



Cambridge-Africa Response to COVID-19



UNIVERSITY OF
CAMBRIDGE

A report prepared for the Trustees of The Alborada Trust

MARCH 2022



The University of Cambridge extends its gratitude to the Trustees of The Alborada Trust for their support of the Cambridge-Africa Alborada Research Fund.

Thanks to this generosity, the programme was able to set up an emergency award scheme in April–June 2020 to address COVID-19-related problems in Africa. Dr Tabitha Mwangi, Cambridge-Africa Programme Manager, provides an update on how the Fund was used to digitally fabricate facemasks, bolster diagnosis and study the impact of the pandemic on education, to list only a handful.

An update from **Dr Tabitha Mwangi**

Cambridge-Africa Programme Manager

“

When the COVID-19 pandemic hit, Cambridge-Africa launched an emergency award scheme in April–June 2020, from the Cambridge-Africa Alborada Research Fund. Each award (of up to £20,000) brought together researchers from African research institutions and universities with partners at the University of Cambridge, to work together to address COVID-19-related problems on the continent.

A total of 14 projects were funded in 8 African countries: 3 in Ethiopia; 2 each in Somalia, Malawi, Nigeria and Ghana; 1 each in Madagascar, South Africa and the Democratic Republic of Congo.

The grants funded projects on a wide range of topics including: Digital fabrication of facemasks (2), boosting diagnosis through either provision of equipment (2) or development of new assays (1), social media during the pandemic (3), impact on education (2) wellbeing (2) and immunology (1).

We here present a series of studies (7/14) that highlight some of the projects selected, covering a variety of topics and countries. What has been particularly heartwarming is that the output from these projects has so impressed other donors that they have provided additional funding which has led to the continual growth of the work.



“The output from these projects has so impressed other donors that they have provided additional funding which has led to the continual growth of the work.”

Digital Fabrication of Face Shields

Rapid response to crisis using digital fabrication in Malawi and Ethiopia

The genesis of this project was a Facebook post in April 2020 from a Malawian engineer, Mayamiko Nkoloma, who was printing 3D reusable face shields at a time of global shortages. Mr Mayamiko, from the Malawi polytechnic (University of Malawi), partnered with Dr Lucia Corsini (University of Cambridge) and other colleagues to build a case for funding to help him upscale his work. Within two months of receiving the award, Twenti Makerspace was established, with 12 3D printers and 1 laser cutter in place.

The project employed 25 people, with 10 trained in digital fabrication. Within several weeks, they had printed 1,000 reusable face masks that they donated to Kamuzu Central Hospital in Lilongwe and a further 1,000 for Queen Elizabeth Central Hospital, Blantyre, with an additional 168 face shields to Chisawani Rural Primary School, Mpemba, Blantyre. Over 3,000 shields were sold to local small businesses.



Above: Twenti Makerspace in Malawi.



Above: Children from Chisawani Rural Primary school, Mpemba, Blantyre, Malawi – Wearing face shields donated to them from Twenti Makerspace.

The project generated a lot of international interest and, locally, the Malawi Agriculture and Industrial Investment Corporation (MAIIC) provided additional funds (£10,000) to continue the work.

The success of this project inspired a replication in Ethiopia. Knowledge-exchange sessions were organised between Twenti Makerspace in Malawi and BiT Makerspace in Ethiopia. Dr Seifu Tilahun at the Bahir Dar Institute of Technology at Bahir Dar University and Dr Lucia Corsini partnered and used their award to equip BiT Makerspace with digital fabrication equipment. They were able to make 3,000 face shields and over 2,000 face masks which were distributed to hospitals in various cities in Northern Ethiopia, including Bahir Dar and Gonder. The project has expanded with funding from Madison-Bahir Dar Sister Cities Project and the University of Wisconsin-Madison's Global Health Institute.

At the time of writing, both makerspaces are still active. The team in Malawi are producing face shields at Twenti Makerspace with new funding (100,000 Euro) from the EU and the South Africa Development Community (SADC). The team in Ethiopia are working on a range of different health and agricultural solutions at BiT Makerspace.

