COVID-19 Africa Rapid Grant Fund Project Abstracts

Research Strand

Name: Professor Bokang Calvin Maswabi

Institution: University of Botswana

Country: Botswana

Project Title: Quantitative and qualitative pathological changes in the immune system of patients infected with SARS-CoV-2

Project Abstract

In December 2019, the ongoing outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic broke out in Wuhan china and rapidly spread around the globe. As a new type of a highly contagious disease in humans, current understanding of the disease is incomplete, and information is revealed daily. Coronavirus is an RNA virus consisting of positive-sense single-stranded RNA of approximately 27-32 kb. It belongs to the family Coronaviridae, which comprises of alpha, beta, delta, and gamma coronaviruses. The disease is characterised by asymptomatic disease in about 85% of affected individuals and a severe pneumonia which requires ventilation in 15% of the affected. An additional 5% of those affected proceed to much more severe disease necessitating supplemental oxygen due to hypoxemic respiratory failure combined with multiorgan failure. Research work will be done to interrogate changes that occur on the immune system by looking at all cellular subsets involved in the immune response, cytokine production and immunoglobulin production in response to infection with SARS-COV-2. The main goal is to investigate the cellular and cytokine changes that characterize the immune response to SARS-COV-2 infection in the following subgroups: patients with asymptomatic, mild/ moderate and severe symptomatic infection; and people who have been directly exposed (to patients with infection) but remain uninfected and/or asymptomatic. Using this information, new biomarkers and novel targets for immunomodulation can be identified which can facilitate prognosis and disease management since currently no effective treatment exists. The analysis of biomarkers and immune responses will help us to understand the dynamics of SARS CoV 2 infection in asymptomatic patients, symptomatic patients and close contacts (who test negative) of patients with Covid-19.

Expected Outputs

- Research papers to be published which will aid in the understanding of immune system reaction to CoVID-19 a paper will be published in a high impact factor journal, this will be accompanied by participation in conferences to further disseminated the information learned.
- The variant analysis which will be performed will aid in the identification of strains circulating in Botswana, their virulence and transmissibility and importantly the efficacy of available vaccines on these strains. This information will be shared with key policymakers to enable then to plan accordingly.

Name: Professor Oitshepile MmaB Modise

Institution: University of Botswana

Country: Botswana

Project Title: Reflection on Botswana and Malawi's Covid-19 Vulnerability Risks Factors: Towards Equity Interventions

Project Abstract

This project is an urgent response to a rapidly evolving global health pandemic, COVID-19. While impacting the whole world, it is experienced by communities in Africa in vastly different ways. The proposed study will investigate and document the distinct and diverse vulnerability factors of Botswana and Malawi. There are many factors to consider when looking at vulnerabilities to COVID-19. Besides the aggregated HDI and population numbers, these include gender, race, disability, social-economic demographics, income, ethnicity and concomitant non communicable diseases. Experiences and evidence-based lessons link these factors to COVID-19 fatalities.

The scale of COVID-19 infections and challenges is expectedly different in Botswana and Malawi. As of June 12, 2020, Botswana had 48 confirmed positive cases, 24 recoveries, 18 transferred out, 5 active cases and one death while Malawi recorded 481 confirmed positive cases, 65 recoveries, 412 active cases, and 4 confirmed deaths. The Lancet publication, "Redefining vulnerability in the era of COVID-19", brought to light that the strategies of social distancing and frequent hand washing are not easy for the millions of people who live in unplanned crowded settlements, low income communities and those insecure housing, and poor sanitation and access to clean water.

These challenges are played out differently in these two countries involved. Furthermore, Botswana and Malawi provide contrasts in terms of Human Development Index (HDI) and populations. Botswana has a HDI of 0.717 and a population of 2,351,627, while Malawi has an HDI of 0.477and population of 19,129,952 (World Population Review, 2020). Another contrast is in the management of COVID-19 in the two countries. This study intends to provide an assessment of COVID 19 risk factors associated with gender, race, disability, social-economic demographics, income, ethnicity and concomitant non communicable diseases. The proposed study is innovative in adopting an integrated or mixed approach of classical research inquiries such as ethnography and phenomenology, from the qualitative approaches and the day-to-day communication of Africa indigenous communities such as story-telling. As well, quantitative approaches that use descriptive data, t-test and regression shall be used. The main target shall be those who have experienced the COVID-pandemic and can provide information on COVID-related deaths like village leaders and relatives.

This initiative will support interconnectivity, a plurality of perspectives, and a more balanced response to COVID-19, as well as inform related responses.

Expected Outputs

The main outputs are as follows:

- Detailed inception report with action plans.
- Detailed analysis report outlining vulnerability to CORONA VIRUS as it relates to gender, race, disability, social-economic demographics, income, ethnicity and concomitant non communicable diseases.
- Critical literature review report
- Digital artefacts, e.g, audio narratives to written accounts and stories, images, and materials.
- Academic articles analysing the complexities and insights provided by the research in the context of the pandemic; regional policy recommendations in each country informed by a contextualised body of evidence.
- Media outputs in the form of newspaper articles, blogs, and social media to increase the broader visibility of this work; and a published volume of work.

Name: Dr Margaret Mokomane

Institution: University of Botswana

Country: Botswana

Project Title: Detection in wastewaters, genotypic analysis and microbiome interactions of SARS-CoV-2 in Botswana and South Africa

Project Abstract

First described in Wuhan City, China in December 2020, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease it causes (COVID-19) are fast evolving subjects with significant global health concern. In Botswana, 48 confirmed COVID-19 cases resulting in a single fatality have been reported as of 10th June, 2020. Faecal shedding of SARS-CoV-2 RNA from COVID-19 patients has since been reported. For Botswana, where wastewater is occasionally used for agricultural purposes, surveillance of the SARS-CoV-2 virus in this respect is necessary to identify possible risks associated with this phenomenon. Several farms along the Gaborone wastewater system harvest and use these untreated sewage water for irrigation of fresh vegetables. The potential presence, and possible transference on fresh produce, presents renewed public health risks amid the COVID-19 pandemic especially if produce is consumed raw. Furthermore the personnel involved in the handling of these wastewaters present another potential risk. Thus, this study aims to perform molecular surveillance of SARS-CoV-2 and determine the role of wastewater environments in the genetic profile of the virus. In addition, we intend to elucidate microbial biomes associated with wastewater systems and determine their possible role in the evolution of SARS-CoV-2 in Botswana.

Expected Outputs

1. Provision of the first ever estimate of prevalence of SARS-CoV-2 in sewage water and its environs, in wastewater effluents destined for irrigation and the irrigated crops in Botswana. Detection of the virus in these environments will be significant as they may drive programs and regulations aimed at curbing the potential spread of the virus to wastewater treatment workers, farmworkers who may be exposed to SARS-CoV-2 contaminated water and vegetables and subsequently, the possible spread of the virus to the community by this group of workers.

2. In order to control and manage a disease, an in-depth understanding of the etiologic agent and its local adaptation and evolution is imperative. Therefore, knowledge on the circulating strains of SARS-CoV-2 may aid targeted treatment and consequently control and management of COVID-19 infections in Botswana. This work may provide new insights into the evolution of SARS-CoV-2 in the Botswana environment and its pattern of spread in the community. Data generated on the molecular divergence of SARS-CoV-2 strains in Botswana may aid strategies aimed at targeted treatment and control of circulating strains in Botswana. From a sub-regional perspective, it is important to understand phylogenetic relatedness and metagenomics variations of strains prevailing in Botswana and South Africa.

3. Phylogenetic data will be supplemented with biome interactions obtained from microbiome analysis. We propose to obtain microbiome data from different sanitation water ponds at GVWTP and associated air and environmental surfaces. Additional microbiome data will be obtained from vegetables and bioaerosol samples at horticultural farms irrigated with sewage water. To assess the impact of microbiota on the molecular evolution and/or adaptation of SARS-CoV-2 at these sites, we will measure mutation rates across the biomes studied herein.

Name: Dr Abitata Drame

Institution: Université Félix Houphouet-Boigny

Country: Cote d'Ivoire

Project Title: Health information and communication management during a health crisis such as Covid-19

Project Abstract

As of 18 February 2021, Côte d'Ivoire had 31,497 confirmed cases and 180 deaths due to covid. A study on the crisis communication related to the fight against coronavirus in Côte d'Ivoire is necessary.

Also, this study poses the problem of communication in covid-19 health crisis in Côte d'Ivoire. From this thought, the following main question arises: is the management of information in coronavirus crisis (Covid-19) in Côte d'Ivoire up to the complexity of this crisis?

This overarching question implies the specific questions (SQ): What are the issues of the communication actions observed in Côte d'Ivoire since the beginning of the Covid-19 crisis (SQ1)? What are the main results in terms of knowledge, attitudes, individual and collective changes in behaviour in Ivorian society (SQ2)? How can we improve the management of health information, education and communication during a Covid-19 health crisis (QS3)? These questions require the determination of environments, actors, communications, means and targets through the identification of variables and influences of messages, especially media messages.

The general objective of the project is to contribute to the improvement of health education during a Covid-19 health crisis. Specific objectives are: to create an observatory of public communication management during a health crisis; to establish a diagnosis of the management of information during the health crisis of Covid-19 in Ivory Coast; to establish a diagnosis of the health education strategy; to write strategic information notes for decision makers and to publish relevant scientific contributions.

Thus, the project actions and activities will contribute to:

- Conduct a regularly updated, multi-sectoral gender analysis to identify inequalities, gaps, and capacities to identify the specific impacts of the health crisis in covid-19 on women, girls, men, boys, and individuals in the affected populations and inform priorities for preparedness and response plans;
- Integrate gender equality and the empowerment of women and girls in addressing their health needs.

- Conduct data and information collection based on the knowledge, attitudes, practices and needs of men, women, girls, women's groups and organizations, and women community leaders in an accessible, safe and culturally appropriate manner.
- Respect gender parity wherever possible. Data collected throughout the response should be disaggregated by gender.
- Propose scientific publications with a gender perspective.

Expected Outcomes

- An observatory for public communication management during health crises is created.
- A diagnosis of information management during the Covid-19 health crisis in Côte d'Ivoire is established.
- A diagnostic on health education is established.
- Strategic information notes for decision-makers are drafted.
- - Relevant scientific contributions taking into account gender aspects are published.

Name: Dr Bi Sery Ernest Gonedele

Institution: Université Félix Houphouet-Boigny

Country: Cote d'Ivoire

Project Title: Genomic surveillance of SARS-CoV-2 viruses in bushmeat markets and perceptions of the health risks associated with COVID-19 in Côte d'Ivoire

Project Abstract

The consumption and trade of wildlife are held primarily responsible of the current COVID-19 pandemic. To date, SARS-CoV-2-like viruses have been isolated from only two Asian mammals (bat and pangolin). Given the presence of representatives of these species in Côte d'Ivoire and the magnitude of bushmeat trade in this country, it is very likely that natural outbreaks of the SARS-CoV-2 or SARS-Cov virus -2-like exists in Côte d'Ivoire.

The SARS-CoV viruses have a great capacity to cross inter-species barriers and the spectrum of their diversity remains to be described.

Because the wildlife trade is directly linked to the spread of emerging diseases, wildlife surveillance is a critical sentinel in anticipating future epidemics, especially those related to SARS-CoV-2.

Our general objective is to conduct health surveillance and a risk assessment regarding the potential for an upcoming SARS-CoV-2 epidemic in Côte d'Ivoire. Specifically, the project aims to: (i) anticipate future SARSCoV-2-like reservoirs, (ii) understand the evolution of SARS-CoV-2, iii) validate rapid RT-PCR and serological tests that are less inexpensive and (iv) implement effective measures protecting populations against new zoonoses linked to SARS-CoV-2. Hundreds of samples (tissues, blood, swabs) will be collected from bushmeat markets and in the wild for their molecular typing. The actors of the bushmeat sector will also be sensitized on the health risks.

Expected Outcomes

The following results are expected:

- the reservoirs of SARS-CoV-2 like viruses in mammals of Côte d'Ivoire are known;
- the evolutionary dynamics and transmissions between intermediate hosts of SARS-CoV-2 viruses are better understood;
- a "kit" of RT-PCR and serological tests for the detection of the SARS-CoV like viruses in a wide spectrum of potential hosts (mammals) is validated and an expertise in the rapid diagnosis of SARS-CoV surveillance using RT-PCR is made available to Côte d'Ivoire and other African countries;

- sanitary devices are installed in the targeted bushmeat markets;
- the Ivorian populations are informed and better understand the risks associated with the consumption of bushmeat;
- - educational documents (leaflets, posters, etc.) on the health risks associated with the consumption of bushmeat will be disseminated to stakeholders in the bushmeat markets and national media in African countries.

Names: Dr Alexis Kafando

Institution: Centre Muraz of the Institut National de Santé Publique (INSP), Ministry of Health

Country: Burkina Faso.

Project Title : Caractérisation moléculaire et phylogénétique des séquences génomiques du Coronavirus du syndrome respiratoire aigu sévère 2 : Diversité, profil des mutations associés au tableau clinique et réseau de transmission de la COVID-19 au Burkina Faso.

Project Abstract

Le Coronavirus du syndrome respiratoire aigu sévère 2 (SARS-CoV-2) est l'agent causal de la maladie à coronavirus 2019 (COVID-19). C'est une infection émergente et évolutive dont les premiers cas ont été rapportés en décembre 2019 à Wuhan en Chine. Le SARS-CoV-2 est la cause de nombreuses transmissions et de milliers de décès à travers le monde dont le Burkina Faso. Le génome du SARS-CoV-2 a une taille de 29 903 paires de bases. Il comprend : une polyprotéique nommée orf1ab (open Reading frame ou cadre de lecture ouvert) qui couvre les 2/3 du génome viral (21290 nt) orientation 5' et également 4 gènes qui codent pour des protéines structurales. Les protéines structurales couvrent le 1/3 du génome, orientation 3' et comprennent : 1) les protéines de surface (S), 2) les protéines d'enveloppe (E), 3) les protéines de la membrane (M) et 4) les protéines de la nucléocapside (N) (29). Le génome du SARS-CoV-2 contient également 6 protéines accessoires qui sont codées par les gènes ORF3a, ORF6, ORF7a, ORF7b, ORF8 et ORF10. Chacune de ces protéines structurales et accessoires du SARS-CoV-2 jouent un rôle spécifique dans la physiopathologie et pathogenèse de la COVID-19. La protéine S par exemple est responsable de la liaison du virus aux récepteurs membranaires et à l'entrée dans la cellule hôte. Les protéines M, E et N sont des constituants de la nucléocapside des particules virales. Comme tout coronavirus, les gènes S et N du SARS-CoV-2 sont en constantes mutations (sélection positive). Ces mutations et les adaptations pourraient affectées la stabilité et la pathogénicité/transmissibilité du SARS-CoV-2. Par exemple, les mutations au niveau du gène S ou spike peuvent modifier la pathogénicité virale ou son affinité accrue avec le récepteur de l'enzyme de conversion de l'angiotensine (ACE2). Plus récemment, les mutations dans le gène S sont l'origine de nombreux variants dite britannique (20I/501Y.V1, VOC 202012/01, ou B.1.1.7), sud-africain (20H/501Y.V2 or B.1.351), brésilien (P.1)). Ces variants sont hautement infectieux et transmissibles et pourraient échapper à de nombreux vaccins développés ou en développement. La protéine S par exemple est la cible des vaccins de Pfizer/BioNTech et de Moderna. Ils pourront également affecter l'efficacité des tests diagnostiques et la mise en place de traitements efficaces contre la COVID-19. Pour ce faire, une surveillance génomique des mutations et des variants du SARS-CoV-2 permettra d'identifier lesquels sont susceptibles de conduire aux échecs vaccinaux, thérapeutiques ou des tests diagnostiques. Elle permettra d'adapter les stratégies de riposte contre la COVID-19 et l'identification des foyers de transmission de la maladie à travers les analyses phylogénétiques associant

des données socio-démographiques et cliniques au Burkina Faso, dans la sous-région ouest-africaine et dans le monde.

