-Saharan Africa (and elsewhere) to collaborate to generate vital evidence and validate critical tools that will be essential to the tracking and control of COVID-19 in the region.

EDCTP's investment in research & development

2014-2020

Total funding
€752.74 M
In **395 projects** awarded to date.

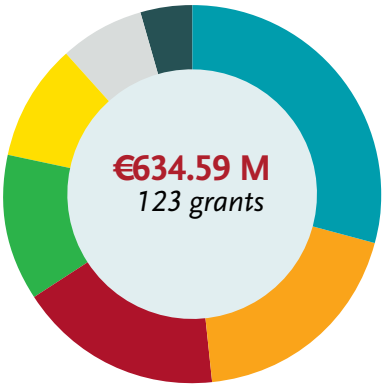
Clinical studies
€634.59 M
to support **123 collaborative research projects** with large-scale clinical trials and other clinical research activities conducted by European-African consortia.

Clinical research capacity
€75.99 M
to support **76 projects** that strengthen the enabling environment for conducting clinical trials and clinical research.

Fellowship programme
€42.16 M
to support **196 fellowships projects** that focus on the career development of African-based scientists.

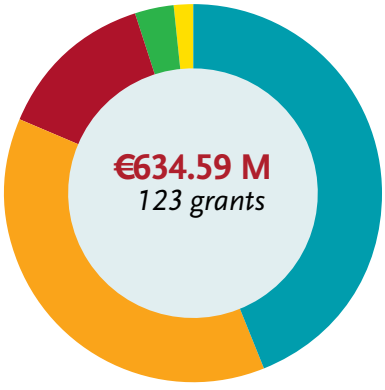
Clinical studies

By disease



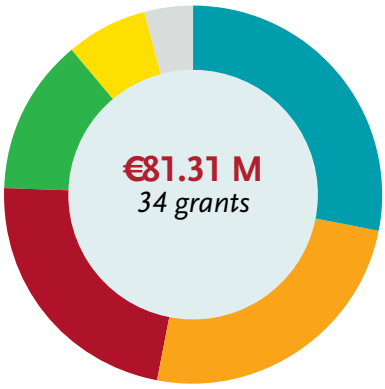
- Tuberculosis, *31 grants* **€186.44 M**
- Malaria, *13 grants* **€121.68 M**
- HIV & HIV-associated infections, *19 grants* **€109.54 M**
- Emerging diseases, *34 grants* **€81.31 M**
- Neglected infectious diseases, *17 grants* **€62.04 M**
- Diarrhoeal diseases, *5 grants* **€45.49 M**
- Lower respiratory tract infections, *4 grants* **€28.09 M**

By intervention



- Drugs, *49 grants* **€279.58 M**
- Vaccines, *24 grants* **€238.39 M**
- Diagnostics, *39 grants* **€86.65 M**
- Non-intervention-specific topics, *4 grants* **€21 M**
- Product-focused implementation research, *7 grants* **€8.97 M**

Clinical studies: emerging diseases

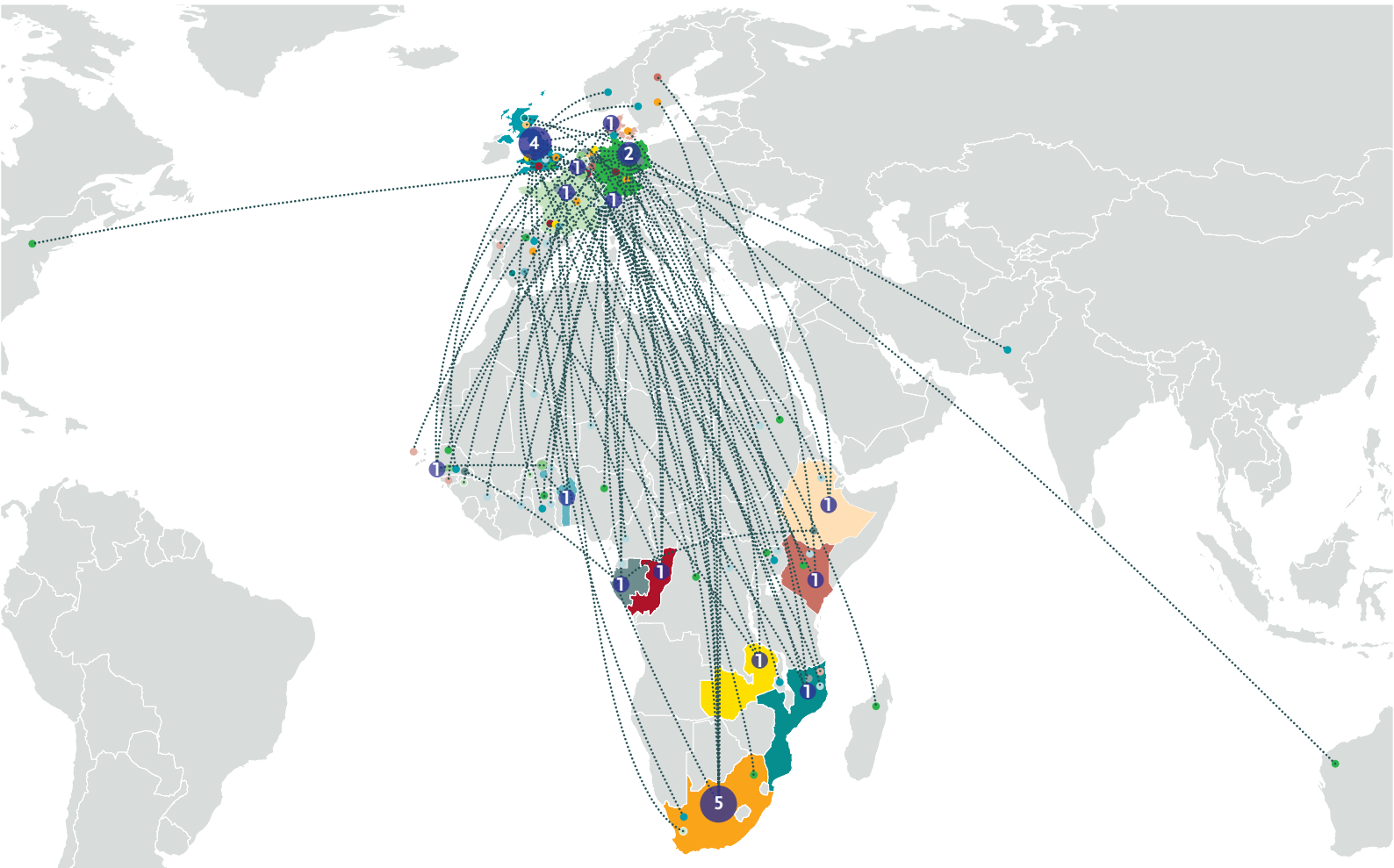


- Lassa Fever, *1 grant*
  €22.89 M
- Epidemic preparedness for multiple diseases, *2 grants*
  €20 M
- Ebola, *6 grants*
  €18.37 M
- COVID-19, *23 grants*
  €11.11 M
- Salmonellosis, *1 grant*
  €5.70 M
- Yellow fever, *1 grant*
  €3.24 M

COVID-19: participation in EDCTP grants

- Male, *12 coordinators*
  52%
- Female, *11 coordinators*
  48%

COVID-19: country collaboration in EDCTP grants



Colour-filled: Coordinating country
Dots: other members of the consortium
(n) number of projects coordinated from the country

Photo:
A resident of the Kangemi community in Kenya

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Emerging diseases: COVID-19

2014-2020

22 grants

€10.61 M

EDCTP portfolio: COVID-19

AfriCoVER
Belgium, France, Mozambique, Netherlands

COREP
Australia, Germany, Kenya, South Africa, Spain, United States

TREATS-COVID
France, Netherlands, United Kingdom, Zambia

AIDCO
Ethiopia, Gabon, Germany, Netherlands, Senegal

periCOVID-Africa
The Gambia, Kenya, Malawi, Mozambique, Norway, Uganda, United Kingdom