Boosting provision of diagnostics

Diagnostic equipment for Madagascar and the Democratic Republic of Congo

In both the Democratic Republic of Congo (DRC) and Madagascar, as in most countries in sub-Saharan Africa, COVID-19 cases were initially restricted in large urban cities that often have better-equipped laboratories, making diagnosis more manageable. However, as the disease spread to rural areas, there was an urgent need for portable, easy-to-use diagnostic kits. In partnership with Professor Gordon Dougan (Department of Medicine, University of Cambridge), Dr Sheila Makiala of Institut National de Recherche Biomédicale (INRB) in the DRC and Professor Raphaël Rakotozandrindrainy from the University of Antananarivo (UoA) in Madagascar were awarded funding to purchase equipment that would expand diagnostic capacity at the start of the COVID-19 outbreak. The hope was that this would support the establishment of an additional site for COVID-19 diagnostics capable of testing over 3,000 samples in each country, which would go a long way towards supporting national control efforts.

An MIC compact, portable qPCR machine, capable of running 48 samples in an hour, was chosen for the job as it was small and easy to pack and transport to rural sites. Minimal laboratory equipment and consumables are required to run these machines.

The machine, associated consumables and reagent, laptop and PPE were shipped to INRB and the DRC, where they were well received.



Above: Professor Octavie Lunguya and Professor Muyembe Jean-Jacques (technical secretary of the Multisectoral Response Committee to COVID-19) as well as the dean of the faculty of medicine at Institut Nationale de Recherche Biomédicale with two portable qPCR machines purchased as part of this grant.



Above: UoA team running qPCR on the Mic qPCR machine (red machine on desk) supplied by the Alborada Fund.

In Madagascar, the plan was to use the machine primarily in the main laboratory at the University of Antananarivo, but also for a few days a week in a rural healthcare centre in Imerintsiasosika, thereby providing greater geographic coverage.

In both the DRC and Madagascar, detailed protocols were made available to staff actively engaged in the project. Video training sessions using either Zoom or recorded videos equipped staff with the necessary skills for RNA extraction and qPCR.

Collaborators from the International Vaccine Institute in Seoul acquired additional funding to further support Madagascar with diagnostics, building on the work that resulted from this grant.

Ultimately, the equipment purchased will have broader, more flexible use for researchers at INRB and UoA for infectious disease research and diagnostics, depending on need and interest.



Media during COVID-19

Conspiracies, COVID-19 and social media in Africa: Navigating public information campaigns in a digital age

The spread of mis/disinformation and conspiracies during the COVID-19 epidemic posed a threat to disease control globally. However, interpretations of the infodemic were often framed around data from North America and Europe. Dr Stephanie Diepeveen (Research Associate, Department of Politics and International Studies, University of Cambridge) and Dr Iginio Gagliardone (Associate Professor, University of the Witwatersrand) sought to advance understanding of the COVID-19 infodemic on the African continent. South Africa and Nigeria were used as case studies because these countries have very active social media debates, with pre-existing tensions around trustworthy information.

The scientists analysed over 6 million tweets collected during the first few months of the lockdown in Nigeria and South Africa. They concluded that conspiracies were actually a small fraction of the conversations on COVID-19. Conspiracies were more pervasive in Nigeria than South Africa and, even then, they existed as clusters, away from the centre of conversations.

On the occasions when conspiracies took hold, their meaning differed according to the setting.

In Nigeria, the two conspiracies were both seized as opportunities to extend criticism to the ruling party. In South Africa, they produced distinctive responses: while the 5G conspiracy* had limited buy-in, the Gates conspiracy resonated with deep-rooted resentment towards the West, corporate interests and what is seen as a paternalistic attitude of some external actors towards Africa. In Nigeria, Gates became caught up in concerns over domestic political legislation, service delivery and corruption. In South Africa, more existential concerns about Western lack of interest, and even malevolence towards the African continent, circulated.**

From their analysis, Dr Diepeveen and Dr Gagliardone concluded that simple interpretations of conspiracies fail to take into account the experiences of different populations. There is not one infodemic, and therefore the approach to counter them should differ by region. Promoting factual information to fight conspiracies is likely to fail as it does not take into account the context around mistrust or what people actually do with conspiracies. Success is more likely if campaigns are structured around what people do with conspiracies.

The next phase of this research will dig deeper into conspiracies around COVID-19 vaccines, and dynamics of trust and mistrust in public authorities around their interventions on social media.