Expected Outputs

1.La diversité génétique ou variants de SARS-CoV-2 circulants chez les patients infectés par la COVID-19 au Burkina Faso et leurs significations cliniques sont déterminés.

2. Le profil des mutations génétiques des séquences du génome du SARS-CoV-2 en fonction de l'évolution de la maladie chez les patients infectés par la COVID-19 au Burkina Faso est déterminé.

3. Les réseaux de transmission de la COVID-19 et les facteurs de risque associés à la propagation chez les sujets infectés au Burkina Faso sont identifiés.

Name: Dr Adey Feleke Desta

Institution: Addis Ababa University

Country: Ethiopia

Project Title: Detection and Characterization of SARS-CoV2 in the water and sanitation system of Addis Ababa

Project Abstract

Since the first confirmed case of the novel SARS-CoV-2 virus in March 13 2020, Ethiopia has marched through enhancing precautionary measures and applying practices to control the spread of COVID-19. Additionally, diagnostic facilities were set-up in EPHI at first, reportedly testing the first 1083 samples (based on data of April 1, 2020). Since April, a growing number of diagnostic testing centers have been opened and have currently reached to 46 test laboratories across the regions with the capacity of testing up to 10,000 samples per day. Up until the time this document is being prepared, a total of 192,087 tests have been conducted. With respect to the number of COVID-19 cases and death reports in Africa, Ethiopia stands fifth with 17,999 cumulative cases and 364 deaths, next to Algeria (3rd) and Kenya (4th). Compared to the total population number of Ethiopia, the daily testing capacity has reached nearly 20% (www.afro.who.int), which is among the least of all WHO member countries. Among the daily tests, the highest proportion of cases are from Addis Ababa making the capital city a hotspot for COVID-19 transmission. Furthermore, the cases in Addis Ababa tend to exhibit similar pattern to the WASH-related outbreaks and therefore, it is important to control re-emergence of the epidemic in these hotspots through predictive surveillance of the wastewater and WASH-related interventions.

The proposed research will focus in examining the five fully functional wastewater treatment plants and river catchments in Addis Ababa, where the risk of fecal contamination is high due to anthropogenic activities. Using molecular methods, comparative approaches will be employed to assess the viral loads in different sites of the river based on the type of anthropogenic activity. The output of this research will provide a knowledgebase on the quality wastewater and Akaki River water and identifies "hotspots" of severe viral pollution.

It is anticipated that the proposed study will create a unique opportunity to introduce a multifaceted approach for control of the spread of COVID-19. Currently, it is believed that enhanced testing capacity is the way towards control; in addition to the prevention strategies. The study will contribute to introducing the contribution of wastewater tests in predicting peak times before the clinical data reveals it.

Expected Outputs

The information generated will help the public health sector on understanding the current situation of the contribution of wastewater treatment plants and Akaki River to the potential burden of COVID-19 in Addis Ababa. Additionally, the genomic data generated will contribute to the global novel Coronavirus Database and adds information to the growing the viral strains across geographical locations (see covseq.baidu.com). The component that deals with source tracking of the virus will contribute to devise control strategies of the disease outbreak in the communities by the respective stakeholders.

Name: Dr Kibur Melese Engdwawork

Institution: Addis Ababa University

Country: Ethiopia

Project Title: Promoting Adoption of Preventive Actions towards Coronavirus in Addis Ababa, Ethiopia: A social-ecological model **Project Descriptive Title**

Project Abstract

The overall objective of the study is identifying optimal ways of promoting adoption of preventive actions towards Coronavirus (COVID-19) in Addis Ababa Ethiopia. Since the first case of coronavirus was reported on December 31, 2019 in Wuhan town, Hubei province, China, the virus has spread fast and wide to other countries, and the world is still in turmoil. Globally, the number of casualties is showing rapid growth. Ethiopia reported its first Coronavirus case on March 13, 2020 and the number of confirmed cases has reached 3345 with 57 deaths by June 14, 2020. In response to this global pandemic, the Ethiopian government is taking a number of actions to reduce the transmission of the disease. However, the public is still seen engaged in risky behaviors. Public health experts appear to be confused and the media is propagating sometimes unclear and conflicting messages. The fight against the virus is likely to require large investment and extended efforts. Among this, there is a need at the moment to alter people's health behavior. Yet, little has been known how to effectively promote healthy behavior against COVID-19 such as keeping physical/social distance, avoiding large gatherings and practicing personal hygiene. It appears that state actors and the media are of the opinion that disseminating information about the virus alone goes a long way to bring about behavioral changes among the populace. We postulate that individuals may lack accurate understanding about transmission/ preventive methods or do not take the disease seriously enough. Another likely hypothesis is individuals take COVID-19 seriously, but they have an optimism bias, they think they won't catch it. Another possible scenario could be individuals have awareness about transmission and preventive methods, perceive the disease to be severe, worry that they could catch it but are materially limited to take preventive actions. Thus, we propose to employee social-ecological model in order to identify the major individual and structural factors that hinder and facilitate adoption of preventive actions. Our team has been conducting an array of research activities on preventive health knowledge and behavior. Our previous experience suggested that interventions that aim at changing the health behavior of individuals should take multilevel enabling factors and barriers into account. In view of this, we propose conducting a mixed methods research to develop effective and context-based intervention strategies to promote adoption of preventive actions. The findings can be used for health promotion interventions to improve the self-efficacy

of the public and creating conducive environment for adoption of preventive actions. This could ultimately contribute to prevention and control of Coronavirus.

Expected Outputs

Expected Knowledge output and outcomes

Outputs

At the end of the research period, we will develop theory-driven effective interventions to promote adoption of preventive practices towards COVID-19 in Addis Ababa, Ethiopia. The intervention will indicate effective strategies to address individual, interpersonal, community and other barriers to adopt preventive actions that can also be implemented in other similar settings. Furthermore, contextual and technological and sector-specific factors which can support adoption to the recommended preventive actions will be identified. The outputs will be made accessible in the following ways: First, a series of research papers/reports that present scientific findings of multilayered factors that account for adoption of preventive actions and the viable ways of promoting preventive actions will be published. Second, a communication strategy manual, outlining techniques of effective communication, key messages, and effective avenues of communication targeting media professionals, government organizations, and other health message providers will be developed. Third, a policy brief which presents key interventions at the individual, community, and national levels, as well as sector-specific intervention will be drafted.

Outcome

This project aspires to inform the scientific community, health communicators, and policy makers. The outputs of the project will help community actors, NGOs and policy makers design and implement effective intervention strategies to modify individual's health behavior to minimize the risk of contracting COVID-19. This could be achieved through supporting people with tailored interventions to overcome their major barriers at individual and interpersonal level, and taking measures that will make public places, service centers, and work-places COVID-19-resistant. This could help us see informed and confident citizens who are able to take preventive actions consistently.

Expected potential impact of knowledge outputs

This research project has been designed to have a long-term effect on the society. Coronavirus causes morbidity that threatens the lives and wellbeing of the affected individual. Moreover, it is associated with adverse psychological and social consequences. With a careful implementation of the project output, the effects of COVID-19 can be minimized and public safety maximized. Additionally, identified intervention strategies could produce lasting changes in preparing citizens and health systems to effectively deal with epidemics and pandemics.

Name: Dr Yekoyealem Desie Kebede

Institution: Addis Ababa University

Country: Ethiopia

Project Title: Migration and Quarantine Experiences, Psychosocial Problems, and Coping Mechanisms of Migrant Returnees in Quarantine Centers in Ethiopia: Intervention for Reintegration

Project Abstract

In relation to the 2019 Coronavirus disease (COVID-19) pandemic, Ethiopia is receiving an increased number of migrant returnees from the Middle East and other countries abroad. While some of the returnees are coming with their own decision, many others come due to mass deportation, particularly from Lebanon, Kuwait, and Saudi Arabia. As one of the measures to contain the spread of the pandemic, the Ethiopian government requires returnees to stay in a mandatory quarantine. The unanticipated return of migrants in the time of the COVID-19 pandemic coupled with the novel quarantine experience may seriously challenge the mental health of the returnees. In addition, coming back home in this challenging time of COVID-19 is likely to exacerbate the reintegration process.

This research project is, therefore, primarily aimed at developing and pilot testing intervention package for effective re-integration of returnees. This will be informed by a comprehensive investigation of the migration and quarantine experiences, psychosocial problems, and coping mechanisms of migrant returnees in the context of COVID-19.

The project will be implemented in three phases with two years life time. In the first phase of the project (or in the first year), a comprehensive investigation of returnees' migration and quarantine experiences, psychosocial challenges, and their coping strategies will be conducted using qualitative and quantitative methods. In the second phase (first three months of the second year), a socio-culturally suitable multidisciplinary intervention package will be developed informed by the findings of the comprehensive research and review of the literature. The intervention will be prepared as a package containing different strands and addressing the psychological, social and economic challenges of the returnees. The third phase (the remaining nine months of the second year) of the project is allotted for pilot testing the intervention for feasibility, acceptability and effectiveness in terms of facilitating reintegration. This will be done in collaboration with stakeholders.

Data will be collected from returnees, experts working in Labor and Social Affairs offices, reintegration practitioners working in non-governmental organizations, and quarantine center coordinators. Interviews, FGDs, and standard questionnaires will be used to collect data. Data will be analysed using both qualitative and quantitative methods. The project is expected to contribute in effective reintegration of migrant returnees through reducing their psychosocial and mental health problems.

Expected Outputs

The primary outcome of this project is enhanced understanding of the migration and quarantine experiences, psychosocial problems, and coping mechanisms of Ethiopian migrant returnees in the context of the COVID-19 pandemic. Development of a socio-culturally suitable and comprehensive intervention package for successful reintegration of migrant returnees will be another major outcome of the project. More specifically, the following are expected to be achieved in this project.

- Qualitative and quantitative comprehensive research reports on migration and quarantine experiences, psychosocial challenges, and coping mechanisms of returnees
- Better understanding of the nexus between migration and quarantine experiences and the psychological effect of the COVID-19 pandemic on returnees
- Publication of more than five papers in peer reviewed journals
- Development of a socio-culturally suitable and multidisciplinary intervention package for reintegration of migrant returnees
- Evaluation reports of the effectiveness of the reintegration intervention
- Enhanced research skills of researchers involved in this project
- At least three virtual conferences with government agencies, non-governmental organizations , and other stakeholders working in the area
- Publication and dissemination of Policy briefs

Name: Dr Jewelna Efua Birago Akorli

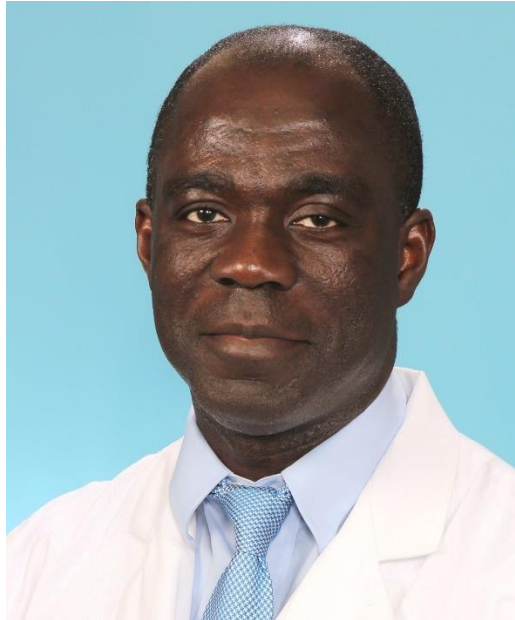**Institution:** University of Ghana

Country: Ghana

Project Title: Validation and operationalization of LAMP assays for COVID-19 diagnosis in low-resourced health facilities in Ghana

Project Abstract

The rapid spread of the novel coronavirus disease, COVID-19, necessitates early detection of infected persons as part of strategies to identify and control community transmission. The current 'gold-standard' method for detection of SARS-CoV-2 is based on RT-qPCR. Although this technique is sensitive, the turnaround time (TAT) takes several hours, often days, limiting its use as a quick test for clinical management, and also makes it less suitable for mass screening. Our ultimate goal is to seek a COVID-19 diagnostic method that can be used at all levels of the health system and for field research. We will evaluate a one- and two-stage loop mediated isothermal amplification (LAMP) assay that allow samples to be run within an hour at constant temperature(s). These assays do not require high throughput sample processing, hence reducing the time required for refined nucleic acid extraction. The newly developed LAMP methods will be validated using nosocomial, nasopharyngeal/oropharyngeal and sputum samples previously collected and tested for SARS-CoV-2 using RT-qPCR. Using RT-qPCR as the gold standard, sensitivity, specificity and, negative and positive predictive values will be compared with the LAMP results. In addition, the processing time will be evaluated in real-time and a cost-benefit analyses using the two diagnostic methods will be performed. Once validated and found to be affordable for use in low-resourced settings, capacity will be built through training of hospital laboratory staff to use the assays. There will be further evaluation of the methods as a point-of-care tool at lower levels of the health-care system and for mass COVID-19 screening.

Expected Outputs

At the end of this study, the effective and most sensitive LAMP assay would be determined as a rapid method for detection of SARS-CoV-2 in clinical samples. In addition, the use and cost-effectiveness of lyophilized reagents for the assay intended particularly for use in lower healthcare settings and field screening of COVID-19 would be determined. We would also build the capacities of laboratory/technical staff in performing LAMP assays for COVID-19, which could potentially be replicated across Africa and other low- and middle-income countries.