Covid-19 HCW
France, South Africa, United Kingdom

HALT_COVID-19
Denmark, Germany, Netherlands, South Africa

CSIGN
Ghana, Spain, United Kingdom

STREESCO
Benin, Burkina Faso, France, Spain

ITAIL-COVID-19
Belgium, Congo, France, Germany, United Kingdom

RADIATES Consortium
South Africa, Sweden, United Kingdom

Suitcaselab
DR Congo, Germany, Ghana, Madagascar, Nigeria, Senegal, Sudan, Uganda, United Kingdom

AfriDx
Denmark, Ghana, Sweden, United Kingdom

Profile-Cov
Ethiopia, Netherlands, United Kingdom

COVADIS
Belgium, Burkina Faso, The Gambia, Netherlands, United Kingdom

ASCENT
Burkina Faso, France, Guinea, Netherlands, South Africa, Switzerland

ImmunoCoV
Kenya, Netherlands, Sweden

COVAB
South Africa, Sweden, Uganda, United Kingdom

RE-BCG-CoV-19
Netherlands, South Africa, Spain, Sweden

BCG-COVID-RCT
Cape Verde, Denmark, Guinea-Bissau, Mozambique, Portugal

ANTICOV
DR Congo, Kenya, Spain, Switzerland, United Kingdom

TraCE
Netherlands, South Africa, United Kingdom

MozCOVID
Mozambique, Spain, United Kingdom

Intervention	Other	Disease	
Drugs	Product-focused implementation research	HIV and HIV-associated infections	COVID-19
Diagnostics		Tuberculosis	Lower respiratory tract infections
Vaccines			

Mapping the spread of COVID-19 in Mozambique

The AfriCoVER project is using an existing health and demographic surveillance site to gain a detailed picture of the spread of COVID-19 through a peri-urban neighbourhood in Mozambique.

The challenge

A crucial COVID-19 challenge is to understand the transmission of SARS-CoV-2 in typical sub-Saharan African settings. For a range of reasons, the epidemic may play out very differently in such settings, with important implications for disease control. Environmental factors, the age structure of populations, and high levels of HIV and TB infections could all have a significant impact on spread of COVID-19 in the region.

Health and demographic surveillance sites already have in place an infrastructure for monitoring population health. It is therefore feasible to supplement ongoing activities with collection of additional data on COVID-19 to rapidly provide insight into transmission dynamics.

Project at a glance

Project: AfriCoVER

Project lead: Dr Marc-Alain Widdowson, Prins Leopold Instituut voor Tropische Geneeskunde, Belgium

Countries involved: Belgium, France, Mozambique, The Netherlands

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Ministry of Higher Education, Research and Innovation, France.

The project

The AfriCoVER project is collecting samples and data from a subset of the 16,500 residents of the health and demographic surveillance site at Maputo in Mozambique. Household visits and links with clinics will be used to identify COVID-19 cases, at least 100 of whom will then be followed to track transmission to household contacts.

To provide an indication of the spread of COVID-19 in the community, the project will also collect blood samples from a random selection of residents (n=2400) in different age groups at baseline and 3, 6 and 16 months, and check for past infection. A high-throughput platform will be established to analyse finger-prick blood samples, which will detect antibodies against SARS-CoV-2 and other human coronaviruses, which could influence responses to SARS-CoV-2.

To conduct the serosurveys, the project will validate an existing Luminex platform with sera from European populations and establish the platform in Mozambique. Further validation will be conducted with Mozambican sera and against two commercial ELISAs.

The data collected will be used to generate a model of the spread of the epidemic and to examine how different public health interventions affected transmission.

Impact

The AfriCoVER project will generate a detailed picture of the COVID-19 epidemic in the peri-urban neighbourhood of Maputo, Mozambique. It will help to identify the drivers of transmission, those most likely to transmit the virus, and those at greatest risk of being infected.

The data will allow estimates to be made of key disease transmission parameters, including numbers of asymptomatic infections, so a model of the epidemic can be created that reflects the behaviour of the virus in the local setting. This will be of relevance to disease control in Maputo and in other similar settings in sub-Saharan Africa characterised by high levels of poverty, HIV and TB. It will also provide key data on a possible approach to high-throughput antibody testing that could be of general relevance to the region.

Mapping the spread of COVID-19 in rural populations

The COREP project will provide a clearer picture of the spread of COVID-19 in rural settings in Kenya and South Africa.

The challenge

Most attention has been given to the spread of COVID-19 in urban settings, where social isolation and quarantining may be difficult, facilitating the spread of the SARS-CoV-2 virus. However, a significant proportion of the population of sub-Saharan Africa lives in rural areas, in which the spread of COVID-19 might show specific characteristics and require targeted control measures. Furthermore, frequent travel between urban and rural areas, for example for work, increases the risk that infections will be introduced into rural communities.

Health and demographic surveillance sites provide a ready-made platform for undertaking studies of COVID-19 transmission at household and community level in rural settings.

The project

The COREP project is taking advantage of two health and demographic surveillance sites, in rural Kenya and South Africa, collectively covering a population of more than 200,000, in order to gather information on the disease burden and spread of COVID-19.

In Kenya, 500 households will be randomly selected and followed as a longitudinal cohort. Households will receive monthly visits from community health workers, who will screen for symptoms and collect finger-prick blood samples for antibody analysis. COVID-19 cases will be confirmed by molecular testing, and affected households will be intensively followed over the following month. This will provide complementary data on population-wide infection and localised transmission clusters.

The use of dried blood spot samples will also provide an opportunity to evaluate centralised antibody testing. Although requiring a transportation step, centralised antibody testing may be more reliable than point-of-care testing and offers the potential for high-throughput analyses that would greatly increase productivity and could be more cost-effective. Symptom screening and dried blood spot collection are also tasks that could be undertaken by community health workers, supporting efficient use of scarce healthcare human resources.

Project at a glance

Project: COREP

Project lead: Professor Till Bärnighausen, Heidelberg University Medical School, Germany

Countries involved: Australia, Germany, Kenya, South Africa, Spain, USA

Target population(s): Rural populations

Year funded: 2020

EDCTP funding: €0.5 M

Impact

The COREP project is working with populations in East and Southern Africa to generate data on the disease burden due to COVID-19 and transmission characteristics of SARS-CoV-2 in rural populations, including rates of asymptomatic infections, periods of transmissibility, and high-risk groups. The project will reveal whether rural areas should be prioritised, and how control measures might need to be adapted in such settings. It will also generate data on a 'hub' model of antibody response monitoring as a possible approach for tracking COVID-19 at the individual and population level.

Mapping the spread of COVID-19 in Zambia

The TREATS-COVID project is taking advantage of an existing EDCTP-funded project to rapidly gain a better picture of COVID-19 transmission in an urban setting in Zambia.

The challenge

Sub-Saharan Africa may be differentially affected by COVID-19. There is no guarantee that the features of the epidemic seen in high-income countries will be exactly the same in resource-poor settings in sub-Saharan Africa.

Many factors may influence how the COVID-19 epidemic plays out in the region. The simultaneous presence of HIV and TB epidemics alongside COVID-19 is one critical factor. Social and behavioural differences in response to COVID-19 may also be seen, given widespread social disadvantage and living conditions that present challenges to social distancing and good hygiene practices.

The project

Taking advantage of the infrastructure provided by the EDCTP-funded TREATS project, the TREATS-COVID project is gaining a deeper understanding of the spread of COVID-19 in an urban population of Zambia.

The TREATS project is working closely with a community of around 28,000 that has been involved in research studies for many years. All households will be visited, and people aged 15 years and above will be screened for symptoms of COVID-19. Cases and their household contacts will be followed up and contact tracing undertaken. All people of 15 years and above will be screened for symptoms of COVID-19. A second study will test 4000 people for past infection, as well as for HIV and TB infection.

Reliable and convenient tests are essential for monitoring the COVID-19 epidemic. The TREATS-COVID project will evaluate a range of potential community-based point-of-care tests to detect SARS-CoV-2 and antibodies to the virus. These will include a novel computer-aided diagnostic tool for interpretation of chest X-rays that has been developed by one of the project partners, initially for TB but since adapted for COVID-19.

Project at a glance

Project: TREATS-COVID

Project lead: Dr Kwame Shanaube, ZAMBART Project Ltd, Zambia

Countries involved: France, The Netherlands, UK, Zambia

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Medical Research Council, United Kingdom.

