Stellenbosch University (SU`s) Research and Innovation Response to the COVID-19 Pandemic

During 2018, Stellenbosch University adopted a new Strategic Framework including Vision 2040. Vision 2040 states that, "*Stellenbosch University will be Africa's leading research intensive university, globally recognised as excellent, inclusive and innovative, where we advance knowledge in service of society*".

Research for Impact is one of the six major institutional strategic themes as part of SU`s Strategic Framework 2019 – 2024. Research for Impact at SU implies optimising the scientific, economic, social, scholarly and cultural impact of our research. Our focus is on interdisciplinary research that benefits society on a national, continental and global scale. At the same time, we are committed to basic and disciplinary research excellence, as it forms the basis for applied and translational research.

Research at SU is driven by the notion of simultaneous excellence and relevance, informed by a diversity of people and ideas. The institution wishes to achieve this by pursuing excellence, remaining at the forefront of its chosen focus areas, gaining standing based on its research outputs, and being enterprising, innovative and self-renewing. This requires a careful balance between, on the one hand, continuity and consistency and, on the other, transformation and rejuvenation of SU's academic researcher cohort. Ultimately, our research efforts are not only aimed at academic success, but also at making a significant impact in the world.

The COVID-19 pandemic is causing numerous challenges for us as a nation. In line with its strategic framework and the focus on Research for Impact, SU is committed to contribute to support the global pursuit to overcome the COVID-19 pandemic. Our researchers are currently involved in, and have now initiated, numerous research activities related to various aspects of the pandemic. We will report on each as follows:

A. Published inventions that may have a possible applicability to COVID-19
B. Completed SU research projects related to COVID-19
C. Ongoing research projects at SU with a relevance to COVID-19
D. COVID-19 related research projects awaiting ethics approval
E. Proposals received for new projects related to COVID-19
F. A selection of popular articles and opinion pieces published by SU academics (up to 6 April 2020)

Note: The research activities outlined below are in different stages of development. Hence, some project information will be more detailed than others. This document will remain work-in-progress over the weeks and months to come, as more research is initiated in this area.

For further information or enquiries:

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A. PUBLISHED INVENTIONS THAT MAY HAVE APPLICABILITY TO COVID-19

1. Natural antimicrobial surface coating

A method for preventing and treating microbial growth on manufactured products including packaging materials.

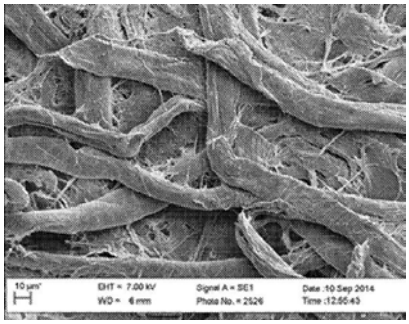

Fig: Scanning Electron Microscopy image of cellulose filter coated with the antimicrobial composition

Microbial adhesion to surfaces and the formation of biofilms is a common problem in both agriculture and medical related industries. Current solutions to these problems are limited in that they only delay the initial onset of infection or have a short-term sterilization effect. Researchers at Stellenbosch University discovered a green antimicrobial with high stability, biodegradable properties and which has limited potential to induce resistance due to its multiple modes of action.

The invention offers a method of prevention of surface contamination and/or biofilm formation which in turn can lead to lower pathogen transfer on high traffic surfaces, decreased product loss and greater food security in agriculture, in industry to improve sterilisation of the production line and in medicine where it can lower levels of infection and cost of wound care.

UNIQUE CHARACTERISTICS

- Green, biodegradable, and natural antimicrobial.
- Broad spectrum antibiotic and antifungal activity.
- Multiple modes of antimicrobial action resulting in low resistance potential.
- Lasting efficacy and adhesion to surface, even when washed with water or other solvents, therewith providing longer inherent antimicrobial activity.
- Withstands high process temperatures (in excess of 100°C).
- Withstands wide pH range (pH < 12).

TECHNICAL DESCRIPTION

The bio-friendly and biodegradable compositions contain natural peptides as the active ingredient. These antifungal and microbicidal peptides, with limited resistance potential, adhere onto solid matrixes to prevent surface contamination and/or biofilm formation. The natural peptides remain adhered to surfaces, even if washed with water, dilute acidic or basic solutions or organic solvents.

VALUE PROPOSITION/BENEFITS

The green antimicrobial provides an economical and effective biodegradable natural fungicide/microbicide alternative or additive to other commercially available chemical fungicides and biocides. Benefits of the antimicrobial include:

- Cost effective
- Natural and biodegradable antimicrobial
- High efficacy at low concentrations
- Lasting activity
- Easily scalable production
- Combats plant pathogens without damage to products during export, shipping and storage
- Prevents biofilm formation where other methods are unable to do so.

USE CASES

Microbial surface contamination leading to infections and/or biofilm formation results in product loss or disease spread. This innovation provides a solution to the problem of surface microbial contamination facing several industries. Use cases include:

- Food packaging, such as inherently antimicrobial fruit and vegetable packing materials for shipping and storage
- Antimicrobial surface treatment for long-term sterilization of industrial, medical and hygiene products (consumable and non-consumable), and manufacturing facilities. Examples include:
  - Sterilisation of food and beverage industry preparation and production lines susceptible to bacteria contamination, such as Listeria;
  - Antimicrobial coatings onto medical devices such as catheters and textiles such as wound dressings and filters.

INNOVATION STATUS

PCT national phase patents based on WO2015186058 (Australia, EPO, China, South Africa and USA)

PRINCIPAL RESEARCHERS

Prof M. Rautenbach, Department of Biochemistry, Stellenbosch University.
Miss W. van Rensburg, Department of Biochemistry, Stellenbosch University

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2. Antimicrobial Polymer Resin

A synthetic, permanently antimicrobial polymer resin for use in the textile or medical industry

Antimicrobial coatings are applied to substrates such as wound dressings, personal hygiene or sanitary products, clothing, packaging, furniture, construction materials, textiles and the like to make them sterile and prevent bacterial growth. Antimicrobial coatings find particular use in wound dressings as the exudate from the wound contained in an absorptive wound dressing typically encourages the growth of bacteria, resulting in infections that compromise wound healing.

UNIQUE CHARACTERISTICS

Materials and textiles coated with the resin become permanently antimicrobial

- No leaching
- Kills bacteria on contact
- No loss of activity over time

TARGET MARKET

- Medical and Healthcare sector
- Textile industry

VALUE PROPOSITION & BENEFITS

Most antimicrobial coatings include antimicrobial agents that are not permanently bonded to the substrate and eventually leach from the coating or are released from it. Such coatings lose their efficacy over time and the microbes may develop resistance against the particular active agents.

Antimicrobial wound dressings, for example, normally include low molar mass biocides or nanosilver that leach from the coating and affects bacterial growth in its immediate environment. Due to the mode of action and activity of biocides and nanosilver, antimicrobial efficacy is lost over time and cannot be regenerated. Moreover, the antimicrobial agents may in some instances have a toxic or harmful effect if concentrations are increased in an attempt to prolong efficacy.

There is thus a need for an antimicrobial coating that may be permanently bonded to a substrate and which has the required antimicrobial activity to protect the substrate and surrounding environment from microbial infection, whilst retaining its antimicrobial activity for extended periods of time.

TECHNICAL DESCRIPTION

Commercially available poly(styrene-co-maleic anhydride) copolymers are synthetically modified to incorporate quaternary ammonium compounds (QACs) in the backbone of the polymer.

QACs are well known to have antimicrobial activity and in this case act as contact biocides whilst permanently fixed on the surface of materials and textiles. A proof of concept was achieved where a commercial wound dressing was coated and the antimicrobial polymer fixed to the surface.

Antimicrobial assays with gram-positive and gram-negative bacteria indicated complete reduction in the total number of colony forming units (CFUs) in a matter of hours.

INNOVATION STATUS

Patents granted in South Africa (ZA201801156) and United Kingdom (GB201702804); Pending in Canada, India and USA.

PRINCIPAL RESEARCHERS

Dr William J. Cloete, Innovus, Stellenbosch University
Prof Bert Klumperman, Department of Chemistry and Polymer Science, Stellenbosch University

3. SynSurf®

A synthetic pharmaceutical to be tested as a supportive agent for the treatment of Acute/Adult Respiratory Distress Syndrome (ARDS).

Stellenbosch University (SU) and AzarGen Biotechnologies (Pty) Ltd, a South African biotechnology company focused on developing human therapeutic proteins using advanced genetic engineering and synthetic biology techniques in plants, have joined forces in the global fight against the coronavirus.

In the hope of contributing towards assisting treatment of patients with severe effects related to the condition, the collaboration will see the partners further develop SynSurf®, a synthetic pharmaceutical to be tested as a supportive agent for the treatment of Acute/Adult Respiratory Distress Syndrome (ARDS). Based on the latest research, ARDS has been cited as one of the major reasons that COVID-19 patients become critically ill and/or die.

SynSurf® was initially developed and tested (preclinically) for the treatment of neonatal Respiratory Distress Syndrome (nRDS), a condition where some premature babies struggle to breathe due to collapsed lung sacs, as well as treatment for acute lung injury in adults.

Since commercially available surfactant is very expensive, its cost has to date precluded adult patients from being treated. SynSurf® is composed of pure chemical substances which overcomes the cost issue to a great extent and almost excludes batch-to-batch variation issues as one expects with mammalian (animal) derived formulations. SynSurf® in experimental animals has not shown any toxicity or adverse effects.

SynSurf® requires testing in humans and if the laboratory tests and experimental work are any indication, the product has huge potential to ameliorate and/or treat both new-born and adult lung conditions. Other than replacing and supporting either a deficiency in lung surfactant, as found in premature new-borns, SynSurf® has the potential to strengthen poorly functioning lung surfactant, such as found in severe adult acute lung injury related to serious COVID-19 and other bacterial infections.

Specific laboratory work with SynSurf® has shown that it decreases inflammation and factors inducing inflammation in the lung. This aspect of SynSurf® could be “exploited" to suppress inflammation accompanying serious lung conditions such as those related to SARS, Swine Flu and COVID-19 lung infections.

We need to focus on getting SynSurf® to the patient and therefore regulatory oversight and resource allocation for all development aspects, including manufacturing, preclinical and clinical testing, for this project is now a high priority.

INNOVATION STATUS

Patents registered from national validation of WO2011/104621 in China, EPO (validated in Astria, Switzerland, Germany, France, United Kingdom, Ireland, Italy, Netherlands, Norway, Sweden, Portugal, Spain, and Denmark), India, South Africa and USA

PRINCIPAL RESEARCHERS

SMITH, Johan, VAN ZYL, Johann, Martin, VAN DER BIJL, Pieter, and HAWTREY, Arthur, Owen
From AzarGen Biotechnologies' side, the collaborative team will be complemented by co-founders Drs Mauritz Venter and Cobus Zwiegelaar

B. COMPLETED SU RESEARCH PROJECTS RELATED TO COVID-19

1. Transmission of respiratory viruses when using public ground transport: a rapid review to inform public health recommendations during the COVID-19 pandemic


Team members: Prof T Young, A Schoonees, Centre for Evidence-based Health Care, Division of Epidemiology and Biostatistics, Dept. of Global Health, Faculty of Medicine and Health Sciences, SU

The researchers conducted a rapid review of relevant literature and guidelines to identify effective interventions for the reduction of respiratory viral infections associated with ground public transportation during the COVID-19 pandemic. Completed and submitted to SAMJ, findings also shared with local, provincial and national DoH.

C. ONGOING RESEARCH PROJECTS AT SU WITH A RELEVANCE TO COVID-19

1. Modelling Covid-19 spread in African countries – SACEMA

Prof Juliet Pulliam, Director: SACEMA

The South African Centre for Epidemiological Modelling and Analysis, a DSI-NRF Centre of Excellence hosted at Stellenbosch University, has been developing models to evaluate the spread of COVID-19 in African countries. A recent project has focused on predicting when countries across the continent will experience their first 1,000 and 10,000 cases in the absence of control measures. In collaboration with researchers at the London School for Hygiene and Tropical Medicine, SACEMA researchers developed a model for the early stage of spread of+H112s where the disease has been reported. The model predicts that almost all African countries currently reporting cases will reach 1,000 cases by the end of April and – if effective interventions are not put in place – most will reach 10,000 cases by mid-May. The model correctly predicted that South Africa would reach 1,000 cases between 28 March and 2 April and has been validated against countries outside Africa that have already reached 1,000 cases.

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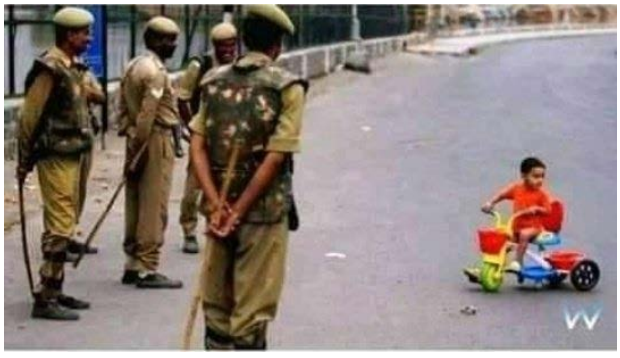
2. Mapping the 21-day Lockdown: South Africa in the time of the COVID-19 pandemic



Team members: Dr Anthea Lesch, Department of Psychology, SU

This exploratory project seeks to examine the COVID-19 pandemic and the SA societal response to coronavirus and the 21-day lockdown. The research uses data available in the public domain: news reports, social media posts, amongst other sources, to examine the SA response to COVID-19. This research is low risk and exempt from REC review.