Title: Dr George Boateng Kyei

Institution: University of Ghana

Country: Ghana

Project Short Title: Effect of antimicrobial mouthwashes on the detection of SARS-COV-2 in Ghana

Project Abstract

The COVID-19 pandemic has challenged all facets of society, especially the health sector in Africa. Studies have investigated viral shedding dynamics in symptomatic patients, however, not much has been done for asymptomatic patients. For the health sector to be able to provide efficient care in a safe environment, it is important to determine how long asymptomatic individuals shed viable viruses. Also, evidence-based directions are needed to reduce the risk of infecting staff and other clinic attendees. This is critical since most persons infected with SARS-CoV-2 in Africa are asymptomatic. Many anti-microbial mouthwashes have been proven to be effective against oral pathogens. However, these are yet to be proven to reduce the spread of SARS-CoV-2. This study proposes to investigate how long it takes for SARS-CoV-2 infected asymptomatic persons to shed viable virus. It also seeks to evaluate among these patients the effect of a one-time mouth rinsing with four different mouthwashes on the detectable viral load of SARS-CoV-2 and to determine how long it takes for SARS-CoV-2 viral load to remain low after using the mouth rinse. Participants confirmed to have SARS-CoV-2 will be randomly assigned to receive one of four different mouth rinses. The viral load would then be reevaluated immediately post rinsing, and at 15 minutes, 30 minutes and one hour for changes in the viral load. This study will inform guidelines regarding pretreatment of patients before being attended to by health workers, to reduce the spread of SARS-CoV-2.

Expected Outputs

(1) Critical data on shedding dynamics among asymptomatic persons infected with SARS-COV-2. This may help change isolation rules and give confidence to caregivers.

(2) Information on effects of mouthwashes on Covid-19. The study will show whether or not commonly available mouthwashes can temporarily reduce the viral load of SARS-CoV-2. If so, that agent could serve as standard of care gargle prior to patient-provider encounter in clinical settings.

(3) Training of students in translational research. Another key area that this proposal will be impactful is in capacity building in clinical studies for young postdoctoral fellows and technicians.

Name: Professor Reginald Ocansey

Institution: University of Ghana

Country: Ghana

Project Title: Physical Activity Mediates, Fear, Anxiety and Depression, Associated with the Covid-19 pandemic

Project Abstract

This research study focuses on analysis of speech through mobile devices, combined with online physical activity survey to examine if level of physical activity mediates the level of fear, anxiety, depression, and coping associated with Covid-19 in the general population in Ghana, Botswana, Tanzania, and Nigeria.

There are concerns that the COVID-19pandemic is having a significant impact on mental health of populations across the globe. This could have dire consequences on African populations because of under-resourced health systems, especially in the area of mental health. Research evidence has demonstrated that regular Physical Activity (PA), especially moderate to low intensity exercise is associated with low levels of depression and improved well-being. Furthermore, regular exercise has been found to be predictive of improved cognitive functioning and overall mental health. COVID-19 lockdowns, quarantines, and travel restrictions are likely to have negatively affected regular PA and exercise. Investigating the pandemic's impact on mental health of African populations and if PA in mediates these effects is urgent and key to developing targeted and effective strategies to address the challenge.

An online survey will be administered to assess general well-being, anxiety depression and coping comprising: Demographic information items, the novel non-linguistic speech analysis app, International Physical Activity Questionnaire (IPAQ), General Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire-9 (PHQ9). Data collection will be done in multiple sessions over ten months. In the first six weeks, phase one participants from the health care system and universities will be asked to complete online assessments once a week. Thereafter they will complete the assessments every other week for three months. Monthly assessments will be done for an additional 5 months. These assessment periods are designed to monitor changes in PA, anxiety, depression, and coping related to COVID-19 restrictions, the period under restrictions (a period when a second surge lockdown occurs), and the period after government restrictions have been fully lifted. The lockdowns and reopening are expected to vary from one country to the next. The survey will be extended to the public in phase three.

Early detection of disease risk factors, and impact on physical and emotional health provides key information for crafting appropriate mitigation strategies. This study is expected to demonstrate   increases in levels of fear, anxiety and depression and inactivity as a result of Covid-19 and lock downs in countries.

Expected Outputs

The project will identify and make available interventions on mental health challenges caused by the COVID-19 pandemic. Create statistical models linking social isolation and lockdown measures, PA levels, depression, and coping. Create statistical models linking non-linguistic speech measurements, PA levels, depression, and coping. To test the robustness of the Fear of Covid-19 scale in sub-Saharan Africa.

Name: Professor Joseph Osafo

Institution: University Of Ghana

Country: Ghana

Project Title: Stigma, Violence And Mental Wellbeing Among Covid-19 Survivors In Ghana: A Prospective Longitudinal Cohort Study

Project Abstract

Since the confirmation of the first two coronavirus disease (COVID-19) cases in Ghana on 12th March 2020, a total of 10,201 cases have been confirmed as at 10th June 2020. The number of deaths stood at 48, whereas a total of 3,755 persons have recovered from COVID-19. Just like any other infectious disease outbreak, COVID-19 is reportedly associated with stigmatization, violent/aggressive practices and mental health consequences that can hinder the fight against the pandemic. Individuals who have recovered from COVID-19 are resourceful agents as they navigate the sociocultural context that define and shape responses to the pandemic. Insight into their experiences could be added to the gamut of programs and interventions designed to expand public education and prevention of COVID-19. However, despite the growing interest in COVID-19 research, we do not know of any study from Ghana and Africa that has examined stigmatization, violence encounters and mental health from the perspective of COVID-19 survivors. This crucial knowledge gap, with significant promise for COVID-19 mitigation policy interventions and programs, will be addressed in our project. To accomplish our task, we propose a prospective longitudinal cohort study where we would recruit individuals who have recovered from COVID-19 and follow them for 12 months. We will collect data at four different waves, with 3 months interval between the waves, using sequential mixed-method data collection approach consisting of surveys, individual in-depth interviews (IDI) and focus group discussions (FGDs). The survey data will come from questionnaires measuring the study variables, including stigmatization, mental health, violence experience and coping strategies. The questionnaires will be designed and hosted on SurveyMonkey, an online research platform, or administered via telephone to maintain social and physical distancing protocols. These would be complemented by two waves of IDIs and FGDs conducted through videoconferencing – Zoom and telephone. The project would generate empirical evidence on the stigmatization, violence experiences and mental wellbeing of survivors of COVID-19. We will engage stakeholders, researchers and practitioners to assess the implications of the findings for the design of interventions to reduce COVID-19 associated stigmatization and mental health problems

Expected Outputs

First, the project would generate empirical evidence on the stigmatization, violence experiences and mental wellbeing of survivors of COVID-19 in Ghana. As the first of its kind in Ghana and perhaps in Africa, the findings are expected to deepen our understanding of the prevention and management of COVID-19 from the perspective of survivors.

Among the expected knowledge output will be the development of COVID-19 survivors' tool kits containing salient information on mental health problems, stigma, violence and coping experiences for distribution among all COVID-19 holding centres. This will help to achieve four-fold objectives; (1) serve as a guide for educating health workers whose domain of work interface with COVID-19 survivors such as counsellors and clinical psychologists; (2) serve as framework for developing pre-discharge orientation guide for would-be COVID-19- survivors; (3) manual for developing anti-stigma public education and advocacy programs, and (4) resource package for survivors to enable them to engage in self-directed reintegration processes.

The project will bring at least 40 key policy makers, practitioners and researchers to attend a policy workshop to discuss the results from the project. Two workshops have been proposed. The first workshop will be organized upon completion of data collection and analysis for wave one. This will give stakeholders, practitioners and policy makers the opportunity to assess the findings for possible short-term interventions to address the pressing concerns of COVID-19 survivors, reduce stigmatization and promote community reintegration. The second workshop will be held upon the completion of all waves of data collection and analysis. This engagement is anticipated to help build the foundation for formulating long term national policy interventions and programs on integrating survivors into their respective communities as well as promoting community acceptance of COVID-19 survivors.

Other anticipated potential impact of the study findings includes (1) facilitate the formation of COVID-19 survivor mutual help groups to serve as critical resources to augment mainstream efforts; (2) organize workshops and training programs for select groups (e.g., the faith-based leaders, local chief and queen mothers, non-governmental organizations, the media, and community leaders) to build their capacities for gatekeeping roles in their respective communities. These individuals are well respected in their various communities and so would contribute to contextually relevant public education and awareness campaign to support the integration of COVID-19 survivors into the communities. Non-governmental or community-based organizations have good working relationship with their respective communities and so have good understanding and knowledge of the dynamics of their communities to deliver impactful awareness and education on COVID-19.

The findings of this protect will be disseminated through open access scientific peer reviewed outlets to share knowledge with wider audiences.

Full Names: Professor Benson A. Estambale
Institution: Jaramogi Oginga Odinga University of Science and Technology
Country: Kenya
Project Title: Towards COVID-19 Containment: Serological, Faecal and Wastewater Epidemiological Surveillance of SARS-CoV-2 in Support of Home-Based Isolation and Care in Kenya

Project Abstract

The Corona virus epidemic continues to cause massive disruptions to human activities globally and negatively impact locally on Kenyans lives. Urgent measures are therefore needed to stem the tide and avert further disruptions. The project seeks to develop a multi-faceted COVID-19 surveillance tool to support the evaluation of the home-based isolation and care system in Kenya. It has its objectives, to profile SARS-COV-2 RNA load in faecal samples; to develop a COVID-19 surveillance tool using SARS-COV-2 antibody profiling and wastewater-based epidemiological surveillance; to assess the success of the home-based isolation and care system when supported with COVID-19 surveillance data; and to develop a COVID-19 Geo App surveillance platform for collection and dissemination of the research findings to stakeholders.

We propose to use serology to identify immunoglobulin antibodies (IgG and IgM) to understand the antibody kinetics in asymptomatic and symptomatic infections and wastewater-based epidemiology to measure biomarkers from the SARS-CoV-2 in sewage to identify extent of community infections. In this respect we will establish the community transmission patterns to produce spatiotemporal risk maps of SARS-CoV-2 circulation in Kenya. We will further assess and evaluate the recently launched Kenyan government guidelines for the home-based isolation and care of Covid-19 patients. In addition, we propose a complimentary non-invasive method of detecting COVID-19 in the general population that involves the use of human faecal waste.

This study has the potential impact of slowing the spread of the COVID-19 including development of novel diagnostics, expansion of surveillance and response systems, strengthening the home-based care and surveillance system and increasing the body of knowledge towards COVID-19 containment in Kenya.

Expected Outputs

The study will provide
  i. New data on extent of COVID-19 infection in Kenya and a develop protocol for the use of faecal samples in SARS-CoV-2 RNA detection.

ii.	New data on the plasma antibody profiles and kinetics in asymptomatic and symptomatic individuals.
iii.	An identification of COVID-19 infection hotspots in Kenya and map the trends of SARS-CoV-2 community circulation in infection hotspots.
iv.	Knowledge on the local understanding and experiences of HBIC; data on achievement and challenges in implementation of HBIC; Evidence based policy briefs on HBIC and integrated community-based approaches.
v.	A real-time COVID-19 surveillance tool; a pool of trained personnel capable of using the Geo App for data input and interpretation; and enhanced contact tracing strategy.

Full Names: Professor Paul O. Okemo

Institution: Kenyatta University

Country: Kenya

Project Short Title: Uptake Of Preventive Measures, Sero-Surveillance And Complementary Management Of Covid-19 In Kenya.

Project Abstract

Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first reported in Wuhan City in Hubei Province, China on December 31, 2019 The outbreak began with clusters of patients presenting with symptoms of SARS. Some of the patients rapidly degenerated and died within 7 to 14 days with the initial survivors recovering and being presumed to be immune to reinfection. Cases of re-emergence have been reported in South Korea, China, Singapore and other countries and have been attributed to importation by those traveling from regions of active outbreaks. The World Health Organization (WHO) declared it a 'Pandemic' in January and March 2020, COVID-19 has occasioned one of the worst global health crises in the last century. Transmission of COVID-19 occurs mainly from person to person through infected respiratory droplets expelled during coughing or sneezing or after contact with body fluids during certain medical interventions. This is propelled by the fact that majority of the infected persons are asymptomatic or have only mild symptoms The case fatality rate (CFR) has been seen to be higher among the elderly (14.8%) and those with co-morbidities such as cardiovascular, diabetes, chronic respiratory disease, hypertension, and cancer. In low- and middle-income countries such as Kenya, the health protection systems are weaker and laboratory resources meagre, contact tracing efforts are less efficient and public health infrastructure is not well established rendering disease surveillance systems ineffective. A raft of preventive and control measures including quarantine and movement restrictions have been taken by authorities and regulatory bodies to contain the spread of the disease given its serious nature. The government invoked the Public Health Act Cap 242, issued advisories on travel, instituted preventive measures including hand washing or sanitization, social distancing, use of masks, fourteen days self-or mandatory quarantine for high risk persons, closure of educational institutions, embargos on passenger air traffic and restriction of travel into and out of the hot-spot areas or Counties. In the past several months, every effort has been geared towards the resumption of normalcy in educational, religious, social and economic institutions that were closed since March, 2020. This study will seek to evaluate the level of uptake and population behavioral attitudes towards the MoH preventive and control measures as well as to survey the persistence and effectiveness of anti-SARS-CoV-2 humoral immunity in COVID-19 patients over a period of 2 years. Additionally, the study is designed to evaluate the biochemical profiles and clinical characteristics of COVID-19 patients for potential use as prognostic markers in confirmed cases and determine the anti-SARS-CoV-2 activity of selected medicinal plants for potential treatment COVID-19 patients in Kenya as part of home-grown solutions that can inform any future Government's strategies and guidelines. The survey will be a cross-sectional prospective study focusing on demographic characteristics and uptake and attitudes towards the MoH preventive measures among the sampled residents of the counties. The other parts of the study will adopt prospective and experimental study designs with appropriate and

referenced techniques being employed. The study will be carried out in five different study sites. The survey on the level of uptake and attitudes towards the MoH COVID-19 infection prevention guidelines will be done in two counties: Mombasa (was considered a hot-spot) and Kisumu (was considered a non-hotspot) counties. The study on humoral immunity will take place at the Centre for Virus Research at the Kenya Medical Research Institute (KEMRI), Nairobi while the biochemical profiling for prediction of course of COVID-19 disease patients will be carried out at Kenyatta National Hospital (KNH) and Kenya Medical Research Institute (KEMRI), Nairobi. Experiments on the activity of selected medicinal plants will be done at Kenyatta University and Kenya Medical Research Institute (KEMRI), Nairobi. To ensure that ethical standards are maintained at every stage of the study, this research proposal will be presented to the ethical review committees at Kenyatta University, KNH and KEMRI for consideration and approval before starting the study. Additionally, approval will also be sought from the National Commission for Science, Technology and Innovation (NACOSTI) and the Mombasa, Kisumu and Nairobi City county authorities. Concerted efforts during recruitment of study participants will be geared towards ensuring that neither gender predominates by more than two thirds and that respect and dignity are accorded to them. Accordingly, there will be gender balance among the research team to ensure gender-sensitive and gender-responsive approach to the components and outcome(s) of the study. Finally, the study findings in form of reports, policy briefs and publications will be disseminated appropriately to the relevant bodies and in the form(s) required by NRF, South Africa.