The project team will use the information collected to develop models of COVID-19 transmission that better reflect the local situation, and extrapolate them to wider populations. The project will also take advantage of its excellent links to local communities to explore perceptions and responses to the COVID-19 epidemic.

Impact

With an existing interdisciplinary team in place, the TREATS-COVID project can rapidly gather data on the COVID-19 epidemic in a site that is representative of many urban settings in sub-Saharan Africa. It will be able to generate a clearer picture of the transmission of SARS-CoV-2, the role of asymptomatic infections, and the impact of HIV and TB infections. The project will also gain valuable insight into additional elements of the epidemic, such as stigmatisation and economic impacts. The data will be used to develop locally tailored models that can be used to test intervention strategies and inform local context-specific and culturally appropriate public health responses.

Understanding COVID-19 in African settings

The AIDCO project is exploring whether COVID-19 has a distinct impact on African populations.

The challenge

A notable feature of SARS-CoV-2 infection is the wide range of effects it has on hosts, ranging from asymptomatic infections to life-threatening respiratory distress syndromes. A key factor underlying disease severity appears to be uncontrolled immune responses that have a catastrophic impact on lung function.

Because of differences in its population age profile and prevalence of risk factor such as obesity and diabetes, sub-Saharan Africa may be affected differently by COVID-19 compared to high-income countries. In particular, because of environmental exposures, immune responses to SARS-CoV-2 in people in sub-Saharan Africa may be different, and may also vary between different African settings, such as rural and urban, and between populations of high and low socioeconomic status.

The project

The AIDCO project aims to generate detailed African-specific data on COVID-19 infections, using consistent analytical methods, in three different countries spanning West, Central and East Africa.

The project will gather data on multiple aspects of the COVID-19 epidemic. A household study will collect data on knowledge, attitudes and practices, providing insight into factors associated with household transmission and the relative importance of factors such as asymptomatic or mild infections on transmission. In addition, the project will collect detailed clinical information from hospitalised patients in the three countries.

The early immune response to infection is complex and it remains unclear which aspects are associated with controlling infection, infectivity and symptoms at different stages during infection. Globally, much work is being carried out to address this question, but fewer studies are being carried out in Africa, even though the dynamics of immune responses may not be the same as in high-income countries.

The project is taking advantage of the infrastructure created by EDCTP-funded regional Networks of Excellence. Key partners in the project are members of Networks of Excellence in West Africa (Senegal, WANETAM), Central Africa (Gabon, CANTAM) and East Africa (Ethiopia, EACCR).

Project at a glance

Project: AIDCO

Project lead: Professor Ayola Akim Adegnika, Centre de Recherches Médicales de Lambaréné, Gabon

Countries involved: Ethiopia, Gabon, Germany, The Netherlands, Senegal

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

Impact

The AIDCO project will generate harmonised data across different settings and different countries, providing unique insights into similarities and differences in immune responses to COVID-19 in different populations across sub-Saharan Africa. Work on immune responses will identify markers associated with COVID-19 infection and with protection against disease, of importance to vaccine development and testing. The project will also create an important biobank and freely accessible data resource on multiple aspects of COVID-19 that will support further research on the epidemic in the region.

COVID-19 in pregnant women

The periCOVID-Africa project is generating vital data on COVID-19 infections in pregnant women and their offspring in sub-Saharan Africa.

The challenge

Very little is known about the specific impact of COVID-19 on pregnant women, whether the virus can be transmitted to babies in the womb, and whether maternal antibodies might be transferred across the placenta. This is particularly the case in sub-Saharan Africa, where frequent infection with HIV, TB, syphilis or malaria could add further complications.

Moreover, maternal and neonatal mortality rates are still relatively high, and typically only around half of mothers receive the recommended four antenatal health visits. Opportunities to monitor the impact of COVID-19 on pregnant women and their offspring are therefore limited.

Project at a glance

Project: periCOVID-Africa

Project lead: Dr Kirsty Le Doare, St George's Hospital Medical School, UK

Countries involved: The Gambia, Malawi, Mozambique, Norway, Kenya, Uganda, UK

Target population(s): Pregnant women, newborns

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Department of Health and Social Care (DHSC), United Kingdom.

The project

The periCOVID-Africa project aims to generate key data on COVID-19 in pregnant women and newborn babies, taking advantage of two established cohorts in sub-Saharan Africa.

The first cohort, set up through the EDCTP-funded PREPARE project, covers 70,000 pregnant women and their infants in Kampala, Uganda. The PREPARE project is following up women from the early stages of pregnancy and infants up to the age of three months to gain a clearer picture of the burden of group B streptococcus infections.

The second cohort is drawn from a multicentre study of 10,000 pregnant women in The Gambia, Kenya and Mozambique organised by the PRECISE Network, with support from UK Research and Innovation and Wellcome Trust. This project is exploring the social, clinical and biological factors associated with a range of placental disorders, such as low birth weight and stillbirth.

Subsets of participants in these studies will be screened for COVID-19 symptoms and invited to join the periCOVID-Africa project if they test positive. Blood samples for analysis will be collected at diagnosis, delivery and 4–10 weeks later. Members of the team are also involved in a UK-based project evaluating antibody-based tests to track responses to infection, which, once validated, will be transferred to participating sub-Saharan Africa centres.

Impact

The periCOVID-Africa project will provide a picture of COVID-19 infections in pregnant women in five different settings across sub-Saharan Africa, helping to establish the maternal, fetal and neonatal burden of disease in representative sub-Saharan Africa populations. It will also generate valuable data on the dynamics of antibody responses following infection in pregnant women, providing insights into immune factors associated with protective immunity, and links between COVID-19 infections and adverse pregnancy outcomes. In addition, it will create a platform for potential future vaccine trials in this vulnerable group.

Protecting healthcare workers against COVID-19

The Covid-19 HCW project is monitoring a cohort of healthcare workers to identify risk factors for infection, as well as to provide a clearer picture of the dynamics of immune responses to SARS-CoV-2.

The challenge

Healthcare workers are exposed on a daily basis to COVID-19 infections, and are at high risk of becoming infected. Preventing infection in health workers is important not just for their own health but also to limit the spread of COVID-19 in healthcare facilities and to ensure the availability of health care staff.

Although antibody responses are protective, it is unclear precisely which specific types of response elicited by the virus are most effective and, conversely, which contribute to severe disease symptoms. Generation of long-term 'memory cells', re-activated when the virus is re-encountered, is also not well understood.

Project at a glance

Project: Covid-19 HCW

Project lead: Dr Marta Nunes, Wits Health Consortium (PTY) LTD, South Africa

Countries involved: France, South Africa, UK

Target population(s): Healthcare workers

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Department of Health and Social Care (DHSC), United Kingdom.

The project

The Covid-19 HCW project is monitoring a cohort of healthcare workers exposed to COVID-19 patients at the Chris Hani Baragwanath Academic Hospital in South Africa, Africa's largest tertiary hospital, which serves the township of Soweto and the surrounding area.

Healthcare workers will be monitored for COVID-19-like symptoms and tested regularly to detect symptomatic and asymptomatic infections, and data will be collected on their health, demographics and working practices. The project aims to identify risk factors for infection, and for severe outcomes in those who are infected, in order to identify ways to prevent further infection. It will also test whether analysis of more convenient saliva samples can be used instead of discomforting nasal swabs.

In addition, the project will systematically analyse blood samples from all participants to monitor for the appearance of antibodies and to assess associations with severity of disease in those who become infected.

Finally, sophisticated cell sorting technology will be used to characterise multiple lymphocyte populations, to determine whether infections are associated with the appearance of memory cells that would protect against re-infection. This analysis will also shed light on cell-mediated (T-cell-based) responses to SARS-CoV-2.

Impact

An understanding of infection status in healthcare staff will have several benefits. As well as identifying risk factors that can be targeted to improve infection control, testing will reveal whether healthcare workers need to quarantine, reducing the risk that asymptomatic carers pass on infections and providing psychological reassurance to healthcare staff. It will also enable those without infection to continue working. The impact on understanding the severity and history of infection will have broader implications to the overall population beyond the HCW community.