Funding requirement: Seed funding is required to support data collection, transcription, the services of a research assistant and the process of translating the data into various media.

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3. Working in the Time of COVID-19: Reflections on Practicing in Gauteng's Healthcare Rehabilitation Services (continuation of Project #8574)

Team members:
Prof L van Niekerk
Dr HM van Biljon

Department: Occupational Therapy, Health and Rehabilitation Sciences, Faculty of Medicine and Health Sciences

Rehabilitation clinicians' personal and professional reflections of working in Gauteng's public healthcare during the COVID-19 Pandemic. This study was done in 2019 and 74 rehabilitation clinicians (occupational therapists, occupational therapy assistants and technicians, physiotherapists, speech and hearing therapists, audiologist and podiatrists) employed by Gauteng Health took part. The data creation phase of the project had concluded in 2019. When the pandemic broke out, previous participants contacted the researchers asking if they could continue with the reflections, focusing on working during COVID-19. This was cleared with Gauteng Health management and the data creation phase extended. The project has ethical clearance till 20 February 2021 and the HREC have been notified of the continuation.

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4. The role of executive coaching in supporting leadership during a pandemic

Team members:
Dr Nicky Terblanché, University of Stellenbosch Business School (USB)

The aim of this research is to investigate the challenges faced by organisational leaders and executive coaches during the Covid-19 pandemic, the strategies they employ to cope with the challenges and to what extent organisational leaders draw on their learning from the executive coaching they

received in these unprecedented circumstances. Between 20 and 30 organisational leaders and executive coaches will be interviewed in this in-depth qualitative study. The result will include a conceptual framework and practical guidelines of leadership and executive coaching during a pandemic.

Funding requirement: This project started in March 2020. Funding is required for data collection and analysis of interviews. Assistance is also needed to gain access to more senior organizational leaders to conduct interviews.

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5. The impact of increased hand washing due to Covid-19 on household water use

Team members:
Prof Heinz Jacobs
Ms M Crouch (former M student, graduated March 2020)
Dr V Speight (external collaborator)

Institutions involved: Civil Engineering, SU, University of Sheffield, UK

An existing stochastic water use model will be used, developed by M student, Melissa Crouch, and the model inputs will be linked to results from a consumer survey (conducted via Survey monkey) to assess the changed frequency and duration of hand washing, as impacted by Covid-19 and related media coverage. It is envisaged to also link this research to ongoing work on intermittent water supply in South Africa, to underline the impact of poor water supply on covid-19/hygiene risks due to limited hand washing and household hygiene under restrictions of intermittent supply.

The planning for this project is complete. The model is also complete and ready to use. Funding is required. Data collection, analyses and article compilation has not started. The next step is to finalise the consumer survey and then get ethical approval for the consumer survey, which would run for about 2 to 3 weeks and be conducted on a global scale (we completed a similar survey as part of the M studies and got responses from many countries in 5 continents). Then, analyses and journal article, about 4-6 weeks of work do be done post consumer survey.

Funding requirement:
Minimum ±R50 000.

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6. Analysing the spread and severity of the 1918 Spanish flu

Team members:
Prof Johan Fourie
Mr Jonathan Jayes (masters student)
Dr Kara Dimitruk (postdoc)
Dr Young Ook Jang
Dr Elie Murard

Departments involved: Departments of Economics and History, SU

Researchers are using publicly available death notices from 1915 to 1920 to analyse the spread of the Spanish flu in 1918, in order to understand the reasons why some towns experience heavy spikes – in today's parlance, why they were able to 'flatten the curve' – and others not. Understanding the most important determinants of the Spanish flu may help us predict how Covid-19 would spread, and develop appropriate pre-emptive policies.

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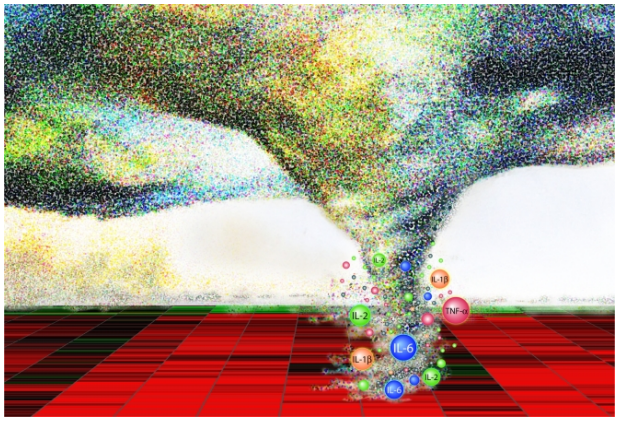
7. Drug development targeting the inhibition of the fatal cytokine storm in Covid-19 positive patients.



Team members:
Prof Colin Kenyon
Drs Leanie Kleynhans-Cornelissen, Ndivhuwo-Tshililo
Dr Happy Tshivhula (postdoc)
Mr Lutho Mabala (MSc student)

Department: Division of Molecular Biology and Human Genetics, Medicine and Health Sciences, SU

Between 3 & 10 % of patients infected with the 2019-nCoV virus develop acute respiratory distress syndrome, thereby having a high likelihood of admission to intensive care and often die. This is as a result of a "cytokine storm" elicited by the immune response. The "cytokine storm" is associated with disease severity and the primary cause of death. As part of a current triple-negative breast cancer (TNBC) drug development programme being conducted by Professor Kenyon, with a consortium in the United Kingdom, it became evident during 2018 that there are commonalities in the signal transduction systems associated with the regulation of both TNBC and a number of immune responses. Work was therefore initiated at SU on the immune responses. The TNBC programme has developed over 800 chemical compounds, a significant number of which have extremely high activity at inhibiting the identified target. We at SU have therefore undertaken to test the best compounds developed to-date against TNBC for their ability to inhibit the "cytokine storm" elicited in a Peripheral Blood Mononuclear Cell (PBMC) model system in association with the inhibition of the identified drug target. The impact of the drugs on the immune response will be assessed using the standard Human Cytokine multiplex assay system. Even if only moderate efficacy is demonstrated the assays developed are relevant for the screening of all potential drugs inhibiting the "cytokine storm". If efficacy is obtained ethical clearance will be sought to do the same set of inhibition assays, however using PBMC's isolated from 2019-nCoV virus positive patients. Having demonstrated efficacy an application will be made to take the compounds through clinical trials. These compounds have already been through a number of animal toxicity trials as part of the TNBC project.

Status:
in vitro testing against drug target - Currently ongoing daily.
Cytokine storm model inhibition - Currently ongoing daily.

Requirements:
The consumable reagents for this project are expensive. This is especially true of the reagents required are for doing Western Blotting and the standard Human Cytokine multiplex assay system.
We will also require prompt ethics approval once a decision has been made to use PBMC's isolated from 2019-nCoV virus positive patients.

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8. Hand Sanitizer from Stale Bread

Team members:
Profs Gunnar Sigge, Pieter Gouws
Drs S Hayward, T Tait (postdocs)
Mr S Orth (MSc student)

Department: Food Science, Faculty of AgriSciences, SU

Production of Bio-ethanol from stale bread by yeast fermentation and subsequent distillation
Requirement: no funding is currently available.

9. Assessing the vulnerability of the airline industry to external shocks

Team members:
Ms Jacomien van der Merwe, Logistics, Faculty of Economics and Management Sciences, SU
Ms RL Paul (Honours student)

Part of the honours 30 credit research assignment, Ms Paul will investigate the impact of the coronavirus pandemic on the global airline industry. She will investigate this impact by looking at the stock prices, revenue and passenger demand of airlines. She will also investigate the recovery rates of airlines and compare it to previous other external shocks such as economic, natural disasters and terrorism. She will also investigate potential mitigation measures / strategies to help airlines mitigate the effects of external shocks on the airline industry.

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10. Modelling the economic and employment impact of the COVID-19 pandemic on the SA economy.

Team members:
Prof Johann Kirsten, Bureau for Economic Research (BER)

Modelling the economic and employment impact of the COVID-19 pandemic on the SA economy. The first estimates will be published by mid-April to show how bad the impact will be on an already very fragile economy.

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11. 3-D printing of ventilator parts: Protective Visors

(i)
Team members:
Prof Jacques du Toit
Dr Rudolph Venter

Department: Orthopaedics, Division of Anatomy, Faculty of Medicine and Health Sciences, SU

Reusable Visors to be utilized in areas with high risks-ICU and surgery for Covid-19 positive patients. First batch to be finished by 5 April 2020. Currently using divisional funds.

(ii)
Team members:
Prof Jacques du Toit
Dr Ed Fuzy

Reusable boxes are being designed for use in A1 ICU to shield the intubation from the Covid-19 positive patient. Prototype currently being designed. Currently using divisional funds.

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12. Primary health care

Team members:
Prof Bob Mash, Family and Emergency Medicine, Faculty of Medicine and Health Sciences, SU

Prof Mash is providing technical expertise to the Metro District Health Services on de-escalation of facility based primary care services and escalation of community-based primary care services. For example a shift towards home deliveries of 200,000 prescriptions per month for patients with chronic diseases so they do not have to come to the facility. Innovation and health system changes will be evaluated and reported on.

13. CrowdFight COVID-19 Initiative

Team members:
Ms Caroline Pule (doctoral candidate), Biomedical Sciences, Faculty of Medicine and Health Sciences, SU

The CrowdFight COVID-19 initiative aims to bring together a global team of researchers in various fields to help understand and alleviate the scientific and health demands of the COVID-19 coronavirus. This initiative would like to get more medical and Health Sciencess professionals on board and calls on those interested to volunteer their time and skills to sign up at https://crowdfightcovid19.org Caroline is one of the core team local contacts (https://crowdfightcovid19.org/contact) and a scientist volunteer.

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14. Enhancement of Efficacy of known anti-viral drugs targeting the 2019-nCoV virus by site selective deuteration.

Team members:

Personnel	Position	Faculty/Department
Professor Colin Kenyon	Staff member	Faculty of Medicine and Health Sciences. Division of Molecular Biology and Human Genetics.
Dr Ndivhuwo Tshililo	Staff member/Postdoc	
ANOTHER	Postdoc	
Prof Willem van Otterlo	Staff member	Department of Chemistry and Polymer Science, SU
Dr Dino Berthold	Postdoc	
Dr Jaco Brand	Staff member	Central Analytical Facility, SU
Dr Marietjie Stander	Staff member	

Prof Colin Kenyon has been working on adenosine-5'-triphosphate (ATP) based reaction mechanisms for a number of years. This research identified that a single critical hydrogen atom on ATP drives all reactions using ATP. It was demonstrated that by replacing the hydrogen with a deuterium atom up to a **30 fold** increase in enzyme activity on all enzymes using ATP was obtained (Kenyon *et al*, BMC Biochemistry 2011: **2**, 36). They were also able to demonstrate that the deuteration affected the rate of synthesis of DNA using Real-time Polymersase Chain Reaction (RT-PCR) assays and deuterated deoxyadenosine-5'-triphosphate (dATP) and deoxyguanosine-5'-triphosphate (dGTP). One of the frontline drugs for the HIV virus is Tenofovir which is an ATP analogue. It was shown in a pseudovirus assay that the deueterated Tenofovir gave a 10 fold increase in activity when compared with the standard undeuterated drug. Patents were filed in the USA and Europe. This work was done while Prof Kenyon was employed by the CSIR. Both DST and the MRC were approached to fund ongoing research. They refused as, "it did not form part of their strategy". Tragically the CSIR was forced to lapse the patents due to the financial cost. Prof Kenyon still has all the compounds and Prof Willem van Otterlo (Department of Chemistry and Polymer Science, University of Stellenbosch) has agreed to assist in continue expanding the range of deuterated antiviral compounds. Prof Matthias Gotte at the University of Alberta, Edmonton, Canada, who is at the forefront of drug development research using the coronovirus RNA dependent RNA polymerase, has agreed to test all compounds. We would also like to deuterate other compounds in the 2019-nCoV virus drug development pipeline as a significant number of them are also dATP and dGTP analogues. These include Remdesivir the current front-runner for the treatment of the 2019-nCoV virus. We would also like to set up the RT-PCR assay to do the RNA dependent RNA polymerase screening on site as it will rationalise our drug development pipeline and allow SU chemists to be involved with the optimization of the deuteration chemistry and the deuteration of a larger number of known antiviral compounds for testing. This project therefore requires urgent additional resources if it is to realize its potential.

Status of activity:	**Status**	**Personnel**
Deuteration of antiviral drugs	Currently ongoing	Professor Colin Kenyon Prof Willem van Otterlo
Characterization of deuterated compounds and quality control	Currently ongoing	Dr Jaco Brand Dr Marietjie Stander
Testing of deuterated compounds		Prof Matthias Gotte (University of Alberta)

Requirements:
This project is currently under-resourced. The Central Analytical Facility costs for sample analysis is relatively high as analysis requires both NMR and Mass Spectroscopy. The consumable reagents for this project are expensive as the individual drugs are purchased at high purity and the deuterated solvents required for the H→D exchange and spectroscopy are also costly. The project should also have a dedicated chemistry resource to assist Prof Kenyon in compound synthesis and analysis and add significant additional know-how – to this end, the assistance and expertise of Prof. van Otterlo and his organic chemistry research group is being requested. The project should also endeavour to set up the RNA dependent RNA polymerase screen in-house to speed up the entire process. This is all possible within a relatively short timeframe, of importance due to the need for anti-effective agents specific for the 2019-nCoV virus.