Expected Outputs

1. A report on the uptake and attitudes towards the MoH COVID-19 infection prevention measures and recommendations for strengthening the evidence-based strategies on how to improve public health outcomes (Obj. 1).
2. Socio-demographic characteristics of a cross section of Kenyans and COVID-19 patients for enhanced disease surveillance in Kenya (Obj. 1-2).
3. An immunity status and persistence report of the COVID-19 patients and recommendations to relevant authorities to inform resumption of normalcy in Kenya over two year (Obj. 2).
4. A recommendation on the potential use of convalescent sera for management of COVID-19 patients.
5. A report of the biochemical profiles and clinical characteristics of COVID-19 patients as predictors of the course of disease in Kenya (Obj. 3).
6. A report on antiviral activities of selected medicinal plant preparations against SARS-CoV-2 for improved case management and health outcomes in COVID-19 patients in Kenya (Obj. 4).
7. Findings and recommendations disseminated in workshops, conferences and published in refereed journals for access and use by relevant authorities and the medical and scientific community globally (Obj. 1-4).
8. Establishing and enhancing multi-disciplinary research with consequent multi-institution and multinational collaborations (Obj.1-4).
9. Potential for patenting of innovation and/or any intellectual property as an outcome of the study (Obj.2-4).

Full Names: Dr Agatha Christine Onyango
Institution: Maseno University
Country: Kenya
Project Title: Consequences of COVID-19 Preventive Measures on Food Security, Dietary Practices and Nutrition Outcomes in Kenya.

Project Abstract

The current global outbreak of COVID-19 has disrupted food systems and individuals' lifestyles around the world and is likely to have a negative impact on household food security and health-related behaviours including dietary practices and physical activity. Such a disruption is likely to affect urban and rural households differently. Thus, these populations may require different supports to prevent lasting negative impacts of COVID-19 on their lives. We are conducting a longitudinal study in rural and urban households in Kenya to examine changes in household food security, food-related behaviours, physical activity, body weight and associated socio-economic and demographic determinants in relation to the COVID-19 preventive measures.

The study population will comprise of households with an adult and at least one school age child who have resided in Kisumu Central and Seme Sub-Counties for at least five years. At least 500 households will be recruited to take the initial survey and assessments and follow-up surveys over a period of one year. Quantitative data will be collected using a questionnaires (SES, food sources, alcohol intake and smoking and drug use, physical activity and agricultural production), Household Food Insecurity Access Scale (HFIAS) tool, 24-hour dietary recall, food frequency questionnaire and anthropometric assessment. Qualitative data will be collected using focus group discussion guide and key interview guide. Generalized estimating equations will be used to evaluate trends over time while accounting for within-person correlation and to evaluate whether food security status, behaviors and nutritional status vary across demographic characteristics and socio-economic status. Qualitative data shall be analyzed using content analysis and recurring themes in the data. The efforts detailed in this proposal will support our longer-term goal of designing public health interventions targeted at the specific food, nutrition and health needs and potential solutions in the communities.

Expected Outputs

a) Multiple workshops will be held at the sub-county and County levels to discuss study results with government, non-government and private industry stakeholders. Workshop content will be uploaded on the IDRC Digital Library for further dissemination

b) Community-based meetings will be held to discuss results with study participants, community members and community leaders. Meetings' content will be uploaded on the IDRC Digital Library for further dissemination

c) Study findings will be presented at conferences and meetings including African Nutrition Conference.

d) Research report and policy briefs will be produced to share impact of COVID-19 on community livelihoods, food security and health outcomes. Research and policy briefs will be uploaded will be made available on the IDRC Digital Library.

e) Study findings will be submitted for publication in lead nutrition, food security and public health peer-review regional and international journals e.g. African Journal of Food, Agriculture, Nutrition and Development (AJFAND), South African Journal of Clinical Nutrition, Public Health Nutrition, BMC Nutrition and BMC Public Health. All listed journals offer open-access options.

Name: Dr Justus B. Aungo

Institution: University of Nairobi

Country: Kenya

Project Title: Public Mobility and Commuter Behaviour Dynamics in the Spread and Control of COVID 19 in Kenya

Project Abstract

Commuter behaviour and the general operations of the transport system have emerged as critical but weak link in the promotion and management of COVID-19 containment interventions in Kenya. There has been little effort in understanding how the transport systems works during such a crisis or how its infrastructure affects human behaviour and disease transmission in the context of pandemics. Furthermore, there is little research data and evidence on the dynamics of commuter behaviour-public transport-public health nexus, especially that relating to prevention and control of pandemics. There is critical need for scientific evidence, and information on how the behaviour of the elements of the transport system such as commuter behaviour, spatial configuration and related actor networks and relations affect the spread and control efforts of the pandemic.

The two-year study employs the actor-network perspective to problematize the transport-public health interactions by examining the role of commuter behaviour in spreading or controlling epidemics in Africa. It will explore how the different elements of the transport system interact to facilitate human movements in ways that generate or ameliorate the risk of viral spread and infection generally and COVID-19 specifically. Thus, it will identify, and map out real and potential threats, risks and opportunities carried by the transport system, the constitutive relations between its key components and its interactions with other systems in the country, especially public health and public administration. At a conceptual level, through the human element (commuter behaviour), the study will examine the critical interdependencies that the pandemic has brought to the fore which go beyond epidemiological models and must be addressed for effective interventions.

Expected Outputs

- Develop a comprehensive research report and policy briefs detailing the socio-behavioural determinants of compliance and adherence to the COVID-19 infection prevention and response public health guidelines among public transport commuters.
- Recommend evidence-based behaviour change messaging and communication strategies promoting compliance and adherence to public health guidelines for COVID-19 in humanitarian setting including developing a detailed intervention

operational manual, a training curriculum; community sessions facilitation guides and evaluation toolkit;

- Produce quality peer-reviewed publications and knowledge products on contextual dynamics and sociology of COVID-19 individual, community and public health response and resilience
- Develop a network of trained pioneer community participatory researchers who can be incorporated into the public health COVID-19 surveillance and infection prevention promotion ecosystem.

Name: Dr Miriam Dalitso Kalanda-Joshua

Institution: University of Malawi

Country: Malawi

Project Title: Exploring the impacts of the COVID19 pandemic on the socio-economic livelihoods for vulnerable communities in semi-arid areas of Malawi

Project Abstract

Rural and urban areas are increasingly interconnected through a constant movement of people, goods, capital, ideas and information including agricultural food flows. The urban population is in many cases solely dependent on food from small-scale producers from rural areas. Yet although there has been growing literature on rural -urban linkages, the nature of rural urban linkages as they relate to diverse urban rural including agricultural food flows and the likely impacts of COVID- 19 on these linkages are not adequately understood. Different factors contribute to food insecurity trends in Africa, and these can vary between temporary and spatially (e.g. from region to region, country to country or household to household. This study argues that COVID 19 and its subsequent responses have potential impacts on these linkages, yet the nature and extent of the COVID-19 impacts are largely unknown. Additionally, the extent to which the design of the COVID-19 measures took into consideration the prevailing rural urban interdependence and their socio-spatial implications on the people's livelihoods is not known. Therefore, the main objective of the study is to explore the impacts of the COVID19 pandemic on the socio-economic livelihoods for vulnerable communities in semi-arid areas of Malawi. Specifically, the study aim to:

i. Establish the state of rural – urban economic and social flows during pre, during and post the-Covid-19 pandemic?

ii. Examine the extent to which the Malawi Government COVID-19 considered social and spatial equity concerns responses in these areas

iii. Assess the people's perceptions on the COVID-19 and its responses within the context of their basic socioeconomic status needs, human rights, livelihoods, gender, generation and geographical location

iiv. Evaluate how the COVID-19 pandemic has affected livelihood activities of communities in relation to previous interventions within the context of rural urban interdependencies?

Expected Outputs

- Documented evidence of perceptions of the COVID-19 pandemic from a livelihood point of view among vulnerable communities;;
- Understanding of the key drivers of socio-economic livelihoods among vulnerable communities under the COVID-19 pandemic;
- Evidence of the impacts of the movement restrictions on rural-urban and urban-rural flows;
- Increased awareness of the role of rural-urban inter-linkages in socio-economic livelihoods;
- Greater understanding of the spatial-temporal trends of the COVID-19 and the key accelerating factors.
- The effectiveness of top down (Government or donor driven) or bottom up (community level) COVID mitigation measures among vulnerable communities.
- Enhanced knowledge and research capacity on impacts of pandemics on livelihoods;

Title: Dr Yamikani Ted Ndasauka

Institution: University of Malawi

Country: Malawi

Project Title: Assessing effects of Covid-19 Responses on mental health in Malawi

Project Abstract

The aim of this research project is to assess the effects of Coronavirus Disease (COVID-19) responses on mental health in Malawi. COVID-19 is an infectious disease caused by a newly discovered strain of Coronavirus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which originated from Wuhan, China. Covid-19 has wreak havoc in countries with underdeveloped health systems. Of particular interest to this research is the effect of COVID-19 responses on mental health services. Mental health or psychological well-being is an integral part of an individual's capacity to lead a fulfilling life, including the ability to form and maintain relationships, to study, work or pursue leisure interests, and to make day-to-day decisions about education, employment, housing or other choices. Disturbances to a person's mental well-being can adversely compromise this capacity and the choices made, leading not only to diminished functioning at the individual level, but also to broader welfare losses for the household and society. As such this study investigates the impact of Covid-19 on mental health (fear, anxiety, depression, post-traumatic stress disorder (PTSD) of vulnerable populations such as health workers and adolescents. The study also investigates cultural norms that lead to perceptions of disease and mental health in Malawi. Finally the research project will implement awareness campaigns of the effects of COVID-19 on mental health and the importance of seeking mental health services. By the end of the study, we hope to (1) enhance research on mental health status in Malawi; (2) increase engagement with stakeholders (health practitioners, policy makers, law makers, academia, and government officials) on issues of mental health and COVID-19; (3) increase awareness on COVID-19 and its effects on mental health of the general population as well specific populations; and (4) add knowledge on the existing cultural/social norms that may play a role in the transmission of COVID-19 in Malawi.

Expected Outputs

1. **Publications** – this project will produce journal articles to be published in local or international peer-reviewed journals.
2. **Conference presentations** – this project will encourage and financially support paper presentations in international or local conferences.
3. **Policy briefs** – the findings of this project will inform two policy briefs, one on Covid-19 and mental health of health workers and another on Covid-19 and mental health of adolescents.
4. **Public lectures** – this project will conduct public lecturers in each of Malawi's four regions to discuss negative effects of COVID-19 people's mental health, and how best to combat them.
5. **Website** – this project will establish an open website, which will host a blog and have social media sharing capabilities to aid research dissemination on COVID-19 and its intervention.

Name: Professor Feliciano Salvador Chimbutane

Institution: Universidade Eduardo Mondlane

Country: Mozambique

Project Title: Pandemics and mental health among adolescents and adults: The effect of Covid-19 school closures in Mozambique

Project Abstract

Depression is the third largest cause of death from non-communicable disease worldwide and preliminary evidence suggests that the Covid-19 pandemic has the potential to meaningfully increase the prevalence of both depression and depression-related health challenges. The objective of this project is to undertake a comprehensive and large-scale survey of mental health during the Covid-19 pandemic in a school-based setting, implementing a broad survey of ten grade seven students and two teachers, the school principal, and the deputy school principal in a sample of 160 primary schools in Nampula province in Mozambique. Most children both in sub-Saharan Africa and around the world have experienced school closures due to Covid-19, and this is clearly among the most significant and devastating shocks that children have faced. In Mozambique, schools closed early in the school year on March 23, 2020 and will open in March 2021, at which point the survey will be undertaken. In addition to measuring children's response to this unprecedented shock, analyzing the effects of the crisis on school staff is important in light of the crucial role these staff play in students' educational and psychosocial development, as well as their role in the transition back to education. The first objective of this study is to generate comprehensive data on mental health among a rural school-based population in Nampula province, and in particular, generate estimates of the prevalence of clinical depression, anxiety, Covid-related fears, and community and institutional trust (or lack thereof) among adolescents (both male and female) well as school staff. The second objective is to identify correlates of depression, anxiety, Covid-related fears, and trust among male versus female adolescents by collecting additional information on their dropout status, their engagement in work and/or other household activities during and following Covid-related school closures, and their exposure to risks of pregnancy and early marriage, particularly for girls. The third objective is to identify correlates of depression, anxiety, Covid-related fears, and trust among adult school staff. Another substantial challenge will be the reenrollment of children in school. The Mozambican government has specified that there will be automatic promotion to the next grade. While a student may have been enrolled in grade two at the start of 2020, they will be promoted to grade three even though they did not receive grade two teaching. They will only have had one year of teaching. Consequently, we will also measure dropout rates and reasons for dropout. We hope to inform government policy regarding the management of mental health of adolescents and school staff to promote this aspect of human capital development.

Expected Outputs

There will be three outputs produced by this research. The first will be two (anonymized) data sets: one for seventh grade students and another for school staff. The data sets will include demographic variables and the measurements of mental health. Anonymized data will be appropriately cleaned and made publicly available with required documentation in a public repository maintained by IFPRI to facilitate further analysis by interested researchers and policymakers in Mozambique and around the world.

The second output will be an academic paper reporting on the findings of the study that will be produced in 2021. While the appropriate venue for the paper will be identified later, the research team commits to publishing in an open-access journal, or to ensure that the article is open access to render the findings accessible to the broadest possible audience.

The third will be a policy brief directed at policy makers summarizing the paper and translated into Portuguese and Emakhuwa. This brief will be shared with the central government, the provincial government, the local government, teacher training colleges, ZIPs (Zona de Influência Pedagógica), school staff in the sample schools, and parents. This will enable all stakeholders to be aware of the findings. The brief will also explore some potential recommendations around policies that can address the observed challenges: e.g., resources to address mental health challenges in the classroom, and organizations that respond to these challenges. Policy recommendations will include potential preliminary methods by which to include post-Covid measures regarding mental health into the planned revision by MINEDH to the school curriculum, and into pre-service and in-service teacher training.

Name: Professor Sansao Agostinho Pedro

Institution: Eduardo Mondlane University

Country: Mozambique

Project Title: Optimizing Covid-19 Prevention Measures In The Face Of Socio-Cultural And People's Movement Patterns in Developing Countries: Case Study of Mozambique

Project Abstract

The coronavirus COVID-19 pandemic is the defining global health crisis of our time. Since its emergence late 2019, the vírus has spread to every continent except Antarctica, demonstrating its capacity to cross significant natural geographic barriers. As of the time of this writing (June 8th, 2020), the number of infected cases worldwide have reached 103,569 867 confirmed cases, 2 238 898 deaths and 75 193 856 recovered.

Although, Africa is the least-affected region globally after Oceania in terms of the number of COVID-19 cases and deaths, since middle September cases have been increasing with steeper increases being observed since late November 2020. In Mozambique in particular steeper increases have been observed since the transition to the new year 2021 rising from below hundred cases a day to over a thousand confirmed new cases a day.