The project will also generate important data on the evolution of antibody-based and cell-mediated immunity in infected staff during acute phases of illness and convalescence. This will provide insights of general importance but may also reveal key differences specific to a sub-Saharan African setting.

Understanding COVID-19 transmission in South Africa

The HALT_COVID project will generate a clearer picture of the impact and transmission of COVID-19 in a setting with a high prevalence of HIV and TB infections.

The challenge

South Africa was one of the first countries in sub-Saharan Africa to be affected by COVID-19. With much of its population living in high-density urban households, there is great potential for significant spread of COVID-19 through the country.

Furthermore, South Africa faces simultaneous epidemics of COVID-19, HIV and TB. People living with HIV are at increased risk of infections, while people treated for TB typically have lung damage that could exacerbate COVID-19 symptoms. However, few data are available on interactions between the three infections.

The project

The HALT_COVID project aims to determine the impact of HIV and TB infections on COVID-19 symptoms, outcomes and transmission, and how COVID-19 affects morbidity and mortality in populations badly affected by HIV and TB.

The project is based on two study populations, in rural and urban areas, that are already participating in a surveillance project. Through use of existing mobile clinics, 5,000 people with COVID-19-like symptoms will be offered molecular testing. In addition, healthcare workers at two research institutes will be offered routine weekly screening.

People testing positive will then be followed through treatment, with intensive assessments of symptoms, viral load and a wide range of immune responses. Baseline data will also be collected on potential risk factors for poor outcomes, including other infections and health conditions, as well as behavioural risk factors such as smoking and alcohol consumption.

Specifically, this project aims to: determine whether biomarkers of infection correlate with disease progression and severity; establish the relationship and disease progression of SARS-CoV and co-morbidities such as TB, HIV, hypertension and diabetes; determine concentration and duration of viral shedding; and to characterize risk factors for infection.

A further important strand of the project is to evaluate molecular and antibody-based tests in the South African setting. Focusing on the most practical tests, the project will assess their performance against gold standard comparators.

Impact

The HALT_COVID project will generate vital information on transmission dynamics, course of infection and the clinical impact of COVID-19 in populations with a high burden of other health conditions, particularly HIV and TB infections. It will also validate tools for rapid detection and monitoring of COVID-19 infections. The evidence generated will inform responses to COVID-19 in South Africa, and in other settings badly affected by HIV and TB.

Project at a glance

Project: HALT_COVID-19

Project lead: Professor Ayesha Kharsany, Centre for AIDS Programme of Research in South Africa, South Africa

Countries involved: Denmark, Germany, The Netherlands, South Africa

Target population(s): All, especially those with HIV and TB co-infections

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

Mapping the spread of COVID-19 in Ghana

The CSIGN project is enhancing COVID-19 surveillance in Ghana to generate locally relevant data to guide public health responses.

The challenge

Tracking of COVID-19 infections in the community is essential for understanding the spread of infections and for targeting public health measures to protect populations. However, many countries in sub-Saharan Africa have limited infectious disease surveillance capacity.

Data on infections feed into models that can be used to predict the spread of infection and to test the impact of public health interventions. However, in the absence of local data, parameters from high-income countries may have to be used, and may not accurately reflect the spread of COVID-19 in sub-Saharan Africa.

Project at a glance

Project: CSIGN: Covid Surveillance Intensification in Ghana Network

Project lead: Dr Michael Marks, London School of Hygiene and Tropical Medicine, UK

Countries involved: Ghana, Spain, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Department of Health and Social Care (DHSC), United Kingdom.

The project

Taking advantage of a well-established surveillance network for influenza in Ghana, the CSIGN project is gathering local data on COVID-19 and developing more contextually sensitive models to guide policymaking.

Ghana's existing influenza surveillance network covers 22 sites. The project will add sentinel surveillance for COVID-19 to this network, as well as community-based reporting of COVID-19 symptoms via a mobile phone-based platform previously used to collect and disseminate information on cases and contacts during the Ebola outbreak in the Democratic Republic of the Congo.

The project will also adapt and enhance the existing influenza community reporting system so that it covers COVID-19, collects more sociodemographic and other information, and links to COVID-19 contact tracing activities. Genome sequencing of positive samples will be used to generate a detailed picture of transmission chains.

Data gathered through the surveillance activities will provide key information on factors such as reproduction number and the numbers of asymptomatic infections. This will feed into models that better represent the COVID-19 outbreak in Ghana and provide a better basis for testing the potential impact of interventions to inform public health decision-making.

Impact

The CSIGN study will take advantage of an existing surveillance infrastructure to rapidly gain a clearer picture of the characteristics of COVID-19 transmission in Ghana. With the Ghana Health Service as a key member of the CSIGN consortium, the results will rapidly feed through into national decision-making and guide the response to the COVID-19 epidemic in Ghana. Furthermore, the approach provides a model that could be adopted by other countries in sub-Saharan Africa.

Strengthened COVID-19 surveillance in West Africa

The STREESCO project aims to develop surveillance activities to support rapid identification and response to COVID-19 cases in Benin and Burkina Faso.

The challenge

Rapid identification of cases is essential to support COVID-19 control responses, such as isolation and contact tracing to break chains of transmission. However, in low-resource settings, limited systems exist for timely detection of new infections.

In addition, a lack of data on COVID-19 infections makes it difficult to determine patterns of spread of infection, an obstacle to effective control measures.

The project

The STREESCO project aims to build capacity to detect COVID-19 infections in two low-resource settings, Benin and Burkina Faso, to provide health authorities with the data needed to launch timely responses and control activities.

In Benin, the project will establish active epidemiological surveillance at three key hospitals – two in cities on the border of a health cordon set up in the country and one in a city well outside the cordon. At front-line health facilities, patients will be screened for COVID-19 symptoms and samples sent to central laboratories for analysis and confirmation of infections. Contacts will be traced and potential routes of transmission explored. Risk factors associated with infection of healthcare workers will also be explored, and a new COVID-19 information system will be introduced.

Over the longer term, it is important that surveillance systems exist that can detect surges in cases and the risk of new outbreaks. In Benin, health workers involved in detection will provide a regular epidemiological bulletin, which will be shared with health authorities. In Burkina Faso, a community-based approach will be introduced in rural areas, following a cohort of 200 households and building on a national system for surveillance of influenza-like syndromes.

Project at a glance

Project: STREESCO project

Project lead: Dr Achlin Achille Massougbodji, Institut de Recherche Clinique du Benin, Benin

Countries involved: Benin, Burkina Faso, France, Spain

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Ministry of Higher Education, Research and Innovation, France.

Complementing this work, a health anthropologist will be embedded in the project and carry out research on public perceptions of COVID-19 and of control measures.

All the surveillance data collected will also be analysed in collaboration with European partners to give a clearer picture of the distribution of disease in the two countries and the dynamics of its spread.

Impact

The STREESCO project will provide data to guide timely responses to COVID-19 in key areas of Benin and Burkina Faso. In Benin, surveillance activities will reveal whether COVID-19 has spread to new areas. The project will also generate a clearer picture of the dynamics of the spread of COVID-19 in the two countries, and introduce ways of working that could be introduced more widely across the two countries. The surveillance systems in health facilities will capture, filter and analyze signals in real time, providing early warnings about the resurgence or emergence of viral respiratory infections.

Boosting COVID-19 surveillance in Republic of Congo

The ITAIL-COVID-19 project will use a range of methods to track SARS-CoV-2 infections in the Republic of Congo.

The challenge

Republic of Congo is a small country, with a population of around 5 million, and has a weak health system infrastructure. COVID-19 surveillance has been introduced in the country but gives only an incomplete picture of the spread of the virus.

Molecular methods for detecting the genetic material of SARS-CoV-2, using the polymerase chain reaction (PCR), are the standard approach for confirming infection, but require specialist facilities. They also take time to generate results, by which time a patient may no longer be in contact with the health system.

The project

The ITAIL-COVID-19 project is assessing a range of methods for detecting SARS-CoV-2 infections suitable for use in different situations.