15. Responses to the COVID-19 pandemic from African Universities in the field of Disaster Risk Reduction and African Water Sector

Team members:
Dr. Nico Elema, Me. Joanna Fatch (Projects Manager), Mr. Alberto Francioli (Projects Manager)

Department, Faculty:
Centre for Collaboration in Africa at SU International (coordinator); SU Research Alliance for Disasters and Risk Reduction (RADAR); SU Water Institute (SUWI) and 31 other African Universities and Research institutions

Through the AUDA-NEPAD SANWATCE and PERIPERI-U networks of African Universities and Research institution, various responses are being developed related to the COVID-19 pandemic. This activity seeks to record and coordinate responses from partner institutions across the continent

Status of activity: Ongoing and planned to expand

Related needs: Funding

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16. Serial COVID screening in at-risk health workers

Team members:

Profs Grant Theron (PI), Allwood (Pulmonologist), and others

Department, Faculty:

Biomedical sciences, Faculty of Medicine and Health Sciences (FMHS)

To test (PCR, serology) all health workers at high risk of exposure (Tygerberg Hospital COVID ICU) daily to detect when someone might be potentially asymptomatic carrier and hence pose a risk to other patients and health workers

Status of activity: Planned

Related needs: Funding, expedited review of REC approvals

17. Screening ART-initiators irrespective of symptoms for COVID and providing diagnostic laboratory capacity and support

Team members:

Profs Grant Theron (PI), Reeve, Abdulgader, Ojo, Warren

Department, Faculty:

Biomedical sciences, FHMS

To test high risk individuals newly diagnosed with HIV for COVID to estimate prevalence (positivity by PCR and/or serology), risk factors, association with symptoms, and to measure patient symptoms and COVID diagnostic readouts longitudinally as patients commence ART (thereby monitoring for any immune reconstitution related issues). We will, using the substantial GeneXpert and Qiacube testing capacity in CLIME, also supplement testing capacity at the request of local laboratory service providers.

Status of activity: Planned

Related needs: Funding, expedited review of REC approvals

18. Xtracted Xpert: Leveraging used COVID-positive GeneXpert cartridges as a source of material for downstream analyses

Team members:

Profs Grant Theron (PI), Venter, Warren, Nieuwoudt

Department, Faculty:

Biomedical sciences, FHMS, BME institution

The GeneXpert COVID testing platform will shortly be rapidly deployed and the cartridges after completion of a test are typically discarded. However, we have shown that similar cartridges still contain useful genetic material. The recovery of this material (without the need for additional specimen collection) will permit downstream testing for epidemiological links or sequencing. This is critical to inform contact tracing and manage the epidemic.

Status of activity: Planned

Related needs: Funding, expedited review of REC approvals

19. Human aerosol chamber to measure the infectiousness of COVID-infected patients and the potential effect on infectiousness of novel, freely-available forms of personal respiratory protection

Team members:

Profs Grant Theron, Venter, Warren, van den Driesche, Mahlobo, Mishra, Diacon

Department, Faculty:

Biomedical sciences, FHMS, TASK Applied

To quantify the infectiousness of COVID positive patients, identify the characteristics of patients who have high vs. low levels of infectiousness, and assess the efficacy of cloth masks at reducing infectiousness.

Status of activity: Planned

Related needs: Funding, expedited review of REC approvals

D. COVID-19 RELATED RESEARCH PROJECTS AWAITING ETHICS APPROVAL

1. Reducing morbidity and mortality in health care workers exposed to SARS-CoV-2 by enhancing non specific immune responses through Bacillus Calmette-Guérin vaccination, a randomized controlled trial.

Team members:
Prof Andreas Diacon
Prof Coenie Coegelenberg
Drs Johan Theron, Morne Voster, Arne van Delft
Profs Gerhard Walzl, Renout van Crevel

Institutions involved:
TASK Applied Sciences; FMHS: Medicine/Div of Pulmonology, Biomedical Sciences/Div of MBHG; Panorama MediClini; TB Proof; Radboud University Medical Center, The Netherlands

The project will focus on BCG revaccination in health care workers to reduce severity of subsequent COVID-19 infection and disease.
It was approved by SAHPRA, Pharmaethics. Submission to SU HREC in preparation. Expedited review of REC approval; expedited review by Tygerberg Academic Hospital and provincial health department.

2. Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT) project

Team members:
Prof Soraya Seedat
Dr G Spies (postdoc)

Department: Psychiatry, Faculty of Medicine and Health Sciences, SU
The researchers plan to initiate research on the mental health effects of COVID-19. This is a multi-country study with 44 countries expected to participate in the global survey. The survey will be launched in all 44 countries and together with Professor Soraya Seedat, who will be co-ordinating the South African study. Submitted to HREC for expedited review.

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3. Coronavirus Rapid Mobile Survey

4.

Team members:
Dr Nic Spaull
Profs Servaas vd Berg, Ronelle Burger, Rulof Burger
Drs Anja Smith, Nwabisa Makaluza

Departments involved: SACEMA; Faculty of Medicine and Health Sciences

The aim of the Coronavirus Rapid Mobile Survey (CRAM) to survey a nationally-representative sample of 10,000-20,000 South African individuals every two weeks for the next six months following the same individuals. This would create a 12-wave panel survey tracking changes in social and economic outcomes over the next six months. This would be sampled in such a way that changes in key statistics such as child hunger, unemployment and income would be able to be tracked fairly reliably. This data would be made be made available to high-level policy-makers in Presidency and Treasury who have agreed to sit on the CRAM Policy Reference Group. In order to ensure that the survey adheres to the highest technical standards and draws on the best available people in the country the study team

includes over 30 leading researchers from the universities of Stellenbosch, UCT, Wits, UWC and UJ. The CRAM survey is the only1 nationally-representative panel study in South Africa in 2020.

Funding is still required, as well as expedited ethics review.

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5. The COVID-19 Pandemic: Psychological impact on Healthcare Workers at Tygerberg Hospital

Team members:
Drs Martin Muller and WAJ Meintes (Health Systems and Global Health)
Dr Kerry Louw (Psychiatry)
Dr Charles van Wijk (private practice)

Baseline survey of healthcare workers at TGB during April and after the peak (Q3, 2020) of the pandemic.

Aims:
1. Baseline psychological assessment in April 2020
2. Post-pandemic psychological assessment in Q3, 2020
3.Quantify burden of mental impact related to pandemic
4. Determine associations between exposures and outcome variables.

Tools employed:
1. Exposure questionnaire with focus on work-related exposures.
2. Generalised Anxiety Questionnaire (GAD-7)6-7
3. Patient Health Questionnaire (PHQ-9)8-10
4. The Copenhagen Burnout Inventory11
5. PTSD Checklist (PCL) – 5
5. CAGE12-13

Requirements:
1. Urgent ethics review
2. Technical assistance with rolling out consent and questionnaires in an electronic format to the staff of TGB
3. Statistical assistance (Will get in contact with US Stats unit)

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6. The clinical evolution, management and outcomes of COVID-19 among patients admitted at Tygerberg Hospital, Cape Town, South Africa

Photo: Dr Jantjie Taljaard (Division of Infectious Diseases) explains isolation protocols at Tygerberg Hospital to a group of journalists

Team Members and Departments:

Faculty of Medicine and Health Sciences

- Prof René English, Division of Health Systems and Public Health
- Prof Peter Nyasulu, Division of Epidemiology and Biostatistics
- Dr Birhanu Ayele, Division of Epidemiology and Biostatistics
- Prof Portia Jordan, Department of Nursing
- Prof Eric Decloedt, Division of Pharmacology
- Dr Kathryn Stinson, Medical Student

Tygerberg Hospital and Faculty of Medicine and Health Sciences

- Prof Brian W Allwood, Division of Pulmonology,
- Prof Coenraad F Koegelenberg, Division of Pulmonology
- Dr Usha Lalla, Division of Pulmonology
- Dr Ryan Davids, Department of Anesthesia and Critical Care
- Dr Hans Prozesky, Division of Infectious Diseases
- Dr Jantjie Taljaard, Division of Infectious Diseases
- Dr Sa'ad Lahri, Department of Emergency Medicine
- Prof Elvis Irusen, Division of Pulmonology
- Prof Razeen Davids, Division of Nephrology
- Dr Yazied Chothia, Division of Nephrology

Short description of activity

The team has been involved in drafting a research project proposal so as to conduct clinical research on COVID-19 cases. As the incident cases of COVID-19 are increasing at it is unclear how the diseases will evolve in our population where the burden of other infectious diseases such as TBH and HIV are high coupled with high levels of poverty, malnutrition and overcrowding. For that reason, the team at FMHS jointly worked on developing this proposal so that we should be able to describe the clinical spectrum of COVID-19 in our setting, understand its complications and its outcomes, mostly focussing on the severely ill patients who require admission to hospital and may need critical care. The team had initially face-to-face meeting in mid-March followed by virtual communication to share ideas on the focus area as well as how to execute the study in real time.

Status of activity

The activities are ongoing. Due to expedited nature of the project, the proposal was completed and submitted to Ethics committee for Approval. Once we have the approval, we plan to carry our data correction, and analysis on regular basis and feedback the findings to the team so that our colleagues in the team who are in the front line providing clinical care should use the information to improve the approach to clinical management as well prevent infection occurring among the clinical and other health care workers at Tygerberg Hospital.

Related needs

1. We need expedited Ethical review and approval as case load is fast increasing and data is essential to help the clinical in patient management and infection prevention
2. We need funding support. As this is investigator initiated, the team has no funding means to support the research activities so that data is collected and analysed in real time as well as collected in a manner that is not risk to those collecting it. We propose a digital platform so correct and transmit data to our datacentre for analysis.

Proposed budget for data collection and dissemination

The study requires collecting data in a real time and integrating data from various sources like lab results, imaging and provisional health data exchange platforms to get information on co-morbidities. This proposed budget provides components do everything in a timely manner with the least amount of burden on people in the front line while keeping staff involved out of harm. The idea is to have a system that is effecient in a critical care environment that creates a platform that functions without undue risk to those in direct contact with COVID 19 patients. Belo is the equipment and staff budget.

Item	Motivation	Proposed budget
25 Tablets with good camera, SIMcard and Wifi enabled	• 20x Tablets for the bedside notetaking and collection of patient diagnosis, treatment,voice chat and outcome data • 5x Tablets for roaming doctors or nursing staff • The idea is to have at least 1 table per bed wifi connected (Immobile)	25x R10000=R250,000
10 PowerApps, PowerAutomate and PowerBI	The automation services to automate repetitive tasked and simplify the data collection process. This will help with Health Data integration, transforming, processes etc	10xR6000= R60,000 per year for 10users
1, IT support staff	For monitoring and configuration of the IT systems and network data flow accordingly	6 Months * R25000=R150000
1, Data Clerk	To manage the flow of data, manage data, validation and making sure data is complete	10 Months R20000=R200000
I Desk top computer	Desk top computer specially designated for this project to manage data safety and minimise data loss	1x R25,000 =R25,000
6 Publication outputs	Publication charges for online access	6xR25,000=150,000
1, Research Coordinator	To coordinate all activities related to this research project so that the project is conducted in the most efficient manner	10x R30,000=R300,000
Total	Projected budget required	R1,135,000.00

E. PROPOSALS RECEIVED FOR NEW PROJECTS RELATED TO COVID-19

1. Seeds of COVID-19 responses

Team members:
Prof Oonsie Biggs, Centre for Complex Systems in Transition (CST)

Departments involved:
Economic and Management Sciences (EMS) / Medicine and Health Sciences

The aim of this project would be to create a (peer to peer) learning community that supports federations of grassroots organizations to:
•Learn from peers in real time about which community resilience strategies and tactics are working in the face of the Covid 19 pandemic,
•inform international and donor organizations wishing to support grassroots organisations, about strategies and tactics that are working,
• provide advice and feedback to governments on implications for policy decisions

Funding requirement: to be determined

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2. Understanding society's response to the Coronavirus/Covid-19 pandemic through the lens of newspaper/online media cartoons as a form of political/social/scientific commentary.

The Side Eye: Viruses vs Everyone

Team members:
Dr Marina Joubert (CREST)

As the current Coronavirus/Covid-19 pandemic is affecting countries around the world, cartoonists are capturing and commenting on issues with a mix of political commentary and societal responses, while also providing some relief via humour. As these cartoons mirror the concerns, fears and frustrations of the nation, they provide an interesting lens for tracking how the societal response evolves over time, as well as to understand and analyse the response. The research will build on the established body of academic literature about the role of cartoons, satire and humour in popular communication of science and science-related issues. The project will focus on daily and weekly publications (newspapers) in South Africa. Starting from 1 February 2020, the project will look at cartoons in at least 15 major South African

newspapers/news sites (printed and only only). All cartoons that are relevant to the Coronavirus/Covid-19 pandemic will be downloaded for visual content analysis. Through this analysis, we will track country-specific issues, how scientists and politicians are portrayed as experts, and look for commentary on conspiracy theories and fake news.

Requirements: This project is currently in the planning phase. Moderate funding (for help with data capturing and coding); as well as expedited review of REC approvals would be required.

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3. Reverse engineer and manufacture ventilator parts

Team members:
Prof Anton du Plessis, Physics and Central Analytical Facilities (CAF)

Researchers are in the process of getting two models of ventilators which they will microCT scan and reverse engineer in order to rapidly produce replica's at low cost using 3D printing and conventional manufacturing tools. Parts are being sourced.
Requirements: Formal approval and some funding to assist in the process for various parts of the project, access to the lab in the time of lockdown.