Life conditions in African countries are vastly different and often fragile, with conflicting limitations of both the health care system and socio-economic conditions, posing difficult challenges for decisions about enacting and lifting interventions, and negatively influence containment as well as recording, testing and medical treatment. For example, the median age below 20, and the low rates of urbanization, could potentially lead to a lower death toll of the epidemic in African countries than elsewhere. However, having a young population implies that many infected individuals may not display symptoms and will risk infecting more people than would symptomatic individuals. Additionally, the large number of informal settlements (including residents, markets and bus stations) could accentuate this phenomenon.

It is therefore urgent to develop a framework that could accurately predict the spread of the virus, accounting for the idiosyncrasies of the African context. A country-specific model will provide policy makers with a wide range of prediction scenarios, based on different actions they can take to address the pandemic.

The work proposed here has the intention to contribute towards a development of tool for investigating and predicting the spatio-temporal COVID-19 pandemic activities while taking into considerations of observed trends of disease spatial spread, social behaviours, population movements patterns, migration and displacement due to war and other calamities and economic constraints by means of modelling across

mathematical sciences, computing, geographic systems, social science and epidemiology. Our objective is then to use the resulting model to make prediction about the spatio-temporal spread of the disease at local and global scale and scrutinize important factors underlying such spatio-temporal patterns. Then, assess viable control strategies particularly in specific socio-cultural behaviours and economic constraints.

Decision makers can use this modelling tool to determine the distribution of resources, the critical time for implementing interventions, and the severity and timing of the epidemic, thus reducing uncertainty in decision-making, leading to better management of disease and resources under specific national socio-economic profile.

Expected Outputs

The main results of the proposed research projected will be described in three manuscripts, highlighting the following expected knowledge outputs:

- Novel relationships on the effects of significant explanatory environmental, socioeconomic, topographic, socio-cultural, and demographic variables on spatial variability of COVID-19 incidence rates established and mapped;
- Impact of transnational border mobility on expanding and seeding COVID-19 infection into new geographic areas determined;
- A tool for assessing relative contribution of various prevention and control strategies such as social distancing, self-quarantine, and isolation measures in high-density settings like informal settlements and co-morbidities, including population movement patterns, border closings, regional (for instance at provincial level) opening and closing strategies, re-seeding of infection, developed, tested and optimized.

Title: Professor Isaac Olusanjo Adewale

Institution: Obafemi Awolowo University, Ile-Ife

Country: Nigeria

Project Short Title: Development and biochemical characterization of proprotein convertase-furin/TMPRSS2 inhibitor from Nigerian medicinal plants traditionally used in viral infectious diseases management

Project Abstract

The world is facing a deadly novel beta coronavirus-severe acute respiratory syndrome (SARS)-coronavirus (CoV) -2 infection that causes a serious debilitating disease called Covid-19 in some individuals. It has wrecked unprecedented havoc in world economy and caused great human casualty. Viral disease of this nature is difficult to contain or eradicate necessitating an urgent need to develop drugs for its cure or vaccination to prevent it.

In search of suitable chemotherapy for the cure, Nigeria in particular is blessed with a diverse species of medicinal plants. In south-western Nigeria, many herbal products exist which have traditionally been used to effectively treat viral diseases including HIV/AIDS, measles, jaundice, yellow fever etc. The problem with the usage of such herbal products is that they contain cocktail of many compounds, in addition to the main active ingredient(s). By virtue of their off-target activities, such compounds often cause unintended adverse health consequences, sometimes resulting in permanent damage. Some have been reported to be teratogenic. This thus necessitates the need for isolation, purification and determining the mechanism of action of the active ingredients, present in such plants. Most of these medicinal plants contain many bioactive ingredients, including phenolics, glycosides, alkaloids, coumarins, diterpenoids, essential oils and peptides suggesting that a bioactivity-guided fractionation should be adopted when searching for novel drug leads from such herbal plants. Phenolics are broadly distributed in the plant kingdom and are the most abundant secondary metabolites of plants. Flavonoids have received a lot of attention because they are powerful antioxidants with anti-inflammatory and immune system benefits. They are thus associated with cancer, neurodegenerative and cardiovascular disease prevention by virtue of the fact that they scavenge reactive oxygen radicals (ROS).

Of recent however, evidences have started to emerge that some of the flavonoids are non-peptide protease inhibitors, suggesting that some of the health benefits may in fact be due to inhibition of some proteases which have been implicated in many diseases including different types of cancer, HIV, influenza, Ebola and the new SARS-CoV-2 disease. Even though synthetic protease inhibitors exist, many of which are modified oligopeptides, therapeutic use of non-peptide protease inhibitors (especially of natural origin) has many

advantages over peptide inhibitors. SARS-CoV-2 differs from other coronaviruses in that the spike protein S which is essential for infectivity contains a proprotein convertase (furin)-cleavage site which increases the efficiency of the spread of SARS-CoV-2 compared to other beta coronaviruses suggesting that furin inhibitors will be suitable as potential drugs for Covid-19. T cells expressing trans membrane protease serine 2 (TMPRSS2) are more susceptible to SARS-CoV-2 attack than those without, in cell line studies. Therefore, targeting TMPRSS2 inhibition could also have a therapeutic value.

Recombinant human furin and TMPRSS2 will be commercially sourced. Medicinal plants with established antiviral activity will be selected and sourced locally. Using bioassay-guided fractionation, their phytochemicals will be screened and purified using standard protocols. Those with potent anti-furin/ anti-TMPRSS2 activity will be used to carry out detailed inhibition studies on the kinetics of furin/TMPRSS2 both in dilute and crowded solutions. Promising compounds thus obtained will be subjected to toxicity tests. SARS-CoV-2 replication/multiplication inhibition assay will be carried out using either of VeroE6, Calu3, Huh7 or human airway epithelial cells infected with SARS-CoV-2. Chemical structure of the most promising compounds will be determined using ^{1}H NMR, ^{13}C NMR, IR, UV and MS spectra analysis.

The proposed investigation will generate an array of chemical compounds that are candidate drugs for the cure of SARS-COV-2 disease in particular, and many other diseases whose mechanism involves activation by furin/TMPRSS2 or other proteases.

Expected Outputs

1. An array of compounds, of natural origin, with high chemotherapeutic potentials for the management of Covid-19, ovarian and prostate cancer, hypertension and seasonal influenza will be obtained for further development and clinical trials.

2. The chemical structure, toxicity, efficacy and mechanism of action of some novel antiviral compounds from African medicinal plants will be established.

3. At least three publications in high impact Journal will come out of the study. The work will be published open-access for wide accessibility.

4. At least two students who will be research assistants will have sufficient research exposure and data for the award of PhD degree in Biochemistry. Many more undergraduate (B.Sc.) degrees will also be awarded in the course of the research.

Title: Dr Macellina Yinyinade Ijadunola

Institution: Obafemi Awolowo University

Country: Nigeria

Project Title: Socio-Cultural Dynamics in the Transmission of COVID-19 and Experience of Inmate Partner Violence amongst Women in Urban and Rural Communities in South West Nigeria

Project Abstract

The Corona Virus Disease (COVID-19) caused by SARS-COV-2, a novel corona virus strain, was declared a pandemic by the World Health Organization (WHO) on March 11 2020. Measures taken to reduce the transmission of the disease included the stay-at-home order (lockdown or shelter in place directives) put in place by various state Governors and the Government of Nigeria, has brought with it physical, social, emotional, psychological and economic stresses. Women and adolescents were particularly vulnerable during this period to the risk of violence, a broad term that includes Intimate Partner Violence (IPV). Reports from organizations that respond to Violence Against Women (VAW) revealed an alarming trend of increased reports of IPV during the current COVID-19 pandemic.

The objectives of this research are to identify the social-cultural factors that may drive COVID-19 transmission in Nigeria, to determine the prevalence of IPV, to compare the forms of IPV among women before and during the lockdown, explore the women's experiences of IPV due to the influence of the pandemic, and design an intervention for victims' counselling, support and treatment.

The project would be conducted in three phases (pre-intervention, intervention and post-intervention phases) in Primary health care centers in communities of If-Ijesa zone in South West Nigeria. The study population comprise of 400 registered female attendees aged 15-49 years, at the facility It is a concurrent mixed method approach will be adopted, were the quantitative aspect of the research will be conducted alongside the qualitative aspect of the research. 200 women with experience of IPV would be enrolled to partake in the intervention phase.

The findings from this study will contribute to the body of knowledge on socio-cultural dynamics and IPV related to the COVID 19 pandemic in sub-Sahara Africa.

Expected Outputs

The following would be achieved by the end of the project:

1. Socio-cultural factors that driving COVID-19 transmission in communities in Osun State in South West Nigeria would be identified.
2. The number of women who experienced intimate partner violence (IPV) would be determined from the total number of women who attended the selected Primary Health Care Centers within the study duration.
3. The forms and experience of IPV among women before and during the lockdown would be compared and explored.
4. The women who experience IPV would be enrolled into intervention programme offering counselling, support and treatment for victims.
5. At least two manuscripts from the project would be publish in reputable journals
6. Advocacy for support for women who experienced IPV would be communicated to Government, NGOs and stakeholders through policy breifs and stakeholders meetings.

Name: Dr Victor Ogbonnaya Okorie

Institution: Obafemi Awolowo University

Country: Nigeria

Project Title: Gender analysis of smallholder farmers' vulnerability to COVID-19 pandemic: Towards a resilient farming sector in Nigeria and South Africa

Project Abstract

Lessons from previous pandemics showed that as a pandemic evolves, there is an urgent need to expand public health activities beyond direct clinical management to cover issues of food, nutrition and basic principles of management and optimisation of resource utilisation among various critical segments of the population. Therefore, this proposed study focuses on vulnerability of smallholder farmers, who are the custodians of food, fibre, firewood and fodder needed in both Nigeria and South Africa to ensure food and nutritional security as well as food sovereignty in this pandemic era and beyond. The overall goal of the proposal is to interrogate the varying degrees of vulnerability among the farmers by gender and articulate theoretical perspectives, policy-options and affirmative programmes for building resilience of the farmers against COVID-19 pandemic, thereby enabling the emergence of a resilient and egalitarian farming sector needed for sustainable food and nutritional security, food sovereignty as well as for the Sustainable Development Goal 2, which focuses on zero-hunger tolerance in Nigeria and South Africa.

Expected Outputs

1. A comprehensive report on the pandemic-induced changes in farming practices, income sources and diets among the selected smallholder farmers.

2. A training manual on COVID-19 prevention measures, agronomic and livestock practices and resilience building strategies for the smallholder farmers.

3. Planning, implementation and evaluation of at least two local capacity building workshops

4. A pool of well-informed and COVID-19-resilient smallholder farmers

5. Publication of at least two info-graphs

6. Publication of at least three articles in journals

7. Publication of at least two policy-briefs

Title: Professeur Mouhamadou Mawloud Diakhaté

Institution: Université Gaston Berger De Saint-Louis

Country: Senegal

Project Title: Transmission de la Covid 19 au Sénégal : analyse des dynamiques socio-spatiales des facteurs de propagation dans la région de Dakar et la ville de Touba.

Project Abstract

Le projet s'inscrit dans une dynamique de recherche-action qui permettra d'expliquer les facteurs de propagation du virus de la Covid 19 dans la région de Dakar et la ville de Touba. L'intérêt du thème est lié au fait que la propagation du virus au Sénégal découle de ce que les autorités sanitaires ont qualifié de transmission issue des cas communautaires.

Les lieux de rassemblement sont les marchés, les transports publics, les lieux de culte, notamment les mosquées, les événements sociaux (baptême, mariage, funérailles…). En recherchant le lien entre la propagation du virus et les aspects socioculturels et spatiaux, notre projet cherche à expliquer la dynamique socioculturelle de la transmission de la Covid 19 au Sénégal.

Même si les enjeux sont scientifiques, sociétaux et spatiaux, il faudrait toutefois tenir compte de la vulnérabilité et de la pauvreté des communautés locales qui sont les premières concernées par les plans de riposte. Dans le cadre de ce projet de recherche, notre intervention permettra de produire des connaissances et données concrètes pour renforcer les plans de riposte à la Covid 19. Cette recherche permettra aussi d'anticiper les futures pandémies. Il s'agira donc de produire des documents de contribution scientifique, mais aussi d'aide à la prise décision à partir des données dites « probantes » (Hanney, 2010).

Expected Outcomes

11 produits de connaissance seront publiés au cours de cette recherche. Il s'agira d'articles scientifiques (04), de policy briefs (04), de mémoires de master (02) et d'une thèse (01). Ces produits de la recherché porteront sur :

- les zones et les secteurs socioéconomiques les plus vulnérables à la COVID 19;
- l'analyse des taux de couverture sanitaire par rapport au nombre de cas positifs à la Covid 19;

- les comportements sociaux et leurs incidences sur la propagation de la pandémie;
- les modes de déplacements en lien avec la pandémie ;
- la faible atteinte des zones rurales, par rapport aux zones urbaines;
- la cartographie des zones les plus touchées par rapport à leur degré d'urbanisation.

Name: Professor Peter S. Nyasulu

Institution: Stellenbosch University

Country: South Africa

Project Short Title: Predicting COVID-19 severity and clinical outcome using routine and novel diagnostic biomarkers

Project Abstract

The number of incident cases of COVID-19 is increasing at a rapid rate in Sub-Saharan Africa. The spread of SARS-CoV-2 in certain regional disease epicentres such as Western Cape Province in South Africa, is associated with high death rate despite young age structure of the population which is demographically different from the Chinese, European and North American populations. Our population is much younger but with a high burden of TB, HIV, malaria among others. Hence, the biochemical, haematological and immunological profile may be considerably different. This may therefore result in the development of a completely different prognostic model of COVID-19 that may be unique to Africa. We will furthermore examine biomarkers not routinely tested but possibly associated with increased risk of severe illness, e.g. NT-proBNP, TnT, PCT, lymphocyte subsets, iron studies and ferritin, albumin, inflammatory cytokines and markers of endothelial damage. Correlation of markers of inflammation, coagulopathy, thrombocytopenia and FBC parameters are more likely to yield a predictive or management algorithm tool for COVID-19, which may influence treatment/management alternatives. Previous studies have shown that individuals aged ≥65 years as well as individuals of any age with underlying cardio-metabolic comorbidities such as hypertension; diabetes mellitus and obesity are at significant higher risk of hospitalization and critical care admission due to severe COVID-19. However, a proportion of individuals with non-communicable diseases such as diabetes, hypertension etc., remain undiagnosed as such pose a challenge when infected with SARS-CoV-2. In such conditions, microRNAs would be of potentially diagnostic and prognostic value. Identification of such biomarkers will potentiate personalized and targeted COVID-19 therapeutic approach including assessing presence of vireamia in these patients as viral load or intracellular RNA levels in blood might help to evaluate the efficacy of treatment interventions. Furthermore, whole blood and serum will also be stored for possible future research.

