UNIVERSITY OF THE
FREE STATE
UNIVERSITEIT VAN DIE
VRYSTAAT
YUNIVESITHI YA
FREISTATA

UFS

Coronavirus

(COVID-19/SARS-CoV-2)

7 April 2020

REPORT

ASSISTANCE BY THE UNIVERSITY OF THE FREE STATE TO GOVERNMENT TO OVERCOME THE COVID-19 PANDEMIC

1. INTRODUCTION

The University of the Free State (UFS) is committed to continue supporting government's efforts to overcome the COVID-19 pandemic. During this challenging time, the UFS continues to deliver essential services that enable the day-to-day continuation of everyday life. Despite the challenges, the dedicated staff at the university who is responsible for delivering essential services, is prepared to continue providing these services as a testimony to their dedication and commitment to service for the greater good of South Africa.

The following is a synopsis of the areas in which the UFS is actively assisting.

2. PUBLIC HEALTH EMERGENCY SOLIDARITY TRIAL

Clinicians from the Department of Internal Medicine, the Department of Critical Care, and the Division of Virology will be working with FARMOVS to participate in the Public Health Emergency Solidarity Trial initiated by the World Health Organization (WHO). This international randomised trial will evaluate four treatment options (remdesivir, lopinavir/ritonavir, lopinavir/ritonavir plus interferon, chloroquine or hydroxychloroquine) for the treatment of COVID-19.

The trial is expected to include more than 45 countries worldwide, including a number of South African sites.

3. FARMOVS

FARMOVS is in a planning process to support all the Bloemfontein hospitals, including Pelonomi, Universitas, 3 Military Hospital, Mediclinic, and Rosepark, in conducting the largest global trial on COVID-19 – the Public Health Emergency Solidarity Trial, under leadership of the WHO.

Negotiations are ongoing between the UFS and the Department of Health in the Free State for FARMOVS to offer support with the continuation of healthcare to non-COVID-19 patients in an attempt to free up space at Universitas Hospital for isolation of COVID-19 patients.

FARMOVS is also receiving feasibility requests to support with the development of novel drugs for the treatment of COVID-19 – this is an ongoing process.

4. DISASTER MANAGEMENT TRAINING AND EDUCATION CENTRE (DiMTEC)

DiMTEC represents the UFS on the Provincial Joint Operating Centre (PROVJOC). This is the highest decision-making body in the Free State during a disaster situation, and its members comprise heads of various provincial departments and Members of the Executive Council of the Free State Provincial Government.

5. UFS CORONAVIRUS (COVID-19/SARS-COV-2) TASK TEAM

The UFS Coronavirus (COVID-19/SARS-COV-2) Task Team was established at the start of the outbreak and comprises representatives from various key university departments.

The team is responsible for the following:

- Providing information to the UFS community regarding the virus, the outbreak, and up-to-date information on cases worldwide and in South Africa.
- Establishing guidelines for staff and students regarding travel for academic-related purposes. Additional guidelines have been prepared as required by the changing situation.
- Establishing and maintaining links with the National Institute for Communicable Diseases (NICD) and the Free State Department of Health to facilitate the dissemination of accurate and up-to-date information. This is facilitated by staff from the Division of Virology who is joint staff with the NHLS and staff from Internal Medicine who are contributing directly to the public health response. Communication is maintained via frequent webinars with Virology and public health experts at the NHLS and NICD and via interaction between colleagues.
- Engaging the university community and creating preparedness on the three campuses.

The constantly evolving outbreak has necessitated frequent updating and dissemination of information.

6. MULTIDISCIPLINARY TASK TEAM

A team of researchers representing a broad range of disciplines has been identified to address the outbreak using a multi-disciplinary approach.

This team aims to investigate innovative interdisciplinary science, modelling, and prediction that will contribute towards the current outbreak, and to build capacity for future outbreak preparedness. The team comprises academics from the natural and medical sciences, clinicians, mathematicians, statisticians, actuaries, lawyers, the humanities, and social sciences. The team liaises with the provincial Department of Health regarding matters such as modelling and prediction.

7. OTHER COLLECTIVE CONTRIBUTIONS

Other projects that are overlapping with and in support of projects run by the provincial Department of Health include:

- Staff members in the Division of Virology and Department of Internal Medicine are coordinating teams involved with outbreak response management, are doing frontline patient care, are serving on expert committees of the NICD in various fields, and are conducting diagnostic testing for the NHLS in the Free State and Northern Cape.

- Staff members in the Department of Quantity Surveying and Construction Management serve as project management advisers for services already established by the provincial Department of Health, including the provision of standard project guidelines towards the implementation of mobile testing units as provided by the national government. Assistance will also be provided in terms of establishing a workflow breakdown of the stakeholders involved, communication matrices, communication planning, project team directories, risk registers, and stakeholder registers.
- Staff members in the Faculty of Health Sciences are assisting with modelling, forecasting, and advising on the approaches to be taken to put the necessary systems in place.
- Simulation areas in the Faculty of Health Sciences are used to train hospital staff in certain procedures linked to COVID-19.
- The Faculties of Health Sciences and Natural and Agricultural Sciences are assisting with providing support to produce hand sanitisers for use by staff and students, including on the academic platforms.

8. INSTITUTE FOR GROUNDWATER STUDIES (IGS) LABORATORY

The IGS South African National Accreditation System (SANAS)-accredited laboratory tests water samples from municipalities and other sources to ensure that the water supplied to the public continues to be safe for consumption and adheres to regulatory requirements. Since the food industry is still in production to provide food as an essential service, water production remains a critical component of food production. Furthermore, companies producing bottled water, especially in areas with limited access to water, must ensure that purified drinking water meets the necessary safety requirements – including water supplied to communities by drinking tanks.