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4. COVID-19 triage by cough sound analysis

Team members:
Prof Rob Warren, SAMRC Unit Director, Biomedical Sciences, SU
Prof Thomas Niesler
Dr Marisa Klopper
Dr Liezel Smith
Dr Madhu Pahar (postdoc)

Technology exists that can distinguish coughs of different aetiology such as pneumonia, asthma, etc. via smartphone apps. Preliminary data suggest that TB coughs have a unique signature as well. Researchers would like to collect cough sounds (asking patients to send a voice note via whatsapp) and limited metadata to determine whether a COVID-19 cough can also be distinguished from other coughs. Provided that a COVID-19 cough has such a distinctive signature, a smartphone app will be developed

that can be rolled out to allow patients to undergo the screening test, including cough analysis and additional screening questions, without health worker contact. This may be useful to triage patients effectively for confirmation of COVID-19 via a laboratory test, thereby aiding in appropriately directing resources.

Requirements:
1. Expedited HREC approval (as well as National ethics approval)
2. Access to NICD database to identify patients that are eligible to participate and obtain their contact details
3. Government buy-in to facilitate access to NICD database and roll-out of the finished app
4. Free data/bandwidth
5. Funds to pay a postdoc salary
6. Funds to facilitate app development
7. Expedited contract review, where external parties are invited to collaborate on the project.

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5. Mask sterilisation with microwaves

Team members:
Prof H Reuter (Division of Clinical Pharmachology)
Dr T Theron (Institute for Orthopaedics and Rheumatology)
Prof JB de Swardt (Electrical and Electronic Engineering)
Mr Sarel Rautenbach (Glasschem)

Sterilisation of masks is in great demand at hospitals. We will see if we can use microwaves or UV or Ozone to sterilize the masks.

Requirements: We are only starting to investigate the problem today. Probably need some funds for equipment and experiments.

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6. Assisting in SARS-CoV-2 testing for NHLS

Team members:
Profs G Walzl
Prof C Kinnear (MRC staff member)
Dr Nelita du Plessis
Ms Lauren Cruywagen and Ms Marika Flinn

Department: Molecular Biology and Human Genetics, Medicine and Health Sciences, SU

As testing will be ramped up, MHLS cannot cope with the numbers and academic labs have been approached to help. This research is currently planned - depending on government, HPCSA and NHLS permissions. Supporting permissions at NHLS and HPCSA level is required to conduct diagnostic work in academic labs.

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7. Impact of SARS-CoV-2 infection co-infection on TB

Team members:
Prof G Walzl
Drs Stephanus Malherbe, Nelita du Plessis
Ms Lauren Cruywagen, Ms Marika Flinn

Departments: Molecular Biology and Human Genetics, Biomedical Sciences; Immunology group and Molecular Biology Clinical Research Unit, Faculty of Medicine and Health Sciences, SU

Testing for Covid-19 co-infection in TB cases and those with symptoms compatible with active TB. Still in planning phase.

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8. Clinical trial of Chloroquine in the treatment of Covid-19

Team members:
Prof G Walzl
Drs Stephanus Malherbe, Nelita du Plessis
Ms Lauren Cruywagen, Ms Marika Flinn

Departments: Molecular Biology and Human Genetics, Biomedical Sciences; Immunology group and Molecular Biology Clinical Research Unit, Faculty of Medicine and Health Sciences, SU

Prospective clinical trial of Chloroquine and other potential drugs in Covid-19. Still in planning phase.

F. POPULAR ARTICLES AND OPINION PIECES PUBLISHED (up to 6 April 2020)

COVID-19: South Africa's neglected military faces 'mission impossible' (SU website, 6 April 2020)
Prof Lindy Heinecken, Department of Sociology and Social Anthropology

South Africa's military has been deployed to help maintain law and order during the lockdown period. But it's going to struggle to fulfil the expected duties, argues Prof Lindy Heinecken from the Department of Sociology and Social Anthropology in an article published by *The Conversation* recently (2 April).

COVID-19: South Africa's neglected military faces 'mission impossible'
South Africa's military has been deployed in communities across the country to support efforts to contain the COVID-19 disease, and help save the lives of citizens.

In terms of the mission to combat COVID-19, the defence force will, among other duties, protect quarantine sites, deliver food and others essential supplies to mass storage facilities, help police restrict people's movements, conduct road blocks and to curtail unrest.

But can it fulfil these duties? The South African National Defence Force has suffered from terrible neglect over the past 25 years of democracy. The result is that in this time of crisis, it may not be able to muster enough troops to maintain the lockdown.

Members of the South African Medical Health Services have also been deployed to provide health support services. But, only 2820 soldiers have been deployed, according to official reports.
The army only has 14 infantry battalions, consisting of about 810 men and women each - including 34 officers. And many soldiers are simply not deployable, due to poor health and other manpower constraints, or other commitments like border control.

In its current condition, the defence force cannot meet the demands placed on it to fight the coronavirus, in addition to serving on peacekeeping missions, and an array of other tasks, from disaster relief, to bolstering internal safety and security and safeguarding the borders.
Another big concern is that soldiers are not trained in riot control, nor do they have the appropriate equipment for this. This could result in them using excessive force against civilians in line with their training, in response to violence.

Why the army is in a parlous state
The South African National Defence Force's poor capacity to deliver on its mandate of safeguarding the republic against foreign aggression go beyond purely budgetary constraints. For the past 25 years' there has been little to no organisational transformation to reconfigure the force structure and design to meet current realities.

Force structure describes how military personnel, their weapons and equipment are organised for military operations, missions and tasks. Force design relates to the shape, structure and purpose to meet operational needs.
Instead, the military has been absorbed in the processes of political transformation, where the focus has been almost exclusively on ensuring that it is representative of broader society. The government has also been preoccupied with getting the military to be subservient to civil control.

I describe these processes, and the impact they are having in my new book, *South Africa's post-apartheid Military: Lost in Transition and Transformation*. Both processes are flawed, and have negatively affected the military's efficiency, effectiveness and professionalism.
Where military generals function out of misplaced political loyalty, this inevitably results in a breakdown in the chain of command.

Secondly, in terms of civil oversight, where non-military people lack knowledge of military matters, this affects the quality of debates on defence matters. It also imperils policy formulation and advice in terms of the military's strategic direction.

Another problem has been the effect of cultural and human resource transformation. This focuses on addressing historical inequality, such as racial and gender discrimination, and labour practices. Here there have been numerous challenges, such as dealing with the impact of HIV and Aids and military unions.

There are large numbers of military personnel who are not health-compliant. This affects all generic personnel processes, including training, deployment, and maintenance and support functions.

The military has been facing numerous other human resource challenges. It has major skills shortages, imbalances in terms of personnel structures, and is unable to rejuvenate its forces. This has led to an aging force and rank stagnation, which means that people cannot be promoted. The reserves, which are being called up under the National Disaster Management Act, are in a similar state. With a strength of 20 000 and an average age of 43yrs, this back-up has limited capacity.

Risky choice
These political, cultural and human resource issues have distracted the military from focusing on the pressing issues of operational and organisational reform.

The 2015 Defence Review, maps out the future security landscape and priority tasks of the military. Priority tasks include to defend and safeguard South Africa, promote peace and security, and perform developmental tasks. But these ideals are unrealistic in light of current budgetary constraints.
It will take great ingenuity to restructure the country's armed forces to meet even the most key obligations, including countering external security threats against the country and peacekeeping in Africa.

External threats are both traditional and non-traditional, including regional and local conflicts; violent political, religious extremism as well as terrorism, and high levels of international crime.
Internally, threats include illegal immigration, crime syndicates, gansterism, and having to deal with medical crises such as Covid-19.

What's needed
The first thing that's needed to transform the military is decisive, strong leadership from politicians and military leaders. There needs to be a clear articulation of what capabilities they want going forward.

Priority tasks will increasingly be those affecting the citizens of South Africa directly, in cooperation with the police. These include deterring and preventing conflict, safeguarding borders, protecting critical infrastructure, and promoting safety and security. It'd be impossible for the defence force to perform these tasks effectively, and still contribute to peace and stability on the continent, within current budgetary and organisational constraints.

The reality is that South African citizens and politicians become interested in the affairs of the military only when there's a crisis. This leaves it to function in a vacuum.

The COVID-19 pandemic might just show how weak the country's military is. It remains to be seen if it will be up to the task if the frustrations caused by the lockdown were to erupt into violent conflict. How well it helps the police contain and suppress this violence will be a telling sign of the country's state of defence.

Hundreds of TygerMaties volunteer to fight battle against COVID-19
Author: Wilma Stassen (SU web, 3 April 2020)

Medicine and health sciences students at Stellenbosch University's (SU) Tygerberg Campus did not want to heed the call to return home when the university announced an early recess in March this year to accommodate ministerial directives around the coronavirus outbreak.

Instead, hundreds of undergraduate students at SU's Faculty of Medicine and Health Sciences (FMHS) decided to sacrifice their recess to stay and fight against the coronavirus outbreak.

“I wanted to stay and make a difference and help wherever I was able to," said Cameron Fourie, a second-year medical student who is now working in the COVID-19 tracing centre on the Tygerberg Campus. Cameron is one of about 360 TygerMaties who volunteered their services in the country's fight against COVID-19.

“I never 'decided' to volunteer. I 'knew' I wanted to be there and to help," explained Elsjé-Marie Geldenhuys, a sixth-year medical student. “As future healthcare workers it's in our nature to help – it is who we are."

Student intern, Sheryl Marshall agreed: “Volunteering was the most natural thing to do. I really felt that I wanted to stay and help – especially when we are facing such a huge health crisis." Marshall is helping to care for patients in Tygerberg Hospital's Internal Medicine ward, which frees up more doctors and nurses to attend to COVID-19 patients.

“The students are doing this of their own volition. The hospital and university never requested assistance, they just took it upon themselves and we are so grateful for their help," said Dr Suretha Kannenberg, a lecturer in the Division of Dermatology at the FMHS. She is currently helping to manage volunteer services at the FMHS and Tygerberg Hospital.

The student volunteers are working on numerous fronts and are provided with the necessary training and protective equipment. They receive a flu vaccination before they are allowed to work in hospital, and are working under the supervision of senior healthcare staff.

Currently 70 students are working in Tygerberg Hospital's COVID-19 Screening Area. “They are doing everything from interviewing patients under investigation to administrative tasks," said Kannenberg. Another 20 students are screening people at the four main entrances to Tygerberg Hospital and dispensing hand sanitizer.

Fifteen students are working at the Contact Tracing Centre at Tygerberg Campus where they are helping to telephonically trace contacts of positive cases, and another 115 students are assisting at the National Covid-19 Helpline.

In the Internal Medicine wards, 70 students are helping with the day-to-day functioning of the hospital. “These are senior students doing things like drawing blood and placing drips and other tasks that they would have been performing anyway as part of their clinical training," Kannenberg explained. Students are also collecting data and running statistics for the Division of Epidemiology and Biostatistics at the FHMS, while others are doing data capturing at the Division of Medical Virology.

“The students have been so professional and so keen to help. With the sudden increase in clinical and administrative duties at the hospital, the students' assistance have freed up doctors' and nurses' hands to be able to perform other lifesaving tasks," said Kannenberg.

“I thoroughly enjoy being at the forefront and screening the patients who come in at Entrance 5 at Tygerberg Hospital. I feel like this is a way for me to give back to my community," said Abdul-Baasit Isaacks, a fifth-year medical student. He admits that volunteering was a risky choice as he has asthma and the coronavirus is notorious for affecting the lungs and causing respiratory problems.

“I am a little scared," admitted Elsjé-Marie, who is also an asthmatic. “But volunteering has given me a purpose during this uncertain time and makes me feel part of something bigger than myself."

“It's exciting, but also a little scary," said Sheryl. “Just getting to the hospital is anxiety-provoking. There are army people with guns, and I get stopped at least six or seven times to show my permit even before I start work. Also, you know that it's going to get hectic, but you don't know when, and you don't know how it will play out exactly," Sheryl admitted.

Still, she said, she wouldn't want it any other way. “There is an amazing sense of camaraderie in the hospital and it is wonderful to see the students, doctors, nurses, cleaners and just everyone coming together and fighting the pandemic as a team. We really are stronger together."

“We are so proud of our student volunteers who are turning up in great numbers in the battle against COVID-19 day after day," said FMHS Dean, Prof Jimmy Volmink. “The courage, commitment, compassion and camaraderie they show in the face of danger and suffering are very inspiring. There is no doubt these students have truly grasped the essence of healthcare as a calling."

"These students from divergent backgrounds are joined by a common sense of purpose: saving lives and improving the quality of life of our people, for the most part, against the odds. The odds of social circumstance characterized by poverty and inequity, of badly equipped medical facilities and poor working conditions, and running the risk of being infected. But these students are undeterred and mobilised by the realization of a sense of both professional and civic duty. They are currently being deployed at the centres of need," commented Prof Wim de Villiers, Rector and Vice-Chancellor.

“The feedback I have gotten about the students from the hospital managers, public health specialists and disaster management team has been wonderful. Even in the lockdown the students have rallied, they are organised and committed and their attitudes to service has been fantastic," said Prof Heike Geduld, head of the Division of Emergency Medicine at the FMHS.
“I really am inspired by their commitment, and they make me optimistic about the future of healthcare in South Africa," she concluded.

Ballet, dance moves can keep rugby players fit during lockdown
Author: Alec Basson (SU web, 6 April 2020)

Rugby players may not be able to train outdoors because of the COVID-19 lockdown, but they can still maintain an edge over their opponents if they make ballet and certain rhythmic (dance) moves part of their strength and conditioning training while indoors, according to a recent study at Stellenbosch University (SU).

“Incorporating rhythmic movements into their training can improve rugby players' flexibility, agility, power, muscular endurance and dynamic balance (maintaining postural stability while moving)," says Jocelyn Solomons who obtained her Master's degree in Sport Science at SU recently. She's currently enrolled as a PhD student at SU.