Expected Outputs

The main aim of the study is to determine clinically relevant routine and novel predictive biomarkers for COVID-19 severity among patients admitted in critical care units. The severity outcome measures will be need for ventilator support, non-invasive and invasive mechanical ventilation, discharge and mortality. The specific objectives include: determining routine biochemical, immunological and haematological abnormalities of COVID-19 patients admitted in critical care unit at Tygerberg Hospital, Pietersburg Hospital and Kenyatta National Hospital; performing immunophenotyping with exhaustion profiling of cells from fresh whole blood samples; measuring NT-proBNP, PCT, iron studies, ferritin, inflammatory cytokines and endothelial markers; investigating whether the 10 miRNAs may potentially have prognostic value in patients with COVID-19; identifying prognostic biomarkers present at baseline and develop a risk predictive score of clinical disease severity requiring critical care; to assess the relationship between baseline levels of biomarkers and clinical outcomes among severe COVID-19 patients admitted in critical care unit at Tygerberg hospital, Pietersburg hospital and Kenyatta National hospital; and to assess predictive biomarkers of severe illness and poor outcomes among patients with HIV/AIDS (CD4, HIV viral load) and or Tuberculosis (IFN-γ).

Title: Professor Keertan Dheda

Institution: University of Cape Town

Country: South Africa

Project Title: A urine mass spectrometry-based same-day diagnostic test for COVID 19

Project Abstract

COVID-19 due to SARS-CoV-2 has evolved into a global pandemic, surpassing over a million deaths world-wide during September 2020. Diagnosis in the acute phase is based on detection of genomic material using RT-PCR.

However, RT-PCR, though a same-day test, has several drawbacks. These include: (i) False negative rate of between 20 and 40% in the early phase of the disease, (ii) the need for kits and reagents to perform RNA extraction, and the reverse transcription and PCR steps, and, (iii) an appreciable infection control risk posed to healthcare workers because nasopharyngeal swabbing is an aerosol generating procedure. Furthermore, detection of the virus by RT-PCR provides no information on likely disease prognosis or organ specificity. These drawbacks, including the cumbersome nature of the assays, has resulted in severe testing backlogs. In many parts of South Africa turnaround times increased to between 5 and 10 days. The testing strategy and criteria was subsequently altered to reduce the turnaround time. This resulted in many undiagnosed cases. Thus, alternative and additional testing capacity is urgently required.

To address these shortcomings, we propose the development of a mass spectrometry-based same-day test for COVID-19 using urine. Urine represents the filtrate of whole blood and, in line with other diseases, would be expected to contain viral genomic material and proteins (though whole virus is not readily culturable from the urine). Our preliminary data support this hypothesis and mass spectrometry testing of a limited number of samples has revealed that COVID-19 is characterised by a distinct urine signature that can be rapidly identified by mass spectrometry. This is not surprising given that we have previously, using mass spectrometry, developed a host biomarker-based rule-out test and a rule-in test for TB, which comprises a combination of host and TB-specific biomarkers (the rule-out test is exclusively host biomarker-based when compared to a range of other diseases). The biomarker signature has been patented through the University of Cape Town. The concept of exclusively using the host response or host biomarker signature has gained traction and widespread acceptance in the TB field where blood-based signatures of risk and diagnosis, and urine-based signatures of diagnosis have been validated for this purpose, and the published data now incorporates many studies.

It is envisaged that the mass spectrometry-based COVID-19 assay will be developed and immediately deployed. There is good precedent for this. Mass spectrometry-based tests are already used in the clinical service for measuring a variety of analytes including drug levels. In the future it would be attractive to develop urine-based rule-in and rule-out tests in the form of antigen capture assays or point-of-care antibody-based tests.

Expected Outputs

Results will be disseminated through patents, high impact journal publications, conference presentations, and press releases. However, the primary output is the development of proof-of-concept mass spectrometry-based assay for COVID-19 that can be used for disease conformation and for screening those in the community, thus improving case detection rates and control of the epidemic. The proposed study also incorporates several capacity developments and networking offsets, including the generation and strengthening of collaborations between academic and in the future commercial companies (both locally and abroad). Nascent scientists will gain new knowledge and build on their existing expertise through the partnerships with leaders in the diagnostics arena, and those with interests in platform development and commercialisation.

The implications of the proposed work will include early and rapid case detection of COVID-19, potential reduction in transmission (which we will study), thereby subverting amplification of the epidemic and reducing morbidity (lung and organ damage) and mortality.

Name: Professor Betty Claire Mubangizi

Institution: University of KwaZulu-Natal

Country: South Africa

Project Title: Understanding the Interplay Among Vulnerabilities, Livelihoods, and Institutional Dynamics in the Context of COVID-19: A Case Study Selected Rural Communities in South Africa

Project Abstract

The ongoing Novel Coronavirus (COVID-19) pandemic leaves a trail of destruction on all facets of societal life worldwide. COVID-19 is poised to increase relative and absolute poverty with implications for several United Nations Sustainable Development Goals' outcomes. While it is too early to quantify the pandemic's economic impact accurately, anecdotal evidence suggests that the poor, particularly those in the informal sector and those in rural areas, will be the most affected. We argue that the pandemic has overstretched the limits of pre-existing coping strategies of vulnerable rural communities. Virtually, COVID-19 is interacting with pre-existing rural vulnerabilities that could lead to significantly higher adverse outcomes than those in the urban areas.

Although the government has implemented a suite of measures to cushion the pandemic's economic impacts, the bulk of these has been targeted at the formal sector (Ebrahim, 2020). Through the expanded unemployment insurance, government measures to registered taxpayers are unlikely to reach about 45% of the population (Bassier et al. 2020). Bassier et al. (2020) further note that "[U]nder existing measures, nearly 8 million workers, and the 13 million additional household members whom they support, will be left without relief." This is particularly telling for rural communities dependent on remittances as an essential income source and who themselves exist in poorly resourced rural-based municipalities whose revenue base is equally weak. Matatiele and Mbizana local municipalities (LMs), situated within Alfred Nzo district municipality in the Eastern Cape province of South Africa, are cases. Poor service delivery is a significant challenge in these municipalities that further undermine their livelihoods capacity and resources. Out of a total possible score of 10 for service delivery, Matatiele scores 3.11 and Mbizana, 2.73 (Cronje, 2014). 90% of the households in these LMs do not have safe and clean toilet facilities and while there have been notable improvements in the past few years, access to clean water, sanitation and electricity backlogs are still very high (Matatiele Local Municipality, 2020; Mbizana Local Municipality, 2020). These local municipalities also struggle with a limited revenue generation base and must rely on grant funding. Several other challenges such as access to healthcare, poor roads and transport, communication infrastructure and minimal access to the internet impact livelihoods in these municipalities (Matatiele Local Municipality, 2020; Mbizana Local Municipality, 2020).

Being the sphere of government closest to the people, municipalities' core function is to render various basic but essential services to the community within their jurisdiction (Koma 2010:113). Several response mechanisms to COVID-19, including basic hygiene, communication, and transport, succinctly fall within South African municipalities' mandate as explicitly captured in crucial legislation and policies. Yet rural municipalities, among other things, are characterised by a limited revenue base, poor infrastructure, and weak human resources.

Against this backdrop, critical questions arise. How are households and institutions in these municipalities responding to the pandemic's impacts and what social dynamics shape these responses? What are the drivers of households' vulnerabilities in these municipalities, and how are these being shaped by the pandemic?

In the study, we seek to understand the impact of COVID-19 in two rural municipalities. More specifically, we want to explore

i. the pre-existing socio-economic conditions of households in the municipalities before COVID-19,
ii. the impact of COVID-19 on pre-existing socio-economic conditions,
iii. how households and institutions in these municipalities are responding to the impacts of the pandemic,
iv. the drivers of vulnerabilities of households in the municipalities and how the pandemic is shaping these, and
v. how pre-existing conditions at a household and institutional level act as barriers/enablers of COVID-19 prevention strategies.

This Sustainable Livelihood Framework (SLF). The SLF is widely associated with Chambers and Conway (1992) underpins this study. A livelihood is the set of capabilities, resources and activities needed for a means of living (Serrat, 2017). A livelihood is sustainable if it "can cope with and recover from stress and shocks, maintain and enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation (Chambers and Conway, 1992:8). The SLF enables an understanding of the factors that enhance or constrain livelihoods and options and how these factors interact with each other (Krantz, 2001). Applying the framework requires an analysis of the vulnerability of the context and the different but overlapping livelihoods resources (human, social, natural, physical and financial resources) which the approach seeks to expand. It also requires an understanding of the institutions and their processes while providing resources to support livelihoods. Based on Matatiele and Mbizana local municipalities, this study will adopt a mixed-method approach using both content analysis and econometric models to explain the relationships under consideration. The research is informed by the constructivism and positivism paradigms and will draw on interpretive methods to draw inferences from respondents' responses. Using surveys and in-depth interviews as data collection approaches, we will offer an understanding of the Interplay Among Vulnerabilities, Livelihoods, and Institutional Dynamics in the Context of COVID-19 with specific reference to two rural-based municipalities in South Africa.

Expected Outputs

1) The proposed research will produce the following *academic outputs*;
   - At least two peer-reviewed publications in open access accredited journals
   - At least one presentation at an academic conference
   - At least one forum (in the form of a symposium) to validate and disseminate the study findings

2) Capacity building, *shared-learning and co-creation of knowledge* are essential aspects of this research project and will be achieved through clear and regular communication with an array of stakeholders and role players (project audience) is paramount. The Project audience comprises project team members (including

academics, postgraduate students) executive management and senior councillors in Matatiele and Mbizana local municipalities.

3) Knowledge *dissemination to a non-academic audience* will be done through popular media and the NRF/SARChI Chair Sustainable Local (Rural) Livelihoods website. [https://sarchichair-slh.ukzn.ac.za/]

Name: Dr Aceme Nyika

Institution: University of Pretoria

Country: South Africa

Project Title: COVID-19 Pandemic: Conceptions, beliefs and practices of community members from different socio-cultural backgrounds

Project Abstract

The COVID-19 pandemic started in Wuhan, China, in December 2019 and spread across the globe infecting and killing millions of people. Anecdotal evidence shows that most affected countries have experienced five main hindrances to their efforts to control the COVID-19 pandemic; these are (i) challenges in implementing preventative measures effectively, (ii) health care delivery systems that could not cope with the pandemic, (iii) limited resources, (iv) limited acceptance/adoption of public health interventions by some members of communities, and (v) socio-cultural dynamics that are not fully understood but have a bearing on efforts to curb the pandemic. Due to the mode of transmission of COVID-19, the socio-cultural dimensions of the COVID-19 pandemic should be an important component of research conducted on the pandemic.

This research project is therefore aimed at investigating conceptions, beliefs and practices of community members from different socio-cultural backgrounds that can potentially affect prevention, transmission and treatment of covid-19 infections. The research project, conducted in South Africa and Zimbabwe, focuses on socio-cultural dynamics, yet within consideration that the pandemic is playing out within a complex, shifting system where it is almost impossible to isolate distinct elements without taking into account the knock-on effects within any complex system. Community members' conceptions, beliefs and practices affect the effectiveness of public health interventions to prevent or treat COVID-19 infections, hence the need to develop and implement evidence-based approaches of factoring socio-cultural dynamics into COVID-19 related interventions, policies, regulations and or guidelines. Most importantly, socio-cultural dynamics have a bearing on the extent to which communities accept vaccination, which is critical for the attainment of herd immunity nationally, regionally and globally.

Expected Outputs

Overall, findings of the research project will enable some evidence-based socio-cultural dimensions of the covid-19 pandemic to be factored into national, regional, continental and global responses (short-term, medium term and long term) to the COVID-19 pandemic in particular and any future disease epidemics or pandemics in general. Responses and interventions that are responsive to socio-cultural realities prevailing in

the communities have greater potential to create a sense of collective ownerships that would in turn enhance acceptability by the communities. Such cooperation and support at grassroots levels would go a long way in minimising the need for strict enforcement of measures, which in the past have turned violent or fatal in some cases, aimed at preventing transmission of the COVID-19 infections. Findings from the study will form a basis for quantitative or mixed methods research focused on socio-cultural issues surrounding COVID-19.

Title: Professor Clifford Obby Odimegwu

Institution: University of the Witwatersrand

Country: South Africa

Project Title: The Virus, The Lockdown And Sexual And Reproductive Health And Rights In Nigeria And South Africa: A Comparative Study

Project Abstract

Studies have shown that in emergency and crisis situations, like with the Covid-19 pandemic, government spending, resources, and service provision to the population, through the different sectors of the national economy, become less of a priority as these are diverted to tackling the emergency .Focus is on broader public health issues while sexual and reproductive health that can heighten vulnerabilities and rights are often overlooked.

In order to think and act locally and contribute to the global discourse, this study proposes to examine evidence-based implications of Covid-19 pandemic and its associated restrictions on sexual and reproductive health and rights, and its potential demographic consequences in two sub-Saharan African countries, Nigeria and South Africa.

Expected Outputs

1. Comprehensive literature review with appropriate bibliography
2. Capacity building of graduate students and emerging scholars in scientific research purposes.
3. Field survey on prevalence, incidents and outcomes of sexual and reproductive health and family behaviour outcomes during the pandemic lockdown.
4. International Conference
5. Special Journal Issue on Covid-19 and SRH to be titled 'The Virus, the Lockdown and SRH in sub-Saharan Africa: Comparative Analysis.
6. A broader research agenda that will be pursued by students and staff of the institutions associated with this research in the next couple of years.

Name: Professor Caroline Tanya Tiemessen

Institution: University of the Witwatersrand

Country: South Africa

Project Title: Longitudinal profiling of plasma cytokines and soluble proteases in relation to clinical outcomes of COVID-19 patients with and without HIV

Project Abstract

The coronavirus disease-2019 (COVID-19) pandemic has highlighted many vulnerabilities, both biological and social, that can predispose Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infected individuals to a greater risk of poor clinical outcomes. Risk factors for severe disease include higher age (>60 years), male sex, obesity and co-morbidities such as diabetes, hypertension, cardiovascular disease, cerebrovascular disease and chronic respiratory disease. There is an urgent need to evaluate HIV coinfection as a risk factor in our setting. The course of COVID-19 varies substantially among different individuals. Effective viral clearance and resolution of immune response characterizes asymptomatic and mild forms, while the development of an uncontrolled hyperinflammatory immune response, called "cytokine storm" is associated with more severe and critical illness.

This study will develop a cohort of black South African patients with COVID-19 at Chris Hani Baragwanath Hospital in order to longitudinally investigate the SARS-CoV-2 immune response with clinical outcomes of patients with moderate to severe COVID-19, and with and without HIV-1 infection. We will focus on the cytokine storm response (65 cytokines) as well as soluble versions of proteases important in coronavirus-host cell infection and in comorbidities known to be risk factors for severe clinical outcomes - angiotensin converting enzyme 2 (ACE2) and dipeptidyl peptidase 4 (DPP4). We will determine associations of these plasma biomarkers with clinical characteristics and COVID-19 outcomes. Findings from this study will provide important insights into immune mechanisms that underlie host differences (age, sex, race, comorbidities) in COVID-19 disease progression, and will inform treatment strategies for at risk populations.