Read the full article here: <https://journals.sagepub.com/doi/full/10.1177/20563051211044233>

** 5G conspiracy: The COVID-19 pandemic coincided with the launch and development of the 5G mobile network. This association gained traction as poorer nations with no 5G network seemed to be less affected by the pandemic. The conspiracy gained such traction in the UK that 5G masts were torched.*

*** Gates Conspiracy: In 2015, Bill Gates, the billionaire Microsoft founder, gave a talk about the possibility of a global pandemic in the future. This inspired conspiracies that he had deliberately created the SARS-CoV-2 virus in order to deploy vaccines that were engineered to control people. In Africa, the conspiracy theories were around population control through vaccination.*

Responding to COVID-19 in Somalia: interactive mass media, 1-to-1 messaging and rapid insights from citizen feedback

For public health messages to be effective, communicators need to understand what the public is thinking in order to make informed decisions on what to emphasise. In the midst of a fast-spreading disease, information gathering needs to be quick. In Somalia, Africa's Voices Foundation has in the past used a platform, Imaqal, to gather information that has been used to design media productions focusing on gender equality and inclusion.

Using this platform, Dr Sharath Srinivasan (Department of Politics and International Studies, University of Cambridge) and Dr George Gathigi (University of Nairobi, Africa's Voices Foundation) partnered to explore its usefulness during the COVID-19 pandemic.

To kickstart data collection, a question was posed during a radio program: 'What are your thoughts on COVID-19 and coronavirus?' A mobile number was provided through which people could respond using free SMS.

Data were collected from 3 to 5 April 2020. Over 15,000 messages were received, and the analysis completed by 9 April. The results were disseminated quickly in order to provide information needed to ensure that health messaging for COVID-19 took into account the local context.

The responses fell into two broad categories. The most common response to the question 'What are your thoughts about COVID-19 and coronavirus?' centred around religion. The understanding was that 'trust in Allah' would keep the disease at bay. This religious response, focused on hope and fate, was more prominent in older participants.

The second most common response was that following government and expert advice (safe practice) was important. This response was more common in young people, especially women.

A less common but more worrying response for public health practitioners was based around rumours and misinformation. This was more frequent in people who were most recently displaced and had poor access to healthcare. Misinformation was mainly around hostility, the idea that it was 'outsiders' and non-Muslims who were bringing COVID-19 to Somalia but that Somali Muslims would not get the disease.

One of the main conclusions of this study was the importance of paying attention to what trusted authorities, in this case religious figures, are saying. Bypassing the main authority (religious) would likely create a vacuum that could be filled with negativity.

The scientists observed that there was strong community solidarity around right practice, especially among women. The strong collective 'we' element creates an opportunity of framing messages around community rather than individual benefit.

When approaching health messaging within this setting, communication should be empathetic, using trusted channels and platforms.

Feedback from this research was communicated to stakeholders within the country as well as the donor community so that they could be put to use in formulating effective health communication as the outbreak unfolded.

Education

The effects of COVID-19 on education in Ethiopia

School closures were part of the panel of recommended global public health measures made to minimise transmission of the virus. Ethiopian schools were closed from March to October 2020. Professor Tassew Woldehanna (President at the Addis Ababa University Policy Studies Institute) and Professor Pauline Rose (REAL centre director at the Faculty of Education, University of Cambridge) explored how school heads and teachers responded to the closures.

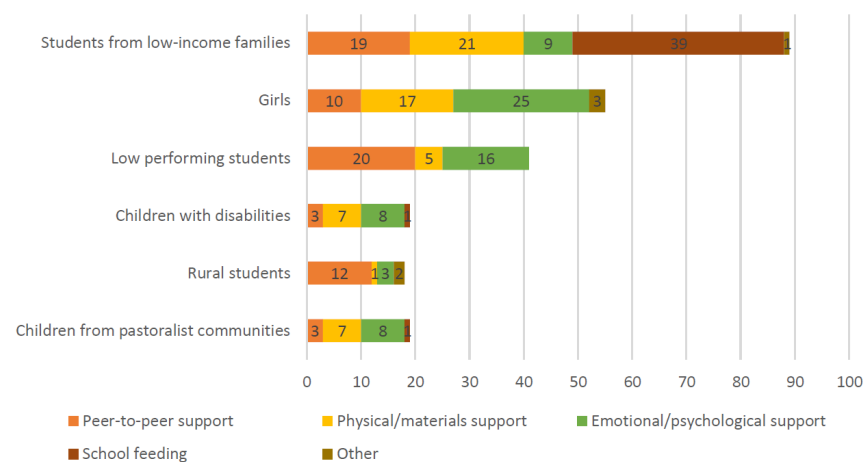
A total of 127 schools from 7 regions across Ethiopia participated in the study which was conducted through phone surveys. A total of 316 teachers and 127 school principals were recruited into this study. The scientists studied the support that school heads and teachers were able to give parents and students during lockdown and what they considered to be priority areas when schools re-opened.



Above: An empty classroom in Ethiopia.