Solomons says she wanted to combine two seemingly different worlds namely dance and rugby because of the potential of rhythmic movements to be incorporated into the strength and conditioning programmes of rugby. She adds that the focus is on specific dance-inspired movements in the form of “exercises" as opposed to dance routines.

In the first study of its kind in South Africa, Solomons tried to determine the effect a rhythmic movement intervention would have on the performance of rugby players. She recruited players from the Stellenbosch Rugby Academy and the Western Province Rugby Academy to participate in her 16-week intervention.

Solomons says the players were very shocked and suspicious at first, but after she had shown them a YouTube video of the Wigan Warriors rugby team who use ballet as part of their training, they were excited to try something new and different from their normal rugby training.

As part of the intervention, the players – both forwards and backs – performed various rhythmic movements as part of their training with a specific focus on exercises that targeted bio-motor skills (flexibility, dynamic balance, agility, power, strength and endurance). These exercises included ballet, salsa basics, jumps and leaps (modern dance), grapevine steps and turns (used for example, in the foxtrot, polka, hustle, etc) and various dynamic and static stretches.

“There were statistically significant improvements from pre- to post-treatment in the players' power and some local muscular endurance bio-motor skills. Additionally, when considering backs and forwards, agility and power showed statistically significant improvements from pre- to post-test", says Solomons.

“The exercises helped the players to throw medicine balls further when seated and to jump higher from a standing position. They were also able to do more crunches in two minutes, as well as more pull-ups and single-leg squats."
“Multiple bio-motor skills can be trained simultaneously, which is advantageous to a demanding rugby-training schedule. In other words, rhythmic movements can be used as a tool to warm-up, as a conditioning method to improve specific bio-motor skills or, when required, as a form of recovery for players."

Solomons says that in order for the rhythmic movement intervention to be as effective as possible, it should be implemented throughout the rugby season and should include and cater to the positional demands of rugby players.

“The findings of the study are particularly relevant for coaches, along with other specialist coaches (strength and conditioning coaches, as well as technical and tactical coaches), who are frequently looking for new ways to improve the performance of players and to implement an alternative training strategy to their strength and conditioning programmes."

Solomons says players of all ages can do these movements as part of their training, adding that apart from rugby players. She points out that rhythmic movement has been used in some form in other sports such as soccer and has shown benefits. “Anyone from any sport can make rhythmic movements part of their training as long as they mimic the movements of the specific sport."
Solomons plans to share her findings with rugby coaches.

FOR MEDIA ENQUIRIES ONLY
Jocelyn Solomons
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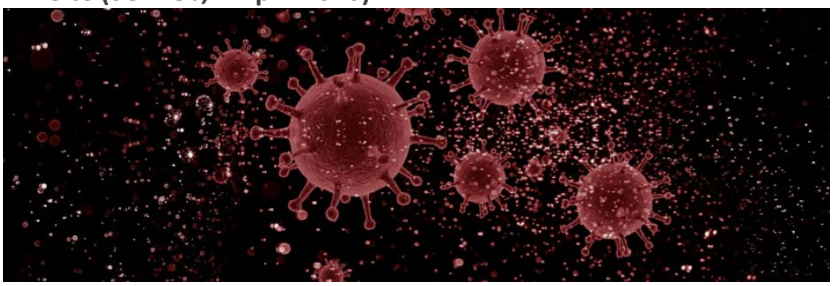
COVID-19: What happens after the lockdown?
Author: Prof Alex Welte (SU web, 2 April 2020)



What will happen after the lockdown is over? This is the question Prof Alex Welte from the South African Centre of Excellence for Epidemiological Modelling and Analysis (SACEMA) tries to answer in an article for GroundUp (31 March).

The epidemic won't disappear by 17 April. We have merely bought three weeks breathing space to plan for the future.

Those of us trying to model the COVID-19 pandemic should try to be humble; there is more we don't know than we do. Anyone who claims to know what the infection or mortality rates are for this disease is either deluded or dishonest. But, with time-tested scientific analysis, some things are predictable: on 17 April, after three weeks of lockdown, the sun will rise in Cape Town at 07:10, and we will still be at the start of a COVID-19 outbreak.

Although our current three-week lockdown will temporarily suppress transmission in the South African epidemic, it won't eradicate it, and if we just go back to business as usual, we will have endured the lockdown for nothing.

Usually, viral outbreaks, like flu, peak and subside long before everyone gets infected. The network for transmission becomes thinned, and transmission just can't be sustained. This thinning has many potential contributing factors: for most viral infections, people acquire substantial immunity from infection, so once they recover (sometimes quite quickly) they no longer contribute to spread.

Of course, people may also adapt their behaviours if they see a severe outbreak around them – but even without changes in behaviour, there are natural reasons for epidemics to die out. This pruning of the transmission tree, however, relies on a substantial fraction of people getting at least a brush with the infection – and it is from the study of seasonal flu and similar viruses that people have been circulating some alarming estimates of how many people might contract the new coronavirus. Indeed, a scarily large number of people would need to be infected for there to be a collective “herd immunity" that would make any residual transmission dwindle away harmlessly.

Even in severe COVID-19 outbreaks like in Wuhan, only about 1% of the local population was ever infected before draconian measures pretty much shut down transmission. While restrictions are now being eased, the population is almost as susceptible to a re-ignition of the epidemic as it ever was, and any reintroduction of infection to Wuhan would be just about as dangerous as the initial outbreak.

So the question is, what do we do after 16 April? This is a political, not a purely technical, question – though there are technical aspects to understanding what will be happening as we try to get out of a strict lockdown to something more sustainable. I don't think epidemiologists necessarily have the insights or creativity to come up with the answers, but we can suggest some of the important things we will have to consider and debate. Between quasi-incarceration and going back to how things were, there is a wide spectrum of measures, and infinite scope for creativity. Here are some questions to ponder:

Post-lockdown, how do we monitor if the epidemic is getting out of control again, and how do we then respond?
If there is a rapid escalation in cases, or hospitals begin to get overwhelmed, do we enter another lockdown? How many lockdowns can we endure before unemployment and the slowdown in the bare bones basics of the economy becomes even worse than a massive but transient epidemic? How do we conceive, implement and monitor meaningfully distinguishable levels of social distancing, and how do we step back, cautiously but with some urgency, from the brink of total stagnation?

How do we scale up testing to the level at which it plays a real role in controlling the epidemic?
In South Korea there is continuous mass testing; over 400,000 tests have been conducted compared to about 35,000 in South Africa (our populations are similar sizes). As soon as infected people are identified, they have to go into isolation until they've recovered. This has helped keep the epidemic manageable, and maintain standards of care for those who experience acute illness – so mortality rates are low. How do we adapt this to our informal settlements, infrastructure and finances? We need rapid, simple, cheap, and reliable tests to become available here, and fast.

What social distancing measures can be maintained for the long term?
Should people who can work from home continue to do so by default? Should restaurants remain closed except for takeout? Can we encourage online grocery shopping? Do airports remain open only for essential travel and goods? What public transport rules will be instituted? How do we even begin to implement social distancing in high-density shack settlements? Or could this epidemic be the impetus to finally address the housing crisis, or, indeed, the land question?

What do we do about schools?
Perhaps a handful of schools can implement sustained distance-learning, but this is impossible for township schools, and even schools in middle-class areas. Perhaps we have to accept that the school year must be cancelled and that a cohort of children will matriculate 12 to 18 months later (or whenever the pandemic has passed). But without schools and feeding schemes, many children will go hungry unless something creative is done. Alternately, if we restart schools soon, can the youth show us how they wish to adapt their environment to take care of their futures?

What steps can be taken to prepare hospitals, both public and private?
Perhaps the main benefit of the lockdown is that it is giving intensive care units an opportunity to prepare for a spike in cases. The impressive crisis-driven adaptations we have seen in other countries may not be replicable here, but it is clear the trenches of this proverbial war are the high care settings of formal healthcare facilities. The pressure COVID-19 puts on health systems is not primarily about people dying. The challenge is that many of those who become really ill can, in principle, benefit hugely from effective care – but they will not get much care if the system is overwhelmed.

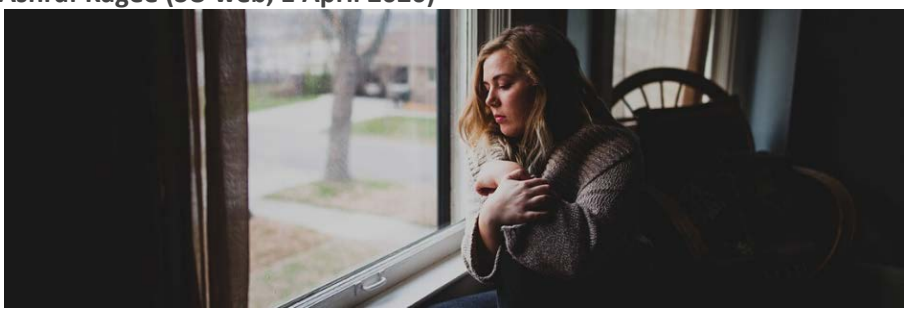
How do we support the economy?
A virtual who's who of local economists have written a compelling letter to President Ramaphosa, with key proposals to mitigate the economic fallout of both the epidemic itself and the ongoing and coming social countermeasures. Engaging seriously, and transparently, with these proposals is now a matter of great urgency.

If we just go back to normal after 16 April, then all that will have been bought, at some pretty awful costs for the more vulnerable in society, is a few weeks delay of a terrible disaster. But a continuous lockdown will obviously also have devastating effects, especially on people living in informal settlements, who are somehow expected to stay confined to their shacks 24 hours a day, except to stand in long queues for social grants and groceries. Jobs have evaporated, women are stuck at home with desperate disgruntled men, and children are forbidden to run around outside unless they live in the plush suburbs and have gardens. This seems almost like pointless cruelty; a heavy-handed over-reaction to the fear that more nuanced social distancing will somehow necessarily fail.

We are facing extremely difficult questions, and we surely won't find “the right" answers to them, except in a few cases, and even then probably only with hindsight. But we need to begin to explore these questions now, and make choices even before the end of the lockdown, so that the next steps are neither rank guesswork nor political expedience.

**Prof Alex Welte is Research Professor at, and the former Director of, the South African Department of Science and Innovation-National Research Foundation (DSI-NRF) South African Centre of Excellence for Epidemiological Modelling and Analysis (SACEMA) at Stellenbosch University.*

Looking after your mental health during the COVID-19 crisis
Author: Prof Ashraf Kagee (SU web, 1 April 2020)



The COVID-19 crisis has disrupted our world and plunged us into a time of great uncertainty. In an opinion piece for *Health24*, Prof Ashraf Kagee from the Department of Psychology offers a few tips that can help us stay mentally healthy during the lockdown period.

The COVID-19 crisis has disrupted our world and plunged us into a time of great uncertainty. Under these circumstances, it is quite common for people to be worried, distressed and anxious about what lies ahead. There is, however, no reason to regard anyone who feels afraid and anxious during these difficult times as being psychologically abnormal. We still have some time to go before the lockdown is over and almost everyone will be having some of these feelings at some point.

However, the constant stream of news reports about the COVID-19 pandemic can lead to a rise in levels of anxiety. If this is the case then one should limit the amount of time spent listening to or watching the news. It is, of course, necessary to get the facts – not rumours, misinformation and fake news – and we should seek information only from trusted sources. This will help us all take practical steps to make plans and protect our own mental health and that of our loved ones.

This is also a time to support others as helping other people in their time of need can benefit both the person receiving support and the helper. For example, checking by telephone on neighbours or people in your community who may need some assistance. Perhaps when leaving the house to buy supplies for yourself, it can be helpful to buy extra food for people who have no means, and whom government and NGOs might not be able to help during this difficult period.

For most people, living in lockdown for three weeks can be very stressful. It can be useful to structure the day with activities such as doing schoolwork and housework, working from home if your job allows, exercising, having some quiet time, watching TV and reading, spending some time with others and also spending some time alone. For many people, prayer or meditation can be quite helpful.

Social engagement is of course very important. Human beings are by nature social beings, and staying in touch with friends and family by phone or texting is necessary to maintain a sense of community and togetherness in this time of crisis.

Probably people who already have a mental health condition such as major depression or generalised anxiety may have exacerbated symptoms and therefore staying in touch with a mental health professional will be quite important. Many psychologists, psychiatrists and counsellors will in all likelihood be available to their patients by phone or skype which can be quite important in helping people feel supported during this difficult time. Resources such as Lifeline can be helpful for others who are not in the care of a mental health professional. The South African Depression and Anxiety Group (www.sadag.org) has some useful resources on its website, including information on apps that can help people reduce stress and anxiety and feel some relief from psychological distress. Also, positive social and family support during this time can help people feel less alone and vulnerable.

We live in an era of technology and so many people find it convenient to use texting, WhatsApp, Skype, email, Instagram and Facebook to check up on each other and stay connected. For those who lack access to social media, to the internet and to data, staying in touch with neighbours at a safe distance, writing letters and keeping a journal can be helpful under these circumstances.

In as much as there is a danger of information overload, it is necessary to keep abreast of what is going on and to understand clearly what the minister of health and the president want us to know. We live in a society in which our political leaders have let us down countless times, leading many of us to regard them with scepticism. However, this is a time to listen to authority. We really do need to heed the message of the lockdown. It will save lives and help to ensure that our health care system can cope with the numbers of people who will require services.