Expected Outputs

Expected outputs: <u>Capacity development:</u> We will gain expertise and experience in working with a new pandemic pathogen within a local African context.

Master and PhD student training and development: A huge amount of data will be generated through this study, thereby providing a data resource for addressing many specific COVID-19 related research questions, that many students could use in pursuing further degrees at the University of the Witwatersrand. <u>Publications:</u> We anticipate that several high impact publications will result from this work; at least two within the project period directly pertaining to this proposal and many more through the use of the developed data resource.

Expected outcomes: We will have developed a cohort of SARS-CoV-2 infected hospitalized patients with and without HIV-1 infection, have stored samples and generated large datasets for this study and for future studies. This is a very important resource, and represents samples and data from black African individuals (both genders) - currently understudied in the COVID-19 pandemic. Importantly, this provides the basis for the establishment of many further collaborations. We anticipate deriving a clinical risk score for severity in the context of SARS-CoV-2 infection with or without HIV-1 infection, and contributing to new knowledge on sex-specific COVID-19 immune responses, and immune responses in comorbid conditions in black Africans.

Name: Professor Flora Masumbuo Fabian

Institution: University of Dodoma

Country: Tanzania

Project Title: Leveraging Intelligent Decision Support System to Promote Inclusive Remote Learning and Teaching in East African Higher Education during Interruptions such as the COVID-19 Pandemic.

Project Abstract

The East African universities response to COVID-19 was extremely slow, mainly attributed to the lack of preparedness by the higher education regulatory bodies, university management and faculty to cope with situations such as the COVID-19 pandemic, this had a significant impact on teaching and learning in the region. Decision-making process in response to such interruptions in teaching and learning in higher education needs to be quick, well informed and focused. However, Higher education in EA is hierarchically regulated and characterized by long chains of command that require vetting. Hence the process was slow, inefficient or completely missing.

The objective of this project is to explore the existing decision-making process, design and test an Intelligent Decision Support System to Promote Inclusive and Significant Remote Teaching and Learning in the East African Higher Education that will respond to interruptions similar to the COVID 19 pandemic.

The research will be conducted in 4 Higher Learning Institutions, and regulatory authorities in Kenya and Tanzania.

Expected Outputs

1. Status of existing policy and regulatory process to support remote teaching and learning in higher education in response to pandemics identified.

2. The identified policy and regulatory best practices for supporting remote teaching and learning during interruptions or pandemics appraised.

3. The gaps in existing policy and regulatory mechanisms by benchmarking with the best practices appraised in (2) diagnosed.

4. A multi-level decision support tool for remote teaching and learning during interruptions and future pandemics developed.

5. A digital decision support tool for remote teaching and learning during pandemics developed.

Name: Dr Mkunde Chachage

Institution: University Of Dar es Salaam

Country: Tanzania

Project Short Title: The Epidemiological and Immunological Attributes for the Progress and Outcomes of Covid-19 Disease in Tanzania

Project Abstract

COVID-19, a disease caused by a novel Severe Acute Respiratory Syndrome Coronavirus – 2 (SARS-CoV-2), was first identified in China and quickly spread at global level, including Tanzania [1]–[3]. SARS-CoV-2 is, together with SARS-CoV-1 (2002-2003) and the Middle East Respiratory Syndrome CoV (MERS-CoV,2012), one of three zoonotic betacoronaviruses known to have crossed the species barrier and caused outbreaks in humans [4]–[7]. More than 400,000 deaths and over 7,000,000 cases of SARS-CoV-2 have been reported globally as of 14th June 2020. Europe, Asia and North America remain the most severely affected countries with high COVID-19 fatality rates. Despite a huge volume of traffic between China where the first cases of COVID -19 were reported and Africa, there was a delay in conformation of a first case of the virus on the African continent. Contrary to the expectations of many, to date, Africa remains the least affected region globally, with 1·5% of the world's reported COVID-19 cases and 0·1% of the world's deaths [1], [8]. This phenomenon has been associated with several theories, including inability of African countries to conduct effective viral surveillance, sensitivity of the virus to warm weather conditions in most African countries and Africa's relatively young population. Other biological factors may potentially modulate Africans' immune responses to SARS-CoV-2, including host factors, such as genetic background, gender and age; and environmental dynamics such as prior exposure to similar pathogens and the nutritional status. Host genetic background, such as polymorphisms in HLA and Fc receptor genes influence the immunological outcome of infection or vaccination in specific study populations [9], [10]. Similarly, Lassaunière and Tiemessen reported that FcγR variant distribution and linkage disequilibrium differs in Africans and Caucasians in a manner that suggests a differentially maintained balance of FcγRmediated cell activation in these populations [13]. While HLA genes are critical in host immune responses to microbes, Fc receptors also mediate a various function including clearance of infected cells, activation of immune cells and regulation of antibodies and a range of cytokine production. SARS-CoV-2 exposed individuals elicit antibodies with varying binding and neutralizing capacity [14], it is therefore likely that the produced antibodies activate the Fc receptor pathways in containing the virus and that variations in Fc receptor genes affect the role of these receptors in the control of SARS-CoV-2 infection. Moreover, genes encoding for SARS-CoV-2's entry receptor to host cells, angiotensin-converting enzyme 2 (ACE-2) may also vary between populations, which may in turn affect populations' susceptibility to SARS-CoV-2. Since COVID-19 pandemic is projected to continue spreading, it is crucial to understand the risk factors for SARSCoV- 2 disease in Africa. Herein, we propose to explore the epidemiological and host immunological factors to acquiring SARS-CoV-2 and progressing to severe illness in Tanzania. We intend to describe characteristics that influence the outcome of COVID-19 in different demographic groups (age, sex, geographic location) and in people with different lifestyles, medical histories (eg: pre-existing conditions vs none). This information is required especially to resource-limited countries in order to: (1) give a scientific explanation on the difference in the dynamic of COVID-19 in different regions/countries and (2) identify populations at high risk for acquiring SARS-CoV-2 infection and progression to severe disease in order to help the government to make decisions on prioritizing limited-resources to those at highest risk of COVID-19.

Expected Outputs

The proposed study will interrogate differences in epidemiologic, immunologic and genetic profiles of people who recovered from COVID-19 of different severity. The project will further investigate whether SARS-CoV-2 unexposed individuals have immunity that can cross-react with SARS-CoV-2. Data generated from this project will shed light about populations that are at greater risk of progressing to severe forms of COVID-19. This information will help the responsible authorities and healthcare providers in mitigating the effects of COVID-19 by identifying and targeting interventions to priority populations. Further, findings from this study will provide baseline information for further research towards management and control of COVID-19.

Names: Dr James Mugisha

Surname: Mugisha

Institution: Kyambogo University, Kampala, Uganda

Country: Uganda

Project Title: Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT): Uganda

Project Abstract

The COVID-19 pandemic has grown rapidly at a global scale and is likely becoming a major public health problem for several years to come. It therefore is essential to start collecting data during the height of the ongoing COVID-19 pandemic. The overall purpose of this project within an international initiative is to gain an understanding of the different ways in which the Ugandan population has been affected relative to its African and non-African counterparts where responses to pandemic have differed. Furthermore, data from the time during the acute COVID-19 outbreak will be used beyond the acute phase of the pandemic by integrating data with two additional planned, independent survey waves at the end of 2021 and in 2022, taking place around 6 and 12 months after the WHO declares the COVID-19 pandemic to have ceased. Each survey will compare the actual status against the recalled status prior to the COVID-19 pandemic. The Ugandan COH-FIT project will recruit a representative sample of 2000 respondents in Uganda during each wave. Our data will shed crucial light on the impact of COVID-19 and its measures (lockdown, curfew, etc.) on different population strata and vulnerable subgroups. Our project aims to assess a randomly selected, nationally representative sample of individuals, which will allow us to conduct a broad range of analyses, within and across individuals living in the same household, within and across health care workers and non-health care workers, and in those with direct versus non-direct exposure to patients with COVID-19 infection and with COVID-19-related death. Data will be crucial not only for international organizations such as the World Health Organization but also for the Ugandan government. The project is led by Prof. Christoph U Correll, Charité University, Berlin, Germany, and Marco Solmi, Padua University, Italy, and developed together with more than 200 collaborators/ stakeholders among which the PI of this project is Dr. James Mugisha working collaboratively with Prof. Dr. Davy Vancampfort for the Ugandan site.

Expected Outputs

We will generate high-quality data on the mental and physical health effects of the COVID-19 pandemic and its measures, in order to promote the understanding of mechanisms relating to its epidemiology and inform interventions. Data will be published in high impact international journals, in local journals and in a policy report.

Name: Dr Elizabeth Patricia Nansubuga

Institution: Makerere University

Country: Uganda

Project Number: COV19200617533249 (UID: 130310)

Project Short Title: Socio – Cultural Dynamics of COVID-19 Transmission among Long Distance Truck Drivers and their Contacts in East Africa: Evidence to inform Policy and Programming Response

Project Abstract

East Africa registered its index COVID-19 case on 13th March 2020 in Kenya. Although the progression of COVID-19 pandemic greatly varies across the East African countries, it is evident that there is an alarming progression of COVID-19 among long distance truck drivers. While transportation of essential cargo remains inevitable especially with most of the East African countries being landlocked, cross-border transmission of COVID-19 has emerged as an eminent concern in the East African region with long distance truck drivers (truckers) identified as high-risk individuals. In response, Governments across East Africa have responded through various preventive measures, different lockdown measures, and guidelines for cargo transportation in each country. The significant variations in guidelines for cargo transportation and lockdown measures continue to pose a significant threat to flattening the COVID-19 curve in East Africa. Unlike other epidemics, COVID-19 presents a unique challenge given its mode of transmission. The political guidelines and COVID-19 health responses have not taken into consideration the socio-cultural dynamics of these truckers; and yet it is such dynamics that possibly increase their vulnerability to COVID 19 and non-compliance to preventive measures. Hence, this study will generate an emic understanding of the socio-cultural dynamics influencing COVID-19 transmission among truckers and their social contacts. Understanding the socio-cultural dynamics of COVID-19 among truckers is essential for regional policy formation and shaping of contextual responses to mitigate COVID-19 in East Africa. Therefore, the project objectives are to examine the socio-cultural dynamics of COVID-19 transmission among long distance truck drivers and their social contacts in East Africa; assess barriers and facilitators influencing non-compliance to COVID-19 mitigation measures; and evaluation of the behavioural change campaign on compliance to COVID-19 mitigation measures.

Methods: A mixed methods research design will be utilized. The quantitative study will involve a baseline and an endline survey. An ethnographic study and qualitative research design (observation, in-depth interviews**,** focus group discussions, and key informants) will also be employed to explore the socio-cultural dynamics of COVID-19 transmission among truck drivers and their social contacts (commercial sex workers, and food and accommodation vendors) along the trans-national highways of these countries. The study sites will include selected border points – Busia (Uganda – Kenya), Elegu/ Nimule (Uganda – South Sudan), Malaba (Uganda – Kenya), Mutukula (Uganda – Tanzania), and Katuna (Uganda – Rwanda) borders. A sample size of 1,537 will be considered. All ethical guidelines will be followed. The study population will be randomly sampled from border posts, trading hubs where they load and/or off-loaded goods and at roadside stops. An intensive behavioural campaign will be undertaken which aims to sensitize truckers and their contacts on COVID-19 mitigation measures. A behavioural campaign toolkit will be developed. The campaign aims to follow scientific proven approaches to create systematic behavioural change. Quantitative data analysis will be done at three levels – univariate, bivariate and multivariate while qualitative analysis will be done based on thematic and content analysis.

Expected Outputs

Expected knowledge outputs and outcomes
- Framework/ Model guiding transporting of cargo during pandemic crises.
- Quantitative Data sets for further analysis.
- Knowledge on socio-cultural dynamics of disease transmission among truckers.
- Policy briefs
- Presentations to National COVID-19 Task Forces in East Africa
- Knowledge and learning briefs
- Publication in an open peer reviewed international journal
- Technical report
- Conference Presentation
- Press coverage/ Newspaper article/ Media Interview
- Digital Scholarship

Name: Dr Dorothy Okello

Institution: Makerere University

Country: Uganda

Project Title: Open Source Design of a Decontamination Device for Personal Protective Equipment

Project Abstract

The COVID-19 pandemic has resulted in a global shortage of personal protective equipment (PPE), due to increased demand and disrupted supply chains. One way to alleviate the scarcity, while ensuring safety of healthcare personnel, is by reusing PPE after a biological decontamination process which concurrently maintains PPE material integrity and deactivates SARS-CoV-2. Currently, there is a dearth of technology for biological decontamination of PPE in Africa. The proposed research seeks to address this need through design of a low-cost device for PPE decontamination, specifically, N95 masks, face shields and safety glasses. The research will involve: 1) Developing design specifications of the device, which will be made open source i.e., licensed in such a way that the device can be studied, modified, created, and distributed by scientists and Governments across Africa and the world, 2) Building functional prototypes of the device, 3) Post-treatment structural integrity tests for N95s, face shields and safety glasses, and 4) Tests for germicidal efficacy of the device on N95s, face shields and safety glasses spiked with SARS-CoV-2. The project will be implemented by a multidisciplinary team of scientists and engineers from Makerere University (Uganda), Uganda Industrial Research Institute, Innovex Uganda Limited, Strathmore University (Kenya), Uganda Virus Research Institute (UVRI) and the National Institute for Occupational Health (NIOH), South Africa. The proposed equipment and process will be pivotal in extending the useful lifetime of the PPE, thereby ensuring protection of health workers during the COVID-19 pandemic, and future anticipated epidemics

Expected Outputs

1. Novel hardware and software designs for a low-cost PPE decontamination device utilizing moist heat and UVC
2. Two (2) physical device models
3. Structural integrity test reports for N95 masks, face shields and safety glasses after subjecting to decontamination protocol
4. Germicidal efficacy report after decontaminating PPE spiked with SARS-CoV-2
5. Project website on which we will release the associated hardware designs, documentation, and code under an Open-Source License
6. Two (2) journal papers
7. Three (3) conference presentations

Name: Professor Noeline Nakasujja

Surname: Nakasujja

Institution: Makerere University

Country: Uganda

Project Title: The Impact Of The Covid-19 Pandemic And Its Response On The Mental Health Of People With Pre-Existing Mental Conditions In Uganda.

Project Abstract

Background: Covid-19 is a worldwide highly infectious respiratory pandemic that causes much anxiety and stress leading to mass panic in populations worldwide People with Severe mental illness (SMI) are likely to be highly vulnerable to Covid-19 infection spread. They have difficulties understanding messages, are often neglected by family, have few or no support networks. The fear, anxiety and stress brought on by the Covid-19 pandemic may exacerbate their conditions e.g., post-traumatic stress disorder, panic anxiety, depression on top of their SMI.