During the closure, distance-learning support was offered through radio broadcasts and occasionally by teachers. Several factors led to poor delivery of distance learning. Few heads of schools and teachers had access to a computer or Internet; therefore, lack of resources and infrastructure was a leading factor, although teachers also lacked the confidence to deliver online teaching. Regional differences were observed, with teachers and students from rural schools experiencing lower levels of support than those in urban settings.

It is worth highlighting the fact that schools offer more than learning and students missed out on other forms of support, as illustrated in the diagram below.



Above: Types of support that students are likely to miss out on as a result of school closures.

It is also worth noting that students from low-income families missed out on school feeding programmes, while girls did not get the emotional and psychological support provided at school.

Priority issues when schools opened was concern that poorer students, especially those from rural areas, as well as girls, were likely to drop out of school. School heads and teachers raised the need for strategies to encourage parents to send their children back to school. Part of the government plan was to promote all the children to the next class when the school year began. This would encourage high-performing students but would seriously disadvantage those who were already behind. Participants emphasised the importance of tutorial sessions for helping them to catch up.

Findings from this study were disseminated in a workshop held on 19 September 2021 in Debre Zeit in Ethiopia and were well received by Ethiopian Ministry of Education officials. On 21 September, a webinar with international donors and stakeholders was held online. The data have been published and presented in several seminars and conferences.

This research has been beneficial in leveraging further funding from the Gates Foundation and Lego Foundation, comprising an additional £500,000 approx. in total. This additional funding will be used to investigate the effects on learning loss as schools reopen in Ethiopia.

Immunology

SARS-CoV-2 immune correlates of protection in Nigeria (SIP-NG)

What does a protective immune response against SARS-CoV-2 look like? This was the question that Dr Uguw Alphonsus Chinedu (Africa Centre of Excellence for Genomics of Infectious Disease Redeemers' University Ede, Osun State, Nigeria) and Professor Jonathan Heeney (Department of Veterinary Medicine, University of Cambridge) sought to answer. The objective of their collaboration was to understand the elements of the human immune response that offered protection to COVID-19 survivors in Nigeria.

This would be achieved through comparing the immune responses of 100 COVID-19 survivors with those of 50 healthy individuals plus 50 stored samples collected before the pandemic began. B cell, T cell and cytokine responses were studied.



Above: In the laboratory.

This project faced delays in the procurement of reagents and at the time of writing this report, 140 participants from three clinical sites had been recruited. In total, 114 were survivors (positive RT-PCR), while 26 participants were naïve (no record of RT-PCR test or vaccination). The target for survivor recruitment was 100, so this has been surpassed. Using the available samples, both the ELISA and T cell ELISPOT assays have been validated.

The results show that 80% of survivors had IgG antibodies to the receptor-binding domain of the spike protein (RBD) compared to 54% of the negative participants. However, 98% of the survivors had IgG response to the N protein compared to 79% of the negative participants. However, using Luminex Multiplex ELISA, all survivors had IgG responses to the full-length spike protein, RBD and N protein.

These results may suggest that the 'negative' samples during the time of the outbreak may actually have been exposed. Once the data from the samples collected before the outbreak have been analysed, the interpretation of the data will be clearer.

The level of neutralisation of the antibodies varied, with the Beta variant being most evasive, although that analysis is still ongoing. More experiments are being conducted and those results will paint a fuller picture of the situation.

The participants will be followed up for six months to a year in order to observe the protection offered via these exposures. As many of the participants will also be vaccinated during the process, scientists will be able to observe both natural immunity from infection as well as that acquired from vaccination.

On top of providing valuable knowledge about the immune response to SARS-CoV-2 in Africa, this grant has led to the training of eight Luminex multiplex ELISA laboratory staff in the three sites who collect and process the samples independently. Two master's students have been trained on this project.

As a result of this study, the team has received funding from Africa Centres for Disease Control and Prevention to train more laboratory personnel from 13 African countries.



Above: The team at ACEGID, Dr Uguw Alphonsus Chinedu, second from the right in dark blue.



Contact

Linda Hindmarsh

Senior Associate Director – School of Biological Sciences

University of Cambridge Development and Alumni Relations

1 Quayside, Bridge Street

Cambridge

CB5 8AB

Tel: +44 (0)1223 332288

Email: linda.hindmarsh@admin.cam.ac.uk

www.cam.ac.uk/yourscambridge



**UNIVERSITY OF
CAMBRIDGE**

Dear World...
Yours, Cambridge

The campaign for the University
and Colleges of Cambridge