It is also important to honour carers and healthcare workers who support people affected with COVID-19. These brave souls play an important role in saving lives. Also, as the number of people infected with COVID-19 starts to rise, we should avoid stigmatising and discriminating, but rather offer our support, compassion and kindness. We should not refer to people who are infected as “victims", “COVID-19 families" or “the diseased". They are “people who have COVID-19", “people who are being treated for COVID-19", or “people who are recovering from COVID-19".
At the moment it is hard to see what positive things can come out of this experience. It is by all accounts a stressful and difficult time for everyone. But perhaps it's also an opportunity for us to acknowledge our shared humanity, the fragility of the human condition, and the fact that we are all in this together, no matter how divided our society might be.

**Prof Ashraf Kagee is Distinguished Professor in the Department of Psychology at Stellenbosch University.*

Covid-19: SU researchers turning bread into hand sanitiser
Author: Engela Duvenage (SU web, 31 March 2020)


If you have the right equipment, some ingenuity and a few loaves of bread, it seems you can do almost anything in times of crisis. That is what Stellenbosch University food scientists have proven, having made 18 litres of alcohol-based hand sanitiser from stale bread crumbs in their in-house fermentation tank. After a weeklong process, they were able to bottle the end product hours before South Africa went into lock-down because of Covid-19.

Departmental staff was able to take a good supply of hand sanitiser home. A few bottles were left at the ready in the Food Science building, for when authorised staff visited the facility to check up on the running of experiments.

“It smells just a little bit like toast," says Dr Stefan Hayward, a postdoctoral researcher in the Department of Food Science at Stellenbosch University (SU).

He is part of a research group in the Department who on a normal day focuses on ways to reduce food waste being produced on the one hand, and on another on ways to put these by-products to use. “Waste implies a need to discard something which has become useless and needs to be disposed of. We see waste products and the tendency to produce too much food not as a problem, but as raw ingredients or by-products that can provide the impetus to invent new ways of reducing, reusing and recycling," he explains the rationale behind their work.

The plan to make their own hand sanitiser came a day after the Presidency announced self-isolation measures, during a brainstorming session between Dr Hayward, another postdoctoral researcher, Dr Timo Tait and MSc food science student Sebastian Orth.

“We were talking about alternative uses for some of the everyday items we often discard, bread being one of them," remembers Dr Hayward. One thing led to another, and they decided to try and produce bio-ethanol from bread with which to make hand sanitiser.

“Bread is composed of 40% starch which can be used as an excellent carbohydrate source during the production of bio-ethanol via fermentation," explains Dr Hayward.

“The global Covid-19 pandemic has highlighted the need for better hygiene practices and adequate supplies of antiseptic products such as hand sanitiser to help 'flatten the curve'," he added.

They knew that they'd have no problem finding their main ingredient, because unsold bread past its sell-by date is generally returned to distribution centres from where it is discarded as waste, or at best used as animal feed.

They were able to obtain dried bread crumbs from one of their industry partners, Innovative Research Solutions (IRS). IRS, in turn, is currently helping a major food producer make something worthwhile out of the large amounts of bread returned daily to its distribution centres. The idea is to convert this waste stream into functional ingredients that can be put to new use.

In the Department's fermentation tank, they combined 60 kg of bread crumbs with hot water and added alpha amylase enzymes that are regularly used in the food industry to the mix. They then adjusted the pH level to optimal levels to convert starch to sugar. The mixture was then incubated at 65°C for 60 minutes to enable saccharification and therefore sugar production, Thereafter, the mixture was cooled to 30°C before a specialised yeast strain used by the distilling industry was added.

The end product, which looks very much like mashed potatoes, was left at room temperature for seven days until the fermentation process was complete and they could start distilling the mixture. From the initial 60 kg of bread in their first batch, they were able to produce 10.5 litres of 75% ethanol. Using a recipe found on the Internet, it was combined with ingredients such as glycerol, hydro peroxide (that also kills viruses and bacterial spores) and a denaturant to ultimately make 18.2 litres of hand sanitiser.

Because of the lockdown the researchers could not continue their work, but they hope to do so once the situation returns to normal in the country.

“We were able to satisfy our scientific curiosity whether or not we would be able to ferment bio-ethanol from a waste product such as stale bread, and at the same time were also able to apply our knowledge to produce an antiseptic formula that can be of help in this time of crisis," says Dr Hayward. In 2018, Dr Hayward was involved in a student project in the Department of Food Science in which beer was brewed using bread.

SU researcher joins the fight against COVID-19
Author: René-Jean van der Berg (SU web, 31 March 2020)

Stellenbosch University (SU) doctoral candidate, Caroline Pule, has joined the frontlines in the fight against the COVID-19 virus which is already infecting hundreds of thousands of people globally.
She recently joined as a volunteer for the CrowdFight COVID-19 initiative in South Africa. This is a global organisation enabling all-volunteer scientists from different countries to work together by helping where possible in their respective fields of expertise to support the fight against COVID-19 pandemic.

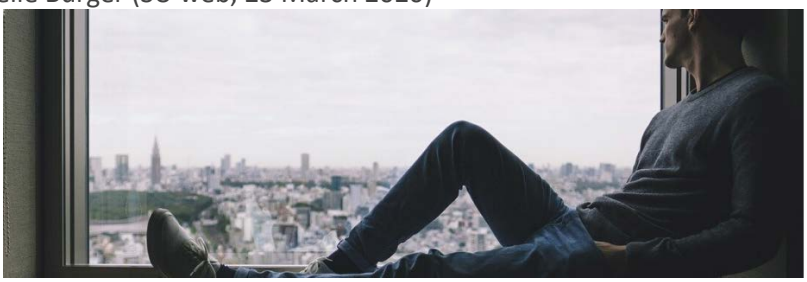
“Noticing what this COVID-19 pandemic is doing, hit me very hard and I could not stop shedding tears of sadness. Due to my passion for global health, medical research and ensuring we have a disease-free nation, I got the urge to come forward and contribute in any way possible to mitigate the effects of COVID-19."

Caroline says that as a medical scientist with a background of working with one of the deadliest communicable diseases, Drug-Resistant Tuberculosis (TB), and serving in several health and sciences organisations, it just made good sense to do something, even if was just by volunteering to help our country and the world to combat COVID-19.

On a normal day, Caroline wears many hats – or lab coats. Not only is she a researcher in Tuberculosis at the Division of Molecular Biology and Human Genetics within the SU's Faculty of Medicine and Health Sciences, but she also shares her passion for science at schools through outreach programmes. She is the vice-chair of the Organisation for Women in Science for the Developing World, South African National Chapter (**OWSD** S**ANC**). She is also the founder of the Caroline Pule Science and Literacy Foundation (CPSLF) that has a number of initiatives, including book donations, science clubs, a literacy centres campaign and a mentorship programme.

About CrowdFight COVID-19
The CrowdFight COVID-19 initiative aims to bring together a global team of researchers in various fields to help understand and alleviate the scientific and health demands of the COVID-19 virus. This initiative would like to get more medical and health sciences professionals on board and calls on those interested to volunteer their time and skills by signing up at https://crowdfightcovid19.org/.

Standing together crucial in a time of social distancing
Author: Prof Ronelle Burger (SU web, 23 March 2020)



Social distancing has been strongly recommended as one of the ways to curb the spread of the Coronavirus. In an article for *Daily Maverick* (19 March), Prof Ronelle Burger from the Department of Economics writes that we also need to navigate properly our social solidarity in these trying times.

Navigating social solidarity in a time of social distancing
This week we have entered unchartered territory with the President's announcements on precautionary measures to stem the spread of the Coronavirus. While these measures were welcomed, there are many unanswered questions around COVID-19. For instance: we don't know why, when infected, children's symptoms are less severe, nor are we sure how long post-illness immunity will last. In South Africa specifically, the fear is how fast the disease will spread in a country where several of the risk factors are present: we have a high burden of chronic diseases; significant shares of immuno-compromised individuals due to hunger, poverty and the known difficulties of adhering to long-term TB and HIV treatment; and many of our citizens may struggle with implementing the President's regular handwashing regime because they lack access to running water in their homes and cannot afford waterless hand sanitizer.

Other uncertainties include that high burden countries like China and Italy where some of these estimates have originated have a much higher share of older people, which will mean that the mortality risk may be lower in South Africa. In addition, we started much earlier with our containment efforts.

There is also some optimism around leveraging treatments developed for other diseases such as HIV and cholera to treat the more serious cases of the Coronavirus, which may help to improve mortality risk. Seasonal patterns in flu provide some hope that the virus would spread more slowly in South Africa because it is still relatively warm this time of year. The same consideration would cause concern that we will be going into winter soon and this can reignite and accelerate contagion just when COVID-19 is expected to be brought under control and we may consider emerging from social distancing. Given all these factors that we need to take into account, it is understandable that there is a reluctance to make projections for the South African COVID-19 trajectory and widespread consensus that any estimates will have large confidence bands.

There is even uncertainty about the mortality risk of COVID-19. There is widespread agreement amongst experts that media estimates of a 2–3.5% mortality risk are exaggerated and alarmist. This estimate has been further distorted by comparing it to the mortality risk of ordinary flu and concluding that the mortality risk of COVID-19 would be twenty times higher than that of ordinary flu. These estimates are wrong because the denominator for COVID-19 is not comparable with that for ordinary flu where we would capture all infections. It is recognized that for COVID-19 we only capture a small subsample of overall infections via testing: we only detect cases where the infected were symptomatic and/or eligible for testing. Recent estimates for the early stages of testing in Wuhan [Li, et al. published in *Science* on Monday] [https://science.sciencemag.org/content/early/2020/03/13/science.abb3221?rss=1] suggest that undetected and asymptomatic cases could represent as many as 86% of total cases, which would then yield a mortality risk that is still higher than that of ordinary flu but not 20 times higher. In short,

less alarmist, but of course still a very grave public health concern; also because this virus is so contagious.

In a case where we face such substantial uncertainty, a conservative approach is warranted. Our response to COVID-19 is important because this will not be the last global pandemic we will see; all indications suggest that global pandemics will become a semi-regular occurrence. We will need to think about this as a potentially recurring problem and find innovative and robust ways to stick together and fight communicable diseases. Expectations are low that a vaccine will emerge any time soon. Even with global investments to fast track vaccine development, there is consensus that it will take at least a year before we have a vaccine to protect against COVID-19 [technically, SARS-COV2]. This means we will need to formulate a robust and sustainable response to COVID-19 as it is likely to re-emerge and remain a threat.

While the health impact may be the most immediate concern, the economic and social impact could potentially be more dramatic and far-reaching. Across the globe, we have seen economic indicators react in dramatic fashion to the crisis and South Africa is no exception. Many anticipate that tourism, hospitality and travel will suffer significant losses and face challenging times. We are also concerned about the impact on education with school and university closures. Again, with universities navigating closures with virtual classes, we may end up with a situation where the most vulnerable are the most severely affected by these social distancing measures.

The social impact may not make headlines at the moment, but given the current fiscal pressures and historically high levels of unemployment, we need to be concerned about how this crisis will play out in our vulnerable and poor communities. Formal sector workers are likely to have savings and insurance and will in most cases continue to receive a salary. We worry most about the informal sector workers and the small business owners who have little or no savings, but may suddenly be cut off from their income streams or face dramatically diminished earnings or revenue if we need to go into lockdown.

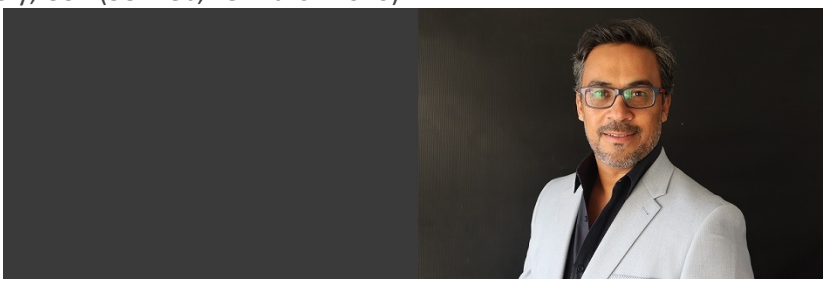
Poor households would often not have money to stockpile food and essentials to prepare for such eventualities – especially in these already difficult times. We are headed for heartbreak and hardship in various shapes and forms.

In the past week, we have all encountered shopping trolleys stacked with towers of toilet paper, sanitary pads and tinned food, navigating the aisles with a manic focus. Hoarding has been well documented in the media with photos of empty supermarket shelves. Uncertainty can often bring out the worst in us, accentuating the impulse to protect ourselves. The recommended social distancing and our individual preoccupation with the risk of contracting the virus can further enhance this instinct, framing others as threats or enemies. Of course, when facing a global pandemic, it is vital that we understand that while practising social distancing, we still need to stand together. This was also clear from our President's message on Sunday.

Our divided health system will face challenges and will need to find ways to coordinate their approach. Recent projections suggest that it is very likely that we will not have enough critical care beds in the public sector to meet needs. To cope, we will need to draw on the existing spare capacity in the private sector. This requires cooperation between private and public hospitals to make decisions about how to best allocate patients. Like the rest of us, the private and the public sector will need to stand together. Transporting severely ill COVID-19 cases from rural communities to equipped facilities will present a particular challenge for our polarized and fragmented health system. If we cannot do this well, there will be avoidable deaths because severe cases fail to access the critical care they need. An overburdened health system may also affect our ability to care for other treatable diseases and injuries, which again makes a strong case for the decision to opt for an early intervention to contain the virus.