Objectives: This research proposal will seek to investigate the difficulties individuals and their caretaking families face during this Covid-19 epidemic and to find ways to mitigate them. The specific research objectives of this proposal will be to investigate the following:

1. The effect of Covid-19 and its response on the mental health of people with SMI
2. The effect of Covid-19 and its response on access to care for people with SMI
3. The effect of Covid-19 and its response on families & caretakers of individuals with SMI
4. The current health and information messaging and knowledge regarding Covid-19 and its response for people with SMI
5. The effectiveness of an outreach mobile mental health clinic (MMHC)[7] initiative to mitigate the care and messaging gap for people with SMI during the Covid-19 pandemic and its response.

Methods: This is a mixed methods study employing both qualitative and quantitative methodologies. The study will take place in Uganda at three sites: Butabika National Referral Mental Hospital, Masaka Regional Referral Hospital and Mityana District Hospital. The planned sample size for each site will be 30 outpatients, 60 family members (2 per patient) and 6 mental health professionals (one per 5 patients). Sample sizes of qualitative methodologies using Focus Group Discussions (FGD) and/or In-depth Interviews (II) of 8-10 participants.

Analysis: For quantitative data, descriptive statistics will be used for socio-demographic data for all participants. To assess for effectiveness of the mobile outreach intervention, mean and standard deviations over the time points (baseline, 6 and 12 months) will be calculated, and the analysis tested using the significance of the differences between the means of the measured outcomes. Qualitative data will be analyzed using thematic analysis using NVivo qualitative analysis software.

Expected Outputs

Currently in Uganda, there is limited consideration of mental health matters as shown by the first consideration of the Ministry of Health response to this pandemic being the conversion of mental health units in the country Covid-19 isolation centers. With this research we hope to raise awareness that will influence Policy in the increased training of psychosocial responders and mental health supervision in all hospitals countrywide and setting up a national psychosocial response.

In addition, this research will demonstrate the need to lobby for setting up family services divisions/secretariat from LCI to LCV to cater for psychosocial and domestic dimensions of the pandemic including caretaking of people with SMI, poverty issues and domestic problems, including Sexual and Gender Based Violence, all of which have increased in this pandemic.

Full Names: Dr Anjali Sharma

Institution: Centre for Infectious Disease Research in Zambia (CIDRZ)

Country: Zambia

Project Title: Ending Stigma and Discrimination: Addressing mental health challenges among COVID-19 survivors and frontline health care workers in Zambia.

Project Abstract

Background: Globally, stigma, defined herein as 'the negative association related to people or a group who have a specific disease in common,' has emerged as a significant barrier to an effective COVID-19 response. The unpredictable nature of the virus, associated deaths and containment measures have generated considerable fear leading to stigma and discrimination, both of which have the potential to persist long after the epidemic has passed. With the country currently recording 55,042 cumulative cases and 349 deaths as of 1st February, 2021, addressing the mental health consequences of discrimination directed toward persons infected with, and affected by, COVID-19 can be important in controlling further disease transmission in the country and region.

Objective: To understand COVID-19-related stigma among survivors and frontline health care workers in COVID-19 hotspot communities of Zambia.

Method: The research will be conducted in three phases to complete 1) formative research, 2) survey on available services and 3) acceptability and feasibility trial. For the formative research, we shall use interpretive phenomenological analysis to gain insights into the psychological experiences of COVID-19 survivors and frontline health care workers in COVID-19 hotspot communities. A self-administered short survey will be used to assess coverage of mental health services available to COVID-19 survivors and front-line HCWs in Lusaka and Nakonde. The COM-B framework will be used to assess the acceptability and feasibility of providing digital technology methods such as mobile phones, Zoom and Skype to provide mental health services to COVID-19 survivors in Lusaka and Nakonde districts of Zambia.

Expected Outputs

- Understanding of stigma-related mental health by COVID-19 survivors and front-line health care workers.
- Mental health services identified in COVID-19 communities.
- Comprehensive mental health package developed
- Provision of referral services to COVID-19 survivors and front-line workers experiencing any form of stigma, fear, anxiety, and stigma

Full Names: Dr Jason Mwanza

Institution: University of Zambia

Country: Zambia

Project Title: Understanding the Socio-Cultural Dynamics of Transmission and Mental Health Effects of COVID – 19 in Zambia

Project Abstract

Background: Humanity faces one of the most serious crises in recent history. The COVID-19 pandemic has and continues to undo many years of socio-economic development for several countries, exacerbating humanitarian crises and potentially aggravating social and public health upheavals. The Covid-19 pandemic has highlighted how interconnected, fragile and complex the global socio-economic system is. The uncertainty, along with the impact of the virus and subsequent economic losses, is likely to sharpen the focus on other socioeconomic factors that have been brewing, such as the growing inequality in wealth, loss of jobs which has resulted in some cases people developing mental health problems. Zambia has not been spared from the scourge of Covid-19. The Zambian Government has recognised the impact of Covid-19 on the mental wellbeing of its citizens and the economy. To this effect, Zambia has come up with a multi-sectoral approach to help deal with the impact of Covid-19 on the economy in general. The overarching aim of this study is to investigate likely pathways of transmission of COVID between rural and urban populations, and the preventive strategies such as social distancing, self-quarantine and isolation measures be effectively implemented in Zambia.

Methods: this research will employ an embedded case study mixed methods design, which will seek to compare rural and urban experiences to understand the dynamism of transmission as well as mental health effects of COVID – 19 across different populations through qualitative and quantitative data collected sequentially. Quantitative samples will be drawn using multistage cluster sampling while qualitative samples will be drawn using purposive sampling. Qualitative data will be analysed thematically using Nvivo 12.0 while quantitative data will be analysed using analysis of variance (ANOVA) in Stata 22.

Expected Outputs

Study findings will be prepared in a number of formats in order to meet the needs of different audiences. Outputs will include academic papers, lessons learned paper, practice guidelines, reports, infographics and video content. These outputs will be directed to families, frontline and management delivering disability services, national-level policy makers, healthcare quality and delivery authorities, national pandemic organisations and international bodies.

Full Names: Elizabeth

Surname: Mbizvo

Institution: University of Zimbabwe

Country: Zimbabwe

Project Title: Health System Preparedness: Lessons for COVID-19 response in Zimbabwe and South Africa (ZimSoNet)

Project Abstract

Background and problem statement: The novel coronavirus disease 2019 (COVID-19) epidemic was first seen and reported in China in 2019 and the WHO declared the COVID-19 a Public Health Emergency of International Concern on 31 January 2020. Since then the virus has stress-tested global health systems, pandemic response mechanisms, health innovation systems and national health delivery systems. Unfortunately, global health systems have been found to be inadequately prepared resulting in unimaginable losses of lives and, livelihoods. The management and control of COVID-19 heavily depends on a country's health system preparedness and its initial and sustained response to the outbreak. Although COVID-19 is a novel disease, it is believed that the history and science of responding to pandemics of greater proportions including the 1918 flu virus, the 2009 Avian flu virus, SARS, MERS and HIV stand as prerequisites for managing COVID-19 outbreak as similar preventative behaviours and approaches can be deployed.

Main Objective: The objective of the study is to assess the effectiveness of the health system response to COVID 19 using an adapted WHO model of health system in selected COVID-19 hotspots in Zimbabwe and South Africa.

The specific objectives are 1) to conduct a desk review to understand what lessons were learnt from similar infectious diseases outbreak preparedness in Southern Africa; 2) to assess what and how lessons learnt from responding to previous pandemics in Southern Africa influenced and shaped the response to COVID-19 outbreak; 3) to assess innovative approaches in COVID-19 outbreak response in human resources requirements, service delivery coping mechanisms, information system optimization, medical products, financing and leadership/governance requirements; 4) to identify specific socio-cultural barriers and facilitators for the containment of the spread of coronavirus in communities; 5) to assess

the impact of COVID-19's response on access to and utilization of sexual and reproductive health services.

Methods: A mixed methods study will be conducted. A desk review will be conducted to understand what lessons were i) learnt and ii) applied from similar infectious diseases outbreak preparedness in Southern Africa. This will be followed by a review of national policies and regulations on public health preparedness and response in previous pandemics in Zimbabwe and South Africa. Using the WHO's six health system building block plus community assessment, **112** health system leaders, managers and implementers per country will be interviewed to identify innovative COVID-19 outbreak responses in human resources, service delivery, information system, medical products, financing, leadership/governance and community. Interviews with **1000** community members per country will be conducted to assess the COVID-19's response on socio-cultural barriers and facilitators for the spread of coronavirus and access to sexual and reproductive health.

Analysis of data: A review will be conducted on literature on outbreaks in Southern Africa. A review of national policies and regulations on health system preparedness will be conducted. Thematic analysis on qualitative data collected from health system leaders and managers will be conducted. Multiple regression analysis will be conducted on community members' data to identify factors associated with COVID-19 drivers and preventative success in each country.

Expected Outputs

The proposed research has five key outputs which include

1. Two scientific publications in open source international peer reviewed journals,
2. At least two policy/action non-academic papers (1 policy review, 1 policy brief, 1 preparedness review, 1 community prevention report on COVID-19 barriers, facilitators and impact on sexual and reproductive health response
3. Two conference abstracts/presentations at local, regional and international conferences
4. Two stakeholder engagement workshops for knowledge sharing.
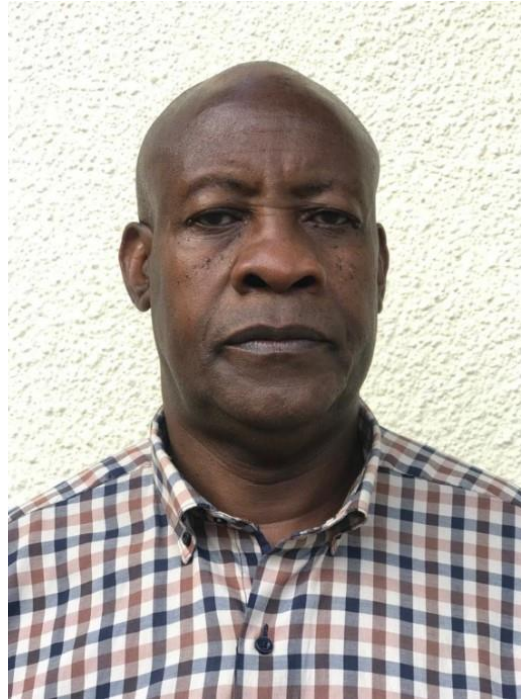
Name: Professor Mark Nyandoro

Institution: University of Zimbabwe

Country: Zimbabwe

Project Title: A historical reflection on Africa's experience in health pandemics since early times to the COVID-19 pandemic

Project Abstract

Using primary sources, oral interviews and secondary literature, the proposed book explores historical-cum public-health and intimate engagements, conversations and experiences on responses in Africa (but not excluding transcontinental associations) to health-pandemics since early times (i.e. Spanish Influenza) to the COVID-19 pandemic. According to the WHO, many cases and deaths have been reported in Africa and worldwide from the ongoing COVID-19 pandemic outbreak. South Africa represents the continental epicentre. By mid-2020, all the 54 countries in Africa had recorded an infection, the last being Lesotho. Though the rising death toll captures the eye and mind, it will be the experiences, action-taking activities by government, the medical-sector and equally so the economic-sector, with social life being locked for definite reasons, that will capture the communities of today and tomorrow. Community behaviours in difficult circumstances, requires research and a narrative not to be forgotten from researchers of the African continent. The book project will be typically collaborative according to an integrative multidisciplinary-research method that seeks to interrogate several diverse research questions from the disciplines involved, with as a major focus Africa and its people. The project is one of the first encyclopaedic-like surveys on COVID-19 as the first and perhaps getting to be one of the worst public-health crises/emergencies in Africa. This study, using its main research-objectives, is to leverage existing, multilateral-collaborations (within and beyond Africa) in support of Africa's consolidated-response to the COVID-19 pandemic and attract new collaborations from international funding sources. It also reflects on how the broad international experiences inform (and have informed) and have contributed to the African response to the pandemic (regional and continental). Many issues on COVID-19 and pandemics are examined to encourage effective research-collaborations. These issues include valued research contributions such as: the diverse experiences and action-taking-activities by government, the medical-sector and equally so the public and economic-sectors, with layers of social-life being nearly confined into an aged (not urbanized) era. Community's (and gender specific) ways of coping in Africa are valued pointers to this research. An analysis is made of issues of border restrictions and porosity, deportations and other migration tendencies in the wake of other pandemics like the cholera outbreak (2008/09) in southern Africa. These and related issues shed insights and sharing of ideas about COVID-19 from an African perspective and from different continental bases. This is important, given Africa and global nations' different historical and cultural backgrounds, irrespective of which country or continent has suffered

comparatively lower or higher cases or fatalities. The study will determine whether COVID-19 by December 2022 was Africa's biggest health threat? Prominent African and world organizations dealing intensively on a daily basis with Africa's health concerns, among others, will also be important sources of information for this study.

Expected Outputs

The study of approximately six (6) chapters will be inclusive of the seven (7) core historical outputs/outcomes. The essence of the research is to address the seven main objectives as outlined. The first thereof will be to raise the level of awareness in Africa about health pandemics from a multidisciplinary perspective which considers a health historical analysis from diverse fields and phenomenological research from multiple angles in Africa up to the recent COVID-19 pandemic. This research in Africa includes knowledge production related to all levels of society: From the poor and vulnerable and also more able backgrounds. A second output envisaged is to interrogate public-health efforts on different levels of societal life in Africa (local, regional and country specific). The integrative multidisciplinary lens will be used to contextualize, inform, and contribute to prepare and respond to disease outbreaks. Thirdly, gender specific perspectives about the impact of COVID-19 pandemic on the social, cultural and economic dimensions of communities are foreseen. Fourthly, it is expected that from the findings to emerge from objectives one to three it will be possible to communicate research on awareness of threats, social disruption and perhaps a future management of pandemics through the health sectors of countries in Africa. Fifthly, the role of governments, the part played by politics in health pandemics such as COVID-19, is expected to unravel to understand rationales and realities of this scourge. The sixth output is expected to assist with scholarly knowledge on multiple levels that provides for information to capacitate a broad range of stakeholders (in Africa and beyond). As a seventh output, the focus and emphasis from a much more holistic point of view and with the support of all disciplines involved, would be to determine how historical contexts of disease outbreaks could inform future situations and recommend a pathway for implementation of such recommendations for purposes of empowering communities and governments and other players particularly in Africa (and indeed elsewhere). Though all these knowledge outputs were envisaged from the broader research team, it should be noted that each discipline will also develop an additional set of 2-3 research questions as secondary project research objectives towards additional knowledge outputs and outcomes. The contribution therefore will be comprehensive.