9. NATIONAL CONTROL LABORATORY (NCL)

Accredited by SANAS, the WHO, and the Good Manufacturing Practice (GMP), the NCL performs quality testing of human vaccine lots before they can be released into the market in South Africa.

The NCL was responsible for testing the quality of the 2020 seasonal influenza vaccine to ensure that it is available for the new influenza season, which is already upon us. After President Cyril Ramaphosa's announcement of the national lockdown on 23 March 2020, the NCL anticipated that the combination of COVID-19 and influenza could place the health-care system under additional stress, and recommended a faster release process for the influenza vaccine to the South African Health Products Regulatory Authority (SAHPRA).

This meant that the vaccines were available two to three weeks earlier than initially anticipated. The availability of the influenza vaccine remains critically important during the COVID-19 pandemic. While vaccination against influenza will not protect individuals against COVID-19, it remains important to protect the population, especially those at risk of influenza.

10. CHRONIC MYELOID LEUKAEMIA (CML) DIAGNOSTIC LABORATORY

The CML Diagnostic Laboratory is responsible for providing an essential diagnostic service to cancer patients with chronic myeloid leukaemia. The laboratory provides routine monitoring of patients with chronic myeloid leukaemia, which is essential for the effective management of treatment. Without routine monitoring, physicians cannot effectively manage patient treatment.

Despite the challenges during the lockdown, the staff in the laboratory continue to perform this essential service to ensure that patient treatment and management can continue uninterrupted.

11. GENETICALLY MODIFIED ORGANISMS (GMO) TESTING FACILITY

The GMO Testing Facility is authorised by the national Department of Agriculture, Forestry and Fisheries, and is internationally certified to perform genetically modified certification of food in South Africa. The facility supports the food industry by providing essential laboratory diagnostic testing of food in support of national and international regulations for the import as well as export of grains and food.

During the challenging period of national lockdown due to COVID-19, the production and processing of food remains an essential service. The laboratory staff performing testing thus supports the food industry by allowing the continued supply and trade in essential food products during the period of lockdown.

12. RESEARCH AND INNOVATION

The UFS hosts a SARChI Research Chair in vector-borne and zoonotic diseases, and recently invested in the establishment of a biosafety level-3 facility. Hence, there is expertise on the campus to plan and conduct research on zoonotic and medically significant viruses. In addition, there are research groups focusing on protein expression systems with potential for utilisation in the development of diagnostic assays with application in either diagnosis or surveillance.

Currently, researchers at the UFS have established several projects that will contribute directly towards the COVID-19 outbreak.

12.1 Determination of kinetics of antibody responses induced by SARS-CoV-2 virus

Laboratory confirmation of the infection requires molecular testing performed in laboratories with sophisticated equipment and skilled personnel. The application of rapid point-of-care tests which could be rolled out to households or clinics has been proposed as an additional test. However, the actual role of this assay in diagnosis is uncertain and is unlikely to be useful, as antibodies are probably not detectable at onset of symptoms and, by analogy with other human coronavirus infections, may take up to a week to develop.

Hence, the Division of Virology, in collaboration with UFS clinicians, has established a research project in which confirmed patients will be enrolled and tested over a period of up to three months to establish the exact kinetics of antibody responses. This will help to determine the exact role of rapid antibody assays in the COVID-19 outbreak.

12.2 Establishment of panels of positive and negative samples for assay development and validation

There are numerous point-of-care assays available on the market, and as this is a novel virus, there is little validation data available with regard to diagnostic sensitivity and specificity. Antibody tests are unlikely to play an important role in diagnosis during the acute stage of illness; however, these tests will play an important role in epidemiological studies and determining the full extent of the outbreak. This has contributed to understanding many facets of the outbreak, including the calculation of an accurate Ro (reproduction number) and an accurate fatality rate. Panels of

confirmed positive and negative samples that can be made available to any researcher, will be an important contribution to the outbreak.

The Division of Virology has established a project to collect these samples and will further confirm the immune status of the samples using neutralisation assays that require a biosafety level-3 facility, which is available at the UFS. In addition, they will use these samples to validate point-of-care assays and in-house assays.

12.3 Development of diagnostic reagents

Commercial assays are currently available for antibody tests; however, the cost of these assays will make surveillance studies difficult to perform. In a collaborative study between the Division of Virology and the Department of Biochemistry, Microbiology and Biotechnology, in-house reagents will be prepared.

Both departments currently have protein production systems that will be adapted to the expression of viral proteins with application in the development of assays. It is anticipated that this work will also be done together with collaborators from the University of Cape Town. Multiple expression systems will be used by each member of the consortium to produce various viral proteins, which will then be systematically tested to identify the most suitable protein for the development of assays (immunofluorescent assays, ELISA and lateral flow or point-of-care assays) with application as both diagnostic and epidemiological tools. The end goal is to identify proteins that could have application in research projects or potential commercial development.

13. CONCLUSION

The UFS works closely with the provincial Department of Health, the NICD, the NHLS, the Department of Higher Education, Science and Technology, provincial agencies responsible for emergency response protocols, industry partners and regulatory bodies to support government to overcome the COVID-19 pandemic.

The most important crisis that South Africa faces is the transmission of COVID-19 into communities and this can have a devastating effect on the country and its health system. The UFS is committed to advance public knowledge about COVID-19 and to support the national and global fight to restrain the spread and impact of the virus.

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