An overarching objective is to develop a clearer picture of the spread of SARS-CoV-2 in Republic of Congo. In part, this will be achieved by increasing capacity for molecular testing. A rapid antigen diagnostic test developed by one of the project's European project's partners is also being evaluated. Although not as sensitive as molecular methods, it is easy to use and gives results within 15 minutes, so isolation and contact tracing can be launched immediately while confirmatory testing is carried out. Antibody-based testing will also be evaluated, which could be used to identify individuals no longer at risk of infection and to provide estimates of the true number of infections in a community.

An additional strand of the project will focus on health care workers, who are at significant risk of infection. It is evaluating a modified version of PCR testing that incorporates an additional sample processing step – involving use of a bloodstream protein that sequesters viral proteins and could increase the sensitivity of PCR-based tests.

Participants will be recruited by screening individuals presenting at a range of health facilities with flu-like symptoms. Blood samples from patients and household members will also be analysed to provide information on the dynamics of antibody responses to SARS-CoV-2 during the course of an infection, how they relate to clinical symptoms, and the prevalence of asymptomatic infections.

Impact

The ITAIL-COVID project will increase testing capacity in Republic of Congo, to give a clearer picture of COVID-19 burden in the country, including the proportion of symptomatic and asymptomatic cases. Epidemic management in the country would also benefit from a validated antibody test, for determining individual protection from infection and levels of population immunity. Data from the project may also reveal whether past viral infections confer some degree of immunity to COVID-19, which would be of wider significance.

Project at a glance

Project: ITAIL-COVID-19

Project lead: Dr Mathieu Ndounga, Fondation Congolaise pour la Recherche Medicale, Republic of Congo

Countries involved: Belgium, Republic of Congo, France Germany, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Department of Health and Social Care (DHSC), United Kingdom.

Molecular tracking of COVID-19

The RADIATES project is testing an innovative molecular approach for detecting SARS-CoV-2 infections, as well as the use of whole genome sequencing to track and understand the COVID-19 epidemic.

The challenge

The standard tool for detecting SARS-CoV-2 infections, PCR (polymerase chain reaction), requires transportation of samples to specialist facilities. This leads to delays in diagnosis. In addition, sub-Saharan Africa has relatively few facilities able to perform PCR. Developing a reliable and easy to use assay is therefore highly important.

Moreover, more information about epidemics can be obtained from whole genome sequencing. Sequence data can reveal how different SARS-CoV-2 infections are related, so that a more detailed picture of routes of transmission can be generated.

The project

The RADIATES project is developing and evaluating a new approach for detecting SARS-CoV-2 genetic material. It is based on a technology known as 'RT-LAMP' (reverse transcriptional loop-mediated isothermal amplification), which forms the basis of promising diagnostics for a range of viral and bacterial infections. Unlike PCR, RT-LAMP does not require multiple cycles of heating and cooling, so is quicker to perform. It also generates easy-to-interpret results based on colour changes in analysed samples.

Having already developed a SARS-CoV-2 RT-LAMP test, the RADIATES Consortium is now optimising it for use in low-resource settings. Its performance will then be assessed in tests on 500 samples, with results being compared to those obtained with PCR.

Complementing this work, the RADIATES team will generate whole genome sequence data for a representative collection of samples from the Cape Town area. The sequences will be used to generate a family tree of genomes to shed light on how the virus has evolved and moved through the population over time.

Project at a glance

Project: RADIATES Consortium

Project lead: Dr Jinal Bhiman, National Institute for Communicable Diseases, South Africa

Countries involved: South Africa, Sweden, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

These data will feed into a dynamic model of the spread of COVID-19 infection, which will be used to estimate key parameters such as reproduction number and how it has changed over time, as well as the number of people infected. The model will also be used to assess how public health interventions at various points affected the spread of infection, and to test the potential impact of other public health interventions, such as introduction of rapid point-of-care testing.

Impact

An effective RT-LAMP test for SARS-CoV-2 would facilitate molecular diagnosis but without the need for centralised laboratory processing of samples. An RT-LAMP-based approach could be carried out in the community, and be quicker and cheaper than PCR, enabling isolation and contact tracing to begin immediately. In addition, the whole genome sequencing strand of work will provide detailed insight into the spread of COVID-19 in Cape Town, allowing comparisons to be made with other locations and providing a tool for evaluating the impact of public health interventions.

Safe field diagnosis of COVID-19

The Suitcaselab project is evaluating an innovative 'laboratory in a suitcase' for rapid detection of SARS-CoV-2 infections.

The challenge

Molecular tests are the gold standard technology for identifying SARS-CoV-2 infections. However, polymerase chain reaction (PCR) testing relies on laboratory facilities that are not widespread in Africa, and transport of samples inevitably delays diagnosis.

This lack of capacity severely curtails the ability of many countries in sub-Saharan Africa to rapidly identify and isolate cases, undertake contact tracing, and provide care for people with SARS-CoV-2 infections.

The project

The Suitcaselab project is evaluating an innovative solar-powered 'laboratory in a suitcase' that can provide rapid results on COVID-19 infections in the field with relatively easy-to-use equipment.

The mobile suitcase detects the genetic material of SARS-CoV-2 without the need for the repeated heating and cooling cycles required of PCR-based laboratory tests. It is easy to use, powered by solar panels, requires no cold chain storage of reagents, and gives results within 20 minutes. Molecular probes specific for SARS-CoV-2 have been developed, and initial results suggest that the mobile suitcase lab performs as well as conventional PCR-based methods.

A second key feature of the set up is a specially designed 'glove box', which can be used to inactivate clinical samples and prevent any risk of transmission of virus to testers.

The project is being run as a multi-country trial, with seven sub-Saharan African countries with past experience of using the mobile suitcase lab evaluating the SARS-CoV-2 assays. In each location, samples will be analysed from confirmed cases and from controls (contacts who tested negative), providing data on 3,500 samples in total.

Project at a glance

Project: Suitcaselab

Project lead: Dr Ahmed Abd El Wahed, Leipzig University, Germany

Countries involved: Germany, Ghana, Madagascar, Nigeria, Senegal, Sudan, Uganda, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Medical Research Council, United Kingdom.

The project will play an important role in linking multiple countries in sub-Saharan Africa and in ensuring the adoption of common operating procedures. It is also engaging with key regional bodies such as the WHO Regional Office for Africa and the Africa Centre for Disease Control and Prevention, and project partners include several members of the EDCTP-funded ALERRT and PANDORA-ID-NET epidemic preparedness networks.

Impact

The Suitcaselab project will generate rigorous data on the performance of a rapid molecular diagnostic test for SARS-CoV-2 that could potentially be used at drop-in centres, or at sites such as airports, and in remote locations. Use of the equipment could help to rapidly identify people with COVID-19 infections so they can be isolated and treated, and so trace and isolate and other control measures can be rapidly implemented.

Affordable diagnostics for SARS-CoV-2

The AfriDx project is developing diagnostic tools specifically designed to be used and manufactured in sub-Saharan Africa.

The challenge

An effective response to the COVID-19 pandemic depends on the ability to detect current infections, as well as people who have been infected and have developed immunity.

The gold standard diagnostic test for SARS-CoV-2 is a molecular test (polymerase chain reaction, PCR) that detects the virus's genetic material (RNA). However, PCR requires specialist facilities and is expensive. In addition, different tests are required to identify those who have been infected, generally based on the detection of SARS-CoV-2-specific antibodies. Again, the most useful rapid point-of-care tests are expensive and their widespread use is likely to rely on donor support.

The project

The AfriDx project aims to develop high-quality molecular and antibody-based tests that are suitable for use in African populations and can also be manufactured locally to ensure affordability and sustainability.

Members of the project team have developed a novel molecular testing platform, known as PATHPOD, that is accurate, easy to use at point of care, and gives results within an hour (as opposed to around two days for conventional testing at central laboratories). PATHPOD is undergoing clinical testing in Europe, and preliminary results indicate very close agreement with the results of gold standard molecular testing.

To enhance affordability, the PATHPOD platform is being adapted so that it functions using reagents that could be readily manufactured in low-resource settings, using technology developed by other project partners. The consortium includes commercial partners with experience of bringing diagnostics to the market in Africa.