This will no doubt be a testing time for our nation in more than one way! It is a time to show our true colours and practise compassion, solidarity and kindness. The government is introducing measures to help the most vulnerable cope with these risks but with high-level policies, there are always individuals who will fall through the cracks. This crisis will require ordinary South Africans, NPOs and religious groups to remain attentive, vigilant, pro-active and generous in responding to the needs of those who are affected. While we hope that this early intervention would mean that we will see a turning point in the daily rise of cases before Easter, the threat of global pandemics and our deep social problems will not go away soon and are likely to worsen over the short to medium term. Pandemics remind us of the invisible string that ties us all together even when we continue to live separate lives.
**Ronelle Burger is the lead health economist at Research on Socioeconomic Policy [RESEP: http://resep.sun.ac.za/] and a professor at the Department of Economics at Stellenbosch University.*

Entrepreneurs hit hard by Coronavirus – ways to stay afloat
Author: Seraj Toefy, USB (SU web, 25 March 2020)



Seraj Toefy, Custodian of Entrepreneurship at the University of Stellenbosch Business School (USB), says that according to the Small Business Association, the average cash safety net for small businesses is estimated to last only 27 days.

It is often said that the elderly and those with impaired immune systems are most at risk due to Covid-19, but small businesses are just as vulnerable, with many who are not going to survive a global economic shut down.

“The South African Government has communicated clearly and regularly around their safety plans, and they are taking decisive action to flatten the curve, but in so doing, the impact on businesses across the country is monumental. This is not unlike what is happening in other countries, but with one very substantial difference, our Government does not have the resources to offer the scale of economic stimulus packages as other countries can."

Toefy says that although fear and panic is rampant entrepreneurs now need to rely on one of their strongest traits: perseverance.

“As a small business owner, you often don't have a larger shareholder to rely on during a time like this, so we must button down the hatches and make sure we're still standing when the shutdown is inevitably lifted."

Here are key things that small business owners can do during this time, according to Toefy.

Reduce Costs
“The one advantage that small businesses do have, is that we have most likely built our business up from the bootstraps, and we know how to make do with less. As our businesses have grown, we start adding “luxuries" like offices, business travel, staff, entertainment, insurance, a bigger car, and countless smaller things to make our lives more comfortable. It is time to cut all discretionary spend."

He says that small businesses have a civil duty to try and cut as few jobs as possible during this time, so cutting everything else needs to take priority before staff are affected.

Negotiating with banks and suppliers for payment holidays, rebates, interest cuts and any help they can give should be top priority. “This economic shutdown is not regional, it is global, [and] so everyone is affected. Your banks and suppliers need you to survive this, as they too will be struggling, but they will struggle more if they lose you as a client. Now is the time to negotiate."

Continue to operate
Toefy stresses that “this is not a holiday, and this is not a time for a pity party. It is a time to do what entrepreneurs do, and that is hustle. Be creative and find a way to continue operating." If you can, set up staff at their homes with laptops and WIFI and use some of these tools that can assist with remote working:

- Zoom, Google HangOuts or Skype to have staff and client meetings
- Slack or Basecamp for instant messaging
- Monday, Asana or Clickup for productivity and project management
- Dropbox and GoogleDrive for file sharing
- Remo and GoToWebinar for online events
- Facebook, LinkedIn and Instagram for Online networking

“If your business is more production based, find a way of maintaining some level of service, even if it is far reduced, and adheres to social distancing. If you have a factory that normally employs 150 people, then rather reduce your output by putting two shifts of 75 people, and space them out. This way you are at least still delivering something and keeping your staff employed."

Co-opetition
Co-opetition is when you cooperate with your competition. He says that now is not the time to try and beat one's competition, but to reach out and see if one could share workloads, share knowledge and work together to try and survive this. “Rising tides lift all ships, and never before have we needed ships to be lifted as much as now."

Communication
As with all crises, increased communication reduces anxiety. Toefy suggests that increasing communication with staff, suppliers and clients is paramount.

“Remind your clients that you are still operational, offer help and support. Your staff will be anxious, so help them through this time by being as open and honest with them as you can. It is ok to be vulnerable; you may be surprised by how much support you receive. There have been several cases of companies where staff are choosing reduced hours and pay instead of laying people off at this time."

Strategise
Small businesses often don't have the time to strategise due to work load however the slow-down of the economy does not mean that one must slow down. Toefy says that business owners should use this time to think of ways of how they will do things better when the shutdown is lifted.

“Being agile is not a strategy, it is an ability. It is an ability that is best used within the framework of a strategy. The Business Model Canvas is a good framework to ensure that all elements of your business are being looked at during this time. There will most likely be a distinctive difference between before Covid-19 and after covid-19. Be prepared to be better, after. “

Read and study
As an entrepreneur, your single biggest asset is you. Use this time to work on yourself. Read books or study online. There are several short courses that one could do while in isolation.

Strive don't just survive
Quoting Rahm Emanuel who said, “Don't waste a good crisis", Toefy says that we are all thinking about ways to survive this crisis, but what if we implemented some of these tips and came out of isolation even stronger. “Perseverance, tenacity, creativity, determination and passion are traits synonymous with entrepreneurs. Now is the time to call on all of them and not just survive, but strive."

- Seraj Toefy is Custodian of Entrepreneurship at USB and Head of Africa at Centuro Global
- If your SME is facing debt-related challenges, you can apply for help from the Debt Relief Fund as of 24 March 2020. Visit: www.smmesa.gov.za for more information.

If you are an entrepreneur or small business owner in a low-income community, the University of Stellenbosch Business School (USB) can help your business grow. USB's Small Business Academy has a nine-month programme that includes training, mentoring, workshops and engaged learning to set your business on course for success. USB's Career Leadership *can also help guide you towards your career goals through career development, networking opportunities and job search support. If novel business ideas excite you, read up on our captivating 2019 Lion's Den event.*

Virus and values
Author: Prof Arnold Smit, USB
Published: 23/03/2020

Prof Arnold Smit, Associate Professor of Business in Society, unpacks five moral values that we all have in common. These values, he says, are the essence of what makes us human, and should be upheld at all costs during these difficult times in our society.

A crisis reveals so much of who we are. It can bring out the best in us. It can bring out the worst in us. Apart from posing a threat to our health and safety, a crisis may also present a test for our values. It is no different in our confrontation with COVID-19. The spread of the coronavirus demonstrates our physical interconnectedness while at the same time it reveals how we respond to the relatedness of our human existence. The physical side of the corona confrontation is a health issue, the relational dimension is a moral one. However, both are contained in the frailty of our human existence.

While not equipped to speak science to virology, I want to share a few thoughts on how COVID-19 confronts our sense of morality. It is widely accepted that humanity holds five moral values in common: honesty, respect, responsibility, fairness and compassion. While we can add some to the list or find different words for each, these five values contain the essence of what makes us human in our relatedness. These values describe our aspirational beliefs about human behaviour and determine how we prefer to live and relate, our sense of what is right or wrong, in a particular context, and the decisions that we make as a result. When we uphold them, we do better; together. When we violate them, we pay the price; together.

Because of the relatedness of our existence, we are ever being called upon to be honest, respectful, responsible, fair and compassionate in our dealings with one another. The demand for being so connected to others seems even bigger now that a dangerous and fast spreading virus runs through the channels of our physical connectedness. Every contact point with others may become a question of how to behave, how to relate and what to decide.

The value of *honesty*, for example, now calls upon us to think carefully about the information we rely on and share, to be transparent about our own state of health and truthful about our whereabouts in potentially risky contact with others.

The value of *respect* now especially calls upon us to treat everyone else – irrespective of their standing or influence – with dignity; to make their health and safety a priority as if it were our own, and to honour their personal space through social distancing.

Responsibility means that we think carefully about what we decide and do - especially in view of the impact that it may have on others. While we need to care for and protect ourselves, we must consider the rightful interests of others too.

What does *fairness* mean when we fear scarcity and shop for supplies? What does it mean when we stock medical supplies which are now more needed in healthcare facilities? What does it mean when decisions are pending about salary adjustments and potential layoffs?

Compassion speaks to our ability to watch out for others and care about their needs and circumstances. What we in South Africa so far mainly witnessed about COVID-19's impact on individuals, families, communities and businesses, and how people have been challenged to manage the tension between social distancing and mutual care, may become more intensively part of our daily existence in the time to come.

What I have written above, about the virus – values connection, may confront most of us in our daily conduct as we go about life, work and relationships. It certainly requires from us to be mindful and sensitive while we care for self and stay in touch with others. It gets more challenging, though, when the essence of your job is to make decisions in an organisational or professional context.
In an organisational context, boards and executives, are confronted with uncomfortable decisions. While operational continuity may be at risk, human dignity is of equal importance. What does it mean then to be honest, respectful, responsible, fair and compassionate with employees, customers and suppliers, to name the most prominent stakeholders, when navigating your way through the pandemic's potentially devastating impact?

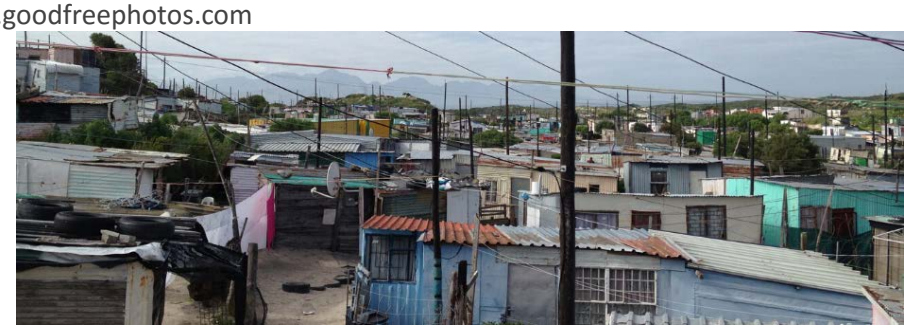
While there are several professional contexts that we can potentially think about, we must spare a thought for the healthcare profession in a time such as this. While duty positions them in eye of the Coronavirus storm, they have to deal with the anguish of worried and potentially infected people, treat every patient with equal respect, provide a clinically safe treatment space for the sick and the healthy, make difficult decisions about the allocation of scarce medicinal and other treatment resources, and maintain their own capacity for nurture at the same time.

The Coronavirus has no awareness of itself or its impact. It simply flourishes where the ecosystems of nature and humanity allow it to do. However, it does awaken a new awareness about our essential vulnerability and inevitable interdependence as a human community. While we stay hopeful for a scientific breakthrough to put the virus in its place, we'll have to rely just as much on our capacity for values-based living and relating to carry us through.

Human Rights Day: Covid-19 and the critical importance of achieving socio-economic rights
Author: Prof Sandra Liebenberg, HF Oppenheimer Chair in Human Rights Law
Published: 23/03/2020

"The coronavirus pandemic has illuminated the critical role of socio-economic rights in securing a dignified life for all and in countering social and economic inequalities. There is a silver lining to this dark cloud. It is the hope that the short-term efforts we now make to protect these rights in a crisis will translate into long-term public and private resource mobilisation for securing accessible, affordable and quality public goods and services for all," writes Prof Sandra Liebenberg, HF Oppenheimer Chair in Human Rights Law in the Faculty of Law at Stellenbosch University, in the Daily Maverick.

Photo: www.goodfreephotos.com



South Africa along with many countries across the globe are adopting far-reaching measures to deal with the Covid-19 pandemic. These have entailed multiple restrictions to fundamental civil and political liberties such as freedom of movement, assembly and association, privacy and freedom of expression.

In a public health disaster such as the pandemic, these measures have the legitimate purpose of protecting public health. Provided that they are in terms of law and meet the requirements of reasonableness and proportionality, such measures will be considered justifiable limitations of rights in terms of section 36 of the South African Constitution and international human rights treaties.
But what about socio-economic rights, which are also enshrined in South Africa's Bill of Rights as well as the International Covenant on Economic, Social and Cultural Rights to which South Africa is a state party?

Like all human rights, socio-economic rights are premised on the notion that all human beings have inherent human dignity, and their lives and well-being are equally valuable. If we are to take this commitment seriously it means that all people should have access to the social and economic goods and services they need to live a dignified life and to participate equally in society.

This in turn depends on having high quality, accessible public services such as health care, water and sanitation, housing support, education, and social security. When public service provision fails, people turn to the private sector to acquire these goods. This in turn fuels social and economic inequality as the poor cannot afford to purchase such services through the market.

Across the world many public health systems and other public services have been weakened by under-resourcing and austerity measures, accelerated by the 2007 – 2008 global financial crisis. South Africa has to cope with the historical backlogs of the colonial and apartheid era, along with high unemployment and a struggling economy. The UN Committee on Economic, Social and Cultural Rights has recently expressed concern about significant budget cuts in the health, education and other public service sectors, and their impact on South Africa's already high levels of inequality as well as service-delivery gains.

Responding effectively to the Covid-19 pandemic will require a major channelling of additional human and financial resources to these under resourced social and economic sectors.

First and foremost, a significant infusion of resources into the health care sector is required, amongst others, for testing, contact-tracing, safety equipment for the medical personnel, intensive care beds and equipment, appropriate isolation and quarantine sites, the preparation and dissemination of health information, research and vaccine research and administration (once one becomes available).

It will in all likelihood require private health care resources such as critical care beds to be combined with public health care resources in a unified, comprehensive, and co-ordinated response to the looming public health crisis.

In Spain and recently Iran, temporary authority has been given to government authorities to take over the management of private health care facilities. A human rights based approach to the right to health in a public health emergency requires the prioritization of urgent health needs and the protection of the health of the public as a whole. Neither of these objectives can be met if health resources are fragmented and divided.