Similarly, new antibody-based tests will be developed, based on two resources held by European and US academic partners: fragments of viral coat proteins that can be used as 'bait' to hook out SARS-CoV-2-specific antibodies; and a large antibody fragment library that will be screened to identify fragments that bind specifically to different types of human antibody. These components will be used to develop a 'dipstick' test for rapid identification of different types of SARS-CoV-2-specific antibodies.

The project will also explore methodological innovations, such as use of pooled testing. As infection rates are generally low (based on incidence rates of April 2020), 5–10 samples could be pooled and tested, and individual samples only tested when a pooled sample returns a positive result.

Impact

The AfriDx project will generate new tools for detection of current and past SARS-CoV-2 infections – essential for understanding the spread and distribution of infections. By focusing on technology transfer, and by involving a partner with experience of launching new diagnostics in Africa, the project will also establish a foundation for regional manufacturing to ensure long-term sustainability.

Project at a glance

Project: AfriDx

Project lead: Professor Elizabeth (Lisa) Hall, University of Cambridge, UK

Countries involved: Denmark, Ghana, Sweden, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

Mapping immune responses to SARS-CoV-2 in Ethiopia

The Profile-Cov project is tracking immune responses to SARS-CoV-2 in Ethiopia, and evaluating diagnostic tools suitable for use in sub-Saharan Africa.

The challenge

Effective immune responses are important for protection against SARS-CoV-2 but, paradoxically, over-activation of the immune system can itself cause serious damage to the lungs. Understanding immune responses to the virus is therefore essential. Moreover, it is possible that extensive past exposure to infections may affect the response of people in Africa to SARS-CoV-2, potentially making them less susceptible to severe disease.

Understanding immune responses has important implications for diagnosis and monitoring of infections. There is a need to identify immune markers that most reliably predict the likely course of illness, risk of deterioration and infectivity. In addition, as the molecular tools generally used to detect SARS-CoV-2 require specialist facilities and skills, affordable and easier-to-use diagnostics are required to expand testing capacity in sub-Saharan Africa.

The project

The evolution of immune responses during the course of a SARS-CoV-2 infection is not yet well understood, and few data are available from African populations. The Profile-Cov project is recruiting a cohort of COVID-19 patients in Ethiopia and undertaking a detailed study of the dynamics of immune responses, comparing results with those from a cohort recruited in the UK. The Profile-Cov team has previously discovered that immune responses in healthy people in Ethiopia differ markedly from those seen in other populations – probably due to differing environmental exposures, rather than genetic differences.

Given limited capacity for molecular testing in Ethiopia (and in sub-Saharan Africa more generally), diagnosis is likely to depend on rapid point-of-care diagnostic tests. Although many are now available, they vary significantly in their sensitivity and specificity, and it is unclear which would be most appropriate to use in sub-Saharan Africa. Moreover, different tests may be needed at different stages – for example, to detect initial infections, to monitor response to treatment, and to confirm cure.

The Profile-Cov project will assess the performance of promising diagnostic tests identified in a large-scale global evaluation being coordinated by the Foundation for Innovative Diagnostics (FIND). These will include both antigen tests (which detect viral proteins) and antibody tests (which detect SARS-CoV-2-specific antibodies). The results from the rapid diagnostics will be compared with those from 'gold standard' molecular testing.

Impact

The Profile-Cov project will shed light on the dynamics of immune responses to SARS-CoV-2 in an African population, as well as their associations with clinical outcomes. This information will inform key areas such as vaccine design and use of treatments that target the immune system. It will also be vital for interpreting the results of complementary studies on rapid diagnostics, helping to identify which tests would be most appropriate to use for diagnosis, monitoring of patients, and screening of populations in sub-Saharan Africa.

Project at a glance

Project: Profile-Cov

Project lead: Dr Dawit Wolday, Mekelle University, Ethiopia

Countries involved: Ethiopia, The Netherlands, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Medical Research Council, United Kingdom.

Diagnostic tools for COVID-19

The COVADIS project is evaluating diagnostics to detect current and past SARS-CoV-2 infection, vital tools in the control of the COVID-19 epidemic.

The challenge

Molecular tests that identify SARS-CoV-2 genetic material are the gold standard method of diagnosis, but require special facilities rare in sub-Saharan Africa. Tests that detect viral proteins (antigen tests) offer the potential for point-of-care detection of infection.

A complementary role is played by antibody tests. As antibodies to SARS-CoV-2 take 2–3 weeks to appear, they are not suitable for identifying new infections but can be used to track infection in populations so that the spread of COVID-19 can be better understood.

The project

The COVADIS project is evaluating a range of tools, including antigen and antibody tests, to provide a detailed picture of the evolution of immune response in individuals and the spread of infection in communities.

A cohort of 100 confirmed COVID-19 patients is being recruited in Burkina Faso and The Gambia. They and their household contacts will be followed for six months, weekly for the first month and then at 3 months and 6 months. The project will assess viral load, monitor for production of antibodies, and determine how many asymptomatic infections occur in households.

Specifically, the project will evaluate a point-of-care antigen-detection test developed by one of the European partners. This test, evaluated on stored samples from Belgium, has very high specificity (99%), although lower sensitivity (60%); sensitivity may be higher when fresh samples are used. Because of the high specificity, a positive result could be considered a true positive, obviating the need for confirmatory molecular testing.

The project will also establish a platform that will enable antibody responses to be assessed using convenient dried finger-prick blood samples.

Project at a glance

Project: COVADIS

Project lead: Dr Annette Erhart, Medical Research Council Unit, The Gambia at the London School of Hygiene and Tropical Medicine (LSHTM), UK

Countries involved: Burkina Faso, Belgium, The Gambia, The Netherlands, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Medical Research Council, United Kingdom.

Impact

The COVADIS project will generate data on use of a rapid and practical point-of-care antigen-detection test for COVID-19 in a sub-Saharan African setting. As test results would be available within 15 minutes, isolation and contact tracing could begin almost immediately. The study will also generate important evidence on the acceptability and usability of the test, including potential use in health facilities and in people's homes.

Work on the patient cohort will provide important data on the dynamics of transmission in households, including the role of asymptomatic infections. The intensive characterisation will enable links to be drawn between viral shedding, immune responses and clinical symptoms. The data will be highly relevant to public health responses, and the project team has established close links with ministries of health in the two countries to ensure rapid communication of results to local health authorities.

High-throughput testing for SARS-CoV-2 antibodies

The ASCENT project will introduce into sub-Saharan Africa a laboratory technology for rapid and high-throughput testing to detect SARS-CoV-2 antibodies in blood samples.

The challenge

In the absence of a vaccine or treatment for COVID-19, there is a need to identify cases as rapidly as possible so that timely control measures can be implemented. Knowledge of the numbers of infections in a population is also vital information for public health authorities planning control strategies.

Detection of antibodies to SARS-CoV-2 is the most practical way to gather information on the current and past infection status of individuals within a population, providing data that can be used to generate local models of the COVID-19 epidemic.

The project

The ASCENT project is transferring a laboratory-based approach that offers the potential for rapid, high-throughput, and highly sensitive and specific detection of antibodies to SARS-CoV-2.

Project team members from Switzerland have developed a robust assay based on Luminex bead technology – microscopic magnetic beads coated in antibodies that recognise specific structures of interest (such as anti-SARS-CoV-2 antibodies). The technology is highly sensitive, relatively easy to use, and enables results from hundreds of samples to be available within a few hours.

The project will also validate and implement a newly developed SARS-CoV-2 neutralisation assay in African laboratories. This test determines how effective antibodies produced by patients are at preventing SARS-CoV-2 infection of cultured cells. This provides important information on the most protective types of antibody, and enables correlations to be made between neutralising ability and clinical symptoms.

The project is transferring the technology and expertise to carry out these assays to laboratory teams in Burkina Faso, Guinea and South Africa.

Project at a glance

Project: ASCENT

Project lead: Professor Yves Levy, Institut National de la Santé et de la Recherche Médicale, France

Countries involved: Burkina Faso, France, Guinea, The Netherlands, South Africa, Switzerland

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden, the - Swiss Agency for Development and Cooperation (SDC) and the Swiss National Science Foundation (SNSF).

Having validated the assays in sub-Saharan African settings, the project will then collect data on local populations to provide an indication of local levels of infection and generate local models of the COVID-19 epidemic.

Impact

The ASCENT project is introducing an important new infection-detection technology into laboratories in three countries in sub-Saharan Africa. It will provide these countries with the capacity to rapidly screen populations for the presence of SARS-CoV-2 antibodies, providing an accurate and up-to-date picture of the spread of COVID-19 in particular communities. This will provide local health authorities with vital information for planning COVID-19 control measures and for developing mathematical models to forecast the potential spread of infection and the impact of control measures.

Mapping antibody responses to COVID-19

The ImmunoCoV project aims to validate tests for COVID-19 antibodies and generate a detailed picture of antibody responses and their link to symptoms and control of viral replication.

The challenge

Although it is not certain, SARS-CoV-2 infection is likely to lead to the production of antibodies that protect against re-infection. Identification of people with SARS-CoV-2 antibodies could therefore support targeting of control measures to vulnerable, uninfected individuals.

However, a diverse range of antibodies are produced in response to SARS-CoV-2 infection, and there is a need to dissect immune responses to determine which are most important for controlling virus replication, preventing infections, or contributing to symptoms.

The project

The ImmunoCov project aims to validate antibody-based tests for COVID-19 in an African population, and also provide detailed data on the evolution of immune responses and their association with viral reproduction and symptoms.

Working with European industrial and academic collaborators, researchers from Kenya are evaluating a range of technologies for detecting different types of antibody recognising different SARS-CoV-2 proteins, as well as antibody-secreting cells. IgM antibodies, for example, may be markers of current infection while IgG antibodies could be indicators of past infection. The project will also assess methods for analysing different classes of T cell, which have the potential either to boost or to dampen down immune responses to the virus.

In the second strand of the project, researchers will track cohorts of symptomatic and asymptomatic individuals with confirmed SARS-CoV-2 infections. The project will use the validated tests to assess antibody and T-cell responses during the course of infection and recovery, and will also monitor clinical symptoms and levels of virus.

Project at a glance

Project: ImmunoCoV

Project lead: Dr Francis Ndungu, KEMRI–Wellcome Trust Research Programme (ARCH Ltd)

Countries involved: Kenya, The Netherlands, Sweden

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

As antibody responses take time to appear, the project is also using RNA sequencing technologies to identify genes that are activated early in infection and are associated with the development of protective immunity, symptoms and viral load. This work is focusing on genetic makers of innate immune response – early, non-specific protective responses.

Finally, the project will also generate monoclonal antibodies based on antibodies from COVID-19 survivors with the strongest viral neutralisation abilities. These will have potential use as therapeutics.

Impact

The ImmunoCov project will generate validated tools for use by researchers investigating COVID-19 immune responses in sub-Saharan Africa and by public health official aiming to control the epidemic. Antibody-based tests could be combined with PCR for diagnosis or for screening social contacts. Population surveys could underpin modelling and design of public health responses, including isolation of the vulnerable in high-risk areas, and allow long-term surveillance to be undertaken to detect flare ups.

Assessing antibody therapeutics for COVID-19

The COVAB project is aiming to identify antibodies from COVID-19 patients with the potential to be used therapeutically.

The challenge

There is great interest in the use of antibodies from recovered patients to treat SARS-CoV-2 infections. However, this requires a good understanding of the antibodies produced after infection and which are mostly strongly associated with protection.

A further important factor to consider is the impact of past infection with other coronaviruses. This past exposure may trigger more protective responses, but could also elicit exaggerated and damaging immune reactions.

The project

The COVAB project is building on the foundation of two EDCTP-funded projects, CHAPS and PrEPVaCC, in order to develop a deeper understanding of the dynamics of antibody production after infection with SARS-CoV-2 and to identify candidate antibodies to be used as therapeutics.

The project is using high-throughput technology to rapidly clone and characterise antibodies from COVID-19 patients in Uganda and UK. It will explore how these change over the course of infection, how they relate to past coronavirus exposure, and their association with severity of symptoms. The project will also clone antibodies with the most potent virus-neutralising abilities for testing as possible therapeutics.

Complementing this work, the project is also setting up an innovative 'ex vivo challenge model' for testing potential therapeutics. This model will be based on cultured mucosal tissue samples, which were collected from 50 healthy adults in South Africa. The tissue samples will be deliberately exposed to SARS-CoV-2. As well as being used to test the potential of candidate therapeutics to prevent infection, the challenge model will be used to determine whether tissue from recovered COVID-19 patients can be re-infected, whether SARS-CoV-2 infectivity is affected by factors such as HIV status, age and inflammation, and how infection and preventive treatments affect mucosal immune responses.

Project at a glance

Project: COVAB

Project lead: Dr Julie Fox, King's College, UK

Countries involved: South Africa, Sweden, Uganda, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

A final strand of the project is taking advantage of existing community relationships to gather information that could shape the design and implementation of a future COVID-19 vaccine trial.

Impact

The COVAB project has the potential to make several important contributions to the battle against COVID-19. Longitudinal profiling will provide insight into the evolution of antibody responses, which will aid interpretation of antibody testing results. Determining whether re-infection is possible is of great importance, and could have a major influence on public health responses, vaccine-testing strategies and modelling of herd immunity. A better understanding of the impact of HIV, age and pre-existing inflammation, as well as past exposure to other coronaviruses, on susceptibility to infection and disease severity would also be of great value.

In terms of therapeutics, the ex vivo model – the first based on mucosal tissue samples – will provide a rapid way to screen potential treatments in advance of trials. Finally, antibody characterisation could identify possible those with therapeutic potential and suggest which antibody-based treatments are most likely to be effective.

Testing BCG vaccination to prevent COVID-19

The RE-BCG-CoV-19 project is testing whether revaccination with BCG protects healthcare workers from infection with SARS-CoV-2 or reduces the severity of symptoms.

The challenge

BCG is used in many countries to prevent TB infections in children. However, there is some evidence that BCG has more general stimulatory effects on the immune system and enhances protection against other infections.

Furthermore, preliminary analyses suggest that countries with routine BCG vaccine programmes have been less badly affected by COVID-19. However, the evidence is not yet strong enough for BCG to be recommended as a preventive intervention for COVID-19.

The project

The RE-BCG-CoV-19 project aims to determine whether BCG revaccination of front-line health workers in South Africa, who are at significant risk of acquiring SARS-CoV-2 infections, prevents infection or reduces the severity of symptoms.

The project is conducting a placebo-controlled trial (NCT04379336) involving at least 500 healthcare workers at clinical sites in South Africa. Participants will be followed up for a year, during which they will be regularly tested for SARS-CoV-2 infection, and their general health will also be monitored. Impacts on TB acquisition will also be assessed, as well as the effects of latent TB infections on COVID-19-related morbidity and mortality.

Regular interim data assessments will be undertaken, with data reviewed by an independent data safety and monitoring board. If early signs are detected that BCG revaccination is proving protective, it will therefore be possible to rapidly roll out vaccination more widely. The trial protocol is aligned with studies conducted in Europe and elsewhere to make it possible for later meta-analyses of pooled results.

Complementing this clinical study, the project team is also planning to use a novel 'organoid' model to explore the cascade of events following SARS-CoV-2 infection. Organoids are complex three-dimensional cellular assemblages that can be grown in culture and form structures resembling human lung tissue. As they include cells of the immune system, they can be used to track immune responses following SARS-CoV-2 infection of lung epithelial cells, which will help to identify responses associated with control of virus replication. The model will also provide a way to assess the impact of BCG vaccination on SARS-CoV-2 infection and viral replication, and shed light on the immune mechanisms underlying any protective effect.

Project at a glance

Project: RE-BCG-CoV-19 project

Project lead: Professor Andreas Henri Diacon, Task Foundation-NPC, South Africa

Countries involved: The Netherlands, South Africa, Spain, Sweden

Target population(s): Healthcare workers

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

Impact

BCG has been used since the 1920s to protect against TB disease. It is safe, affordable and widely available. Therefore, if the RE-BCG-CoV-19 project identifies a protective effect, it could be rapidly introduced to mitigate the impact of COVID-19. RE-BCG-CoV-19 project data will complement other studies being carried out on BCG, contributing data specific to an African population. In addition, the laboratory studies will provide important insight into mechanisms of protection, to inform the development of other interventions.

Testing BCG vaccination to prevent COVID-19

The BCG-COVID-RCT project is assessing whether revaccination with BCG protects healthcare workers from the worst effects of SARS-CoV-2.

The challenge

BCG is used in many countries to prevent TB infections in children. However, BCG may have more generally stimulatory effects on the immune system, boosting early non-specific immune responses and enhancing protection against a range of infections. Notably, BCG vaccination is associated with reduced numbers of childhood infections, including respiratory infections.

Healthcare workers play a critical role in the response to COVID-19. However, their work puts them at increased risk of SARS-CoV-2 infections, and unrecognised infections may also contribute to the spread of infections in clinical settings. Healthcare workers currently account for up to 20% of COVID-19 cases in some countries.

The project

The RE-BCG-CoV-19 project aims to determine whether BCG revaccination of front-line health workers in three sub-Saharan African countries – Capo Verde, Guinea-Bissau and Mozambique – offers protection against COVID-19.

The project is organising a placebo-controlled trial involving 1,050 healthcare workers at clinical sites in the three countries who will be followed up for six months. Its principal outcome measure is the number of days that health care workers are not at work because they are unwell. Although complete BCG revaccination is unlikely to confer complete protection, the project team hypothesise that the numbers of days lost could be reduced by 20%, which would have a significant impact on healthcare delivery.

Data from the study will be pooled with that from ongoing studies of BCG vaccination in other locations, including high-income countries such as The Netherlands and Australia, to support a meta-analysis and to identify any differences in impact in low-resource settings with a high disease burden.

Project at a glance

Project: BCG-COVID-RCT

Project lead: Dr Christine Stabell Benn, University of Southern Denmark

Countries involved: Cape Verde , Denmark, Guinea-Bissau, Mozambique, Portugal

Target population(s): Healthcare workers

Year funded: 2020

EDCTP funding: €0.5 M

Impact

The RE-BCG-CoV-19 project will rapidly generate data on the impact on COVID-19 of a safe, affordable and widely available intervention. Although BCG is unlikely to offer complete protection, it could have a significant impact on disease and be rapidly introduced to protect healthcare workers or other vulnerable populations, such as older people. As well as protecting healthcare workers, it would also ensure they could continue offering care to COVID-19 – an important outcome given the major health labour force shortages in sub-Saharan Africa.

In addition, evidence of a protective effect against COVID-19 would also support use of BCG revaccination as an early response to other infectious disease outbreaks.

Developing a platform for COVID-19 drug trials in Africa

The ANTICOV project is putting in place mechanisms to enable the rapid launch of international multicentre trials of COVID-19 therapeutics in sub-Saharan Africa.

The challenge

COVID-19 is a new disease, and there is an urgent need to develop new drugs to treat it. Despite the urgency of the situation, it is essential that potential new treatments are rigorously evaluated through clinical trials to ensure that they are safe and efficacious.

Numerous clinical trials of drugs for COVID-19 have been launched, mostly evaluating existing treatments developed for other uses. However, only a small proportion of these trials are being carried out in sub-Saharan Africa.

The project

The ANTICOV project is establishing a platform that will enable trials of COVID-19 therapeutics to be rapidly launched in an African setting. Sub-Saharan Africa countries have limited critical care capacity for the most seriously ill, so the project is concentrating on mild disease, with the objective of preventing the numbers progressing to severe illness and overwhelming underdeveloped health systems.

The project is aiming for flexibility, so that the most promising interventions can be evaluated, by comparison with paracetamol. The focus would be on treatments that would be feasible to use in resource-restricted settings, with an adaptive trial design that would allow new treatment arms to be added and modifications made according to local country contexts. The platform will also provide an opportunity to address other important questions, including factors associated with progression to severe illness and treatment strategies for specific groups (such as those with HIV and/or TB infections, pregnant women).

Preparatory activities include development of a template clinical trial protocol and discussions with country regulatory and ethics review authorities to ensure rapid review, drawing on the coordinating role played by the African Vaccine Regulatory Forum (AVAREF). EDCTP funding is supporting the development of a data management system to facilitate efficient data collation and dissemination. Initial trial sites are being chosen and prepared in the Democratic Republic of the Congo and Kenya.

Members of the ANTICOV consortium are all members of the global COVID-19 Clinical Research Coalition, which has more than 150 members from 40 countries, ensuring that its activities will be informed by the latest evidence on COVID-19 and coordinated with other global efforts.

Impact

The ANTICOV project is establishing a platform for clinical trials of COVID-19 therapeutics in sub-Saharan Africa, complementing the work being carried out by WHO (e.g. the SOLIDARITY trial) and by other global and national bodies. It will be able to support the rapid initiation of studies to generate evidence on interventions with the potential to reduce the numbers of severely ill COVID-19 patients, easing demands on limited specialist healthcare facilities in sub-Saharan Africa.

Project at a glance

Project: ANTICOV

Project lead: Dr Nathalie Strub-Wourgaft, Drugs for Neglected Diseases Initiative, Switzerland

Countries involved: Democratic Republic of the Congo, Kenya, Spain, Switzerland, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.2 M

This EDCTP2 project is supported by the European Union with additional funding from the Swedish International Development Cooperation Agency (Sida), Sweden.

Disrupting urban COVID-19 transmission

The TraCE project will provide important data on the spread of COVID-19 in a crowded urban environment, and evaluate an intervention to limit the spread of infection in such settings.

The challenge

The spread of COVID-19 is highly dependent on environmental factors. Urban environments, where people are closer together, provide more opportunities for the virus to spread. In particular, high-density communities in low-income areas, where social distancing and good hygiene practices may be difficult to practise, could be extremely vulnerable to COVID-19.

A significant proportion of South Africa's 55 million population live in urban and peri-urban areas, including informal settlements. It is vital to gain a better understanding of how COVID-19 spreads in such communities and how it can best be contained.

The project

The TraCE project aims to identify and follow 120 people with confirmed COVID-19, as well as their household contacts, in a resource-limited, densely populated community in Cape Town, South Africa. The project builds on well-established mobile screening units, which were set up to provide HIV counselling and testing services, alongside a wider range of health services. These, along with public sector clinics, will be used to identify cases.

A total of 120 households will be recruited and followed for one month, with half receiving an intensive infection mitigation intervention (STOPCOV) administered by lay health workers and the other half being given standard advice on infection prevention. The intervention includes guidance on infection control, basic supplies (such as masks and hand sanitiser), and regular telephone calls and text messages.

Cases and household contacts will record symptoms and be regularly tested, using molecular and antibody detection tests. As well as effects on the spread of infection, the study will also investigate adherence to the intervention and psychosocial impacts, for example on loneliness and social stigma. A process evaluation will assess the acceptability and feasibility of the intervention.

Project at a glance

Project: TraCE

Project lead: Professor Linda-Gail Bekker, Desmond Tutu HealthFoundation, South Africa

Countries involved: The Netherlands, South Africa, UK

Target population(s): All

Year funded: 2020

EDCTP funding: €0.5 M

This EDCTP2 project is supported by the European Union with additional funding from the Medical Research Council, United Kingdom.

Impact

The TraCE project will provide key information on the spread of SARS-CoV-2 in a low-resource urban setting, including infection rates and the incidence of asymptomatic disease. It will also determine whether a practical intervention, tailored to the specific local context, is effective at reducing transmission of infection. The results will be highly relevant to South Africa, but also generalisable to other countries in sub-Saharan Africa with resource-poor urban and peri-urban communities.


OAKS

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Acknowledging our funders

We gratefully acknowledge the support of the following cofunders of the projects highlighted in this publication:

Sida

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR, DE LA RECHERCHE ET DE L'INNOVATION
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Science and Innovation
REPUBLIC OF SOUTH AFRICA

European & Developing Countries Clinical Trials Partnership

The Hague, the Netherlands, December 2020

The EDCTP2 programme is supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation.

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Cover photo:
XACT medical staff and study volunteer, South Africa

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