Secondly, the recommended measures to limit transmission of COVID-19 such as frequent hand washing with soap and implementing social distancing or isolation are particularly difficult to implement in the context of the overcrowded informal settlements and rural areas where many households still lack a regular and reliable piped water supply to their dwellings. There has been significant growth in household access to clean water; according to Statistics South Africa in 2018 46,3% of households had piped water in their dwellings. But this means millions still do not. Moreover, the legacy of apartheid spatial planning has left many households reliant on overcrowded taxi and train transport where social distancing and contact tracing best-practice protocols are impossible to apply.

These realities require a range of targeted mitigating measures such as tanked water supplies; disinfecting programmes; additional public transport facilities to reduce overcrowding; and a massive public education and outreach campaign to prevent disinformation and dangerous stigmatization of vulnerable groups. Some of these have already been adopted but more must be done to protect and shield the most disadvantaged communities from the impacts of this pandemic.

Thirdly, impoverished communities and the precariously employed are particularly vulnerable as the economic impacts of the pandemic bite deeply. They will be hardest hit by retrenchments and business closures and its ripple effect on dependants. As the Constitutional Court noted in the landmark *Grootboom* case, "[t]he poor are particularly vulnerable and their needs require special attention."

In the South African context impoverished communities also bear the disproportionate burden of diseases such as HIV and TB rendering them more vulnerable to serious health consequences should they be infected with the coronavirus.

In this context, special measures are required to boost food and income security in these communities. In terms of the Regulations issued in terms of section 27 of the Disaster Management Act, the Minister of Trade and Industry may issue directions to protect consumers from excessive and unreasonable pricing of goods and services and to maintain their security and availability during the national state of disaster. These powers should be used to ensure that availability and affordability of food and other critical household goods such as soap and sanitary products.

An upscaling of provision of the social relief of distress grants and food packages in terms of the Social Assistance Act, 2004, is also called for in the current circumstances.

Other measures to ease the burden of the pandemic would include measures to protect people from being evicted from their homes, particularly low income families and those with children, elderly or disabled members.

The closures of schools and Universities will have a disproportionate impact on learners and students from impoverished families and communities.

As teaching and learning moves online, it is vital that urgent measures are taken to ensure that data is affordable and accessible to these groups so that online teaching does not aggravate the already deep educational inequalities in South Africa.

Finally, in the context of the closure of schools and the particular vulnerability of elderly persons and those with pre-existing health conditions, women will bear a heavy burden. This is due to gendered burdens of care work that falls disproportionately on their shoulders. Both government and private employers need to be conscious of this reality and respond through adopting flexible workplace policies and support programmes particularly targeted to alleviating this burden.

The coronavirus pandemic has illuminated the critical role of socio-economic rights in securing a dignified life for all and in countering social and economic inequalities. There is a silver lining to this dark cloud. It is the hope that the short-term efforts we now make to protect these rights in a crisis will translate into long-term public and private resource mobilisation for securing accessible, affordable and quality public goods and services for all. **DM**

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New future with and after Corona

Author: Dr Morne Mostert, Instiute for Futures Studies (Eikestad Nuus, 1 April 2020)

https://www.netwerk24.com/ZA/Eikestadnuus/Sake/new-future-with-and-after-corona-20200401-2?fbclid=IwAR0k4xcZqnST102t-ZCUlAiNJ7xIVMPox5L-3QYAnAWqOFScdLXsnkBY9XI

OPINION: Maybe the coronavirus will set SA on a path to a more equitable education system

2020-03-27

To most South Africans, digital or remote learning is as much as an oxymoron as the idea of "physical" or "social distancing" in overcrowded townships, writes Nuraan Davids.

Following President Ramaphosa's declaration of a national state of disaster on 15 March 2020, all schools have been closed since 18 March.

Presuming, against all odds that Covid-19 would have been contained, schools are set to re-open on 14 April 2020.
The highly optimistic projection of a loss of 10 school days as a result of this closure, will be reclaimed via a shorter break during June, and extended tuition hours - so says the national Department of Basic Education (DBE). There is no reason to disagree with the decision taken by the South African government. There is nothing left to do, but to shut down spaces which facilitate human interaction.

While actions such as these have the capacity to remind us of our taken-for-granted lives and routines, they also highlight the myriad disparities, which dictate our lives. Staying at home might be great fun for some children as they enjoy a range of home-based entertainment, including a dip in the family pool.

Most children, however, will have access to none of this, and worst of all, might be deprived from the little security and nurturing, which schools might provide. All the warranted criticisms about educational quality aside, most schools provide so much more than a curriculum.

My concern in this article pertains to the schism between schools, glibly used to differentiate between historically "advantaged" and "disadvantaged" schools - a differentiation which has yet to dissipate, despite more than 25 years of educational reform. Most historically "disadvantaged" schools continue to battle the same types of challenges, inflicted through apartheid - poor to non-existent resources and infrastructure; high learner-to teacher ratios; and limited parental involvement and incapacity, typically associated with impoverished communities.

There are two sets of issues at play here.

One pertains to a question of political will - that is, does the South African government have the will to bring about the necessary redress and reform, which is as focused on physical resources as it is on teacher capacity and professionalism, which will allow these schools to shed its ‘disadvantaged’ label?

The other concerns the category of "advantaged" schools, which seemingly appears intent upon holding onto this label for the purposes of retaining social capital.

Most of us, particularly parents, know about the deep disparities between schools. It is evident in the maddening demand for access to some schools, while others are last resorts, even when education at these schools are free.

Depending on their category of "advantaged" or "disadvantaged", Covid-19 elicited differentiated responses from schools. To "advantaged’ schools, the interruption to the academic programme is minimal. A number of "advantaged" schools have simply transitioned to a digital mode of teaching and learning. Google classrooms, accompanied by parent portals, are a common feature of "advantaged" schools.

Learners are not only adept at navigating digital spaces, but live in homes where technological access is a norm. At worst, the inconvenience is limited to exasperated parents, who might be forced to juggle their own work-demands with that of checking up on their children.

On the other end of the spectrum, the closure of schools means exactly that, closure. Even if "disadvantaged" schools were equipped to provide digital teaching, their learner and parent base do not have the means to access it.

To most South Africans, digital or remote learning is as much as an oxymoron as the idea of "physical" or "social distancing" in overcrowded townships. Google classrooms and digital portals speak to another kind of divide - a divide, low on the ladder of socio-economic inequality and inequity, but

which now stands to widen and deepen the gaps between an already incongruent educational system, and society.
Consequently, depending on their categorisation of "advantaged" or "disadvantaged", South Africa's educational system will unfold along two separate trajectories. Despite the absence of traditional modes of physical contact time, the digital trajectory will ensure the continuation of an academic programme.

The only other route - reserved for the majority of schools - is both unclear and unlikely. Consider the DBE' proposal of extending tuition hours, so that a practical and comprehensive catch-up plan can be implemented at each school.

How will this be managed?

Firstly, thanks to South Africa's differentiated schooling systems, which has led to complex learner migration patterns, learners seldom attend the school in their residential areas. This means that a number of learners commute in order to attend schools; many of these learners rely on an already unreliable and unsafe public transport system.

Secondly, under normal, uninterrupted circumstances, teachers - due to poor or no planning; or social challenges, which includes gang violence, vandalism, and hunger - struggle to complete their annual syllabus.

What are the implications of a more pressurised syllabus in terms of time for teaching, and more importantly, learning? In addition to extending tuition hours, the DBE urges schools to give learners workbooks and worksheets so that they remain actively busy with the supervision of parents. Again, there are a number of presumptions here that are sorely misplaced.

Most historically "disadvantaged" schools do not have ready access to workbooks and worksheets. We can dive into a blame game as to whether this is the fault of provincial departments of education, or disinterested teachers, who simply cannot be bothered.

The point is - these resources, like textbooks, are not readily available at "disadvantaged" schools. Then there is the idea of parental supervision. Unlike parents in "advantaged" positions and contexts, who might have the option to work from the comforts of their homes, the overwhelming majority of South Africa's workforce depends on unskilled labour.

Unskilled labour often implies a level of education, which would not have equipped parents to supervise their children's workbook activities and projects. In fact, there is a very strong likelihood that the parents, and more specifically, the mothers, who might be expected to supervise their own children's homework, will instead be at other homes, fulfilling roles of domestic workers and nannies.

The truth is, there is no quick or easy solution here.

What I have described thus far has not been caused by the Covid-19. Rather, what the virus has served to do is to remind us just how far apart we actually are as a society and that is by only looking at one sector.

Being in a crisis necessarily implies not knowing what to do. But, it can also force us to consider new options. It might be a good idea, therefore, to start by acknowledging that the chances of our schools re-opening within three weeks are not good.

There is a serious risk that "disadvantaged" schools might not get back on track in terms of completing the academic programme - at least not, if digital learning is not prioritised. So, in this time of crisis, I can only look at what is around me; at that which already works.

Firstly, what I know, is that most homes have cellphones. Secondly, what works, are e-learning platforms - of which Google Classrooms is just one.

A number of "advantaged" schools have high functioning e-learning platforms. These are public schools, which ought to be serving a public good.

The major stumbling blocks in extending e-learning platforms to "disadvantaged" schools is the cost of data, and curriculum content. It seems logical, therefore, to appeal to data providers or mobile communication providers to come on board by granting free access to more e-learning platforms, such as Google Classrooms, so that the majority, if not all, South African learners, might benefit from digital classrooms.

In turn, it should be a matter of course for provincial departments of education and metropoles to look to schools, which already have the necessary curriculum content so that other schools are assisted and supported in this regard. Maybe, just maybe, Covid-19 might set South Africa on a path of a slightly more equal and equitable education system.

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COVID-19 tax relief: a snapshot of what's out there

The Conversation; April 8, 2020
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Across the globe, many governments have been forced to lockdown their countries in an attempt to curb the spread of the COVID-19 pandemic. A number of African countries have adopted similar measures. This has stalled, if not brought to a halt, economic activity, resulting in loss of income for businesses, workers (both in formal and informal sectors) as well as the self-employed.

In response, governments worldwide have implemented economic and tax relief packages to help businesses and workers mitigate the impact of these measures.

The use of these tools varies across countries making direct comparisons difficult.

To provide some guidance, the Organisation for Economic Cooperation and Development (OECD) has developed useful design features based on examples from across the globe. Applicable to both developed and developing nations, they are:

additional time for dealing with tax affairs;

quicker refunds to taxpayers;

temporary changes in audit policy and ways to provide quicker tax certainty; and

enhanced taxpayer services and communication initiatives.

So which tax relief ideas are the best? Below I sift through the various options and identify ideas that could be useful examples to policy makers, including those in South Africa.

Direct payment
The first type of tax relief measure extends immediate financial aid to taxpayers by virtue of a cash payment from the revenue authority. It can take the form of a grant, subsidy or contribution from the government. A case in point is the recently enacted stimulus payments of the US.

President Donald Trump signed a massive $2 trillion economic relief package with the aim of easing the financial burden caused by COVID-19. Known as the Coronavirus Aid, Relief, and Economic Security (CARES) Act , the relief plan includes assistance to the unemployed, zero-interest loans, stimulus payments to individuals and more.

The stimulus payments will be administered by the Inland Revenue Service and are based on a person's adjusted gross income. These payments are essentially an advance on a tax credit and will be available for the whole year.

In Germany, a state-funded program dating from World War II and used to great effect during the 2008 financial crisis, is again being implemented. The principle of short-time work ("Kurzarbeit") is aimed at helping companies navigate difficult periods without having to resort to large-scale layoffs, disrupt businesses and the economy.

The employer and employee reach an agreement to cut working hours in accordance with labour law provisions, with the Kurzarbeit covering 60% of lost wages. When the situation improves, working hours can be increased or returned to normal very quickly, without the company having to find and hire new workers.

It's a win-win for both the employer and employee.

Tax holiday
A tax holiday is a period of time during which the collection of a tax is suspended, reduced or postponed. The UK, for example, waived business property taxes for retail, hospitality, leisure and nursery businesses for 12 months. Italy has extended tax deadlines for residents and companies in the so-called "red zones" of the country.

In the US, a 10% excise tax is usually levied on certain early withdrawals from retirement plans. The CARES Act waives this 10% penalty in respect of COVID-19 related distributions of up to $100 000. Above this amount, the recipient can avoid any income tax by repaying the distributed amount as a rollover within three years.

Spanish SMEs and self-employed people will be allowed to defer income, corporate and VAT tax obligations for six months, with the first three months not subject to interest. And in Austria, taxpayers can apply for a reduction of advance payments of personal income or corporate tax if they can demonstrate a loss of revenue as a result of Covid-19 up until 31 October 2020.

Other tax relief
Then there are other categories that can be loosely grouped together: reduced tax rates and tax credits (or rebates), which decrease the calculated tax liability, thus resulting in less tax owed to the revenue authority. For their part, exemptions, deductions and allowances all have the effect of reducing the taxable amount on which a tax is levied. Ultimately, it results in less tax paid, but this benefit may not be felt immediately.

These forms of tax relief don't put an instant strain on government funds. But they also don't offer the same speedy cash flow assistance to taxpayers.

In Italy, businesses will receive a 50% tax credit for sanitation expenditure, for example daily cleaning services, masks and other precautionary measures to curb the spread of the virus. New Zealand taxpayers can opt to receive refunds related to R&D tax credits one year early.

Many countries have reduced Value-added Tax (VAT) rates or introduced exemptions. For example, China has introduced a VAT exemption on "lifestyle services". This includes medical, catering, accommodation and personal services (such as hairdressing). Norway has temporarily dropped its VAT rate from 12% to 8%, with VAT payments postponed. Greece has introduced a four-month suspension of VAT payments, and the UK three months. Greece has also lowered VAT on products related to the prevention of the spread of the virus.

Enhanced deductions or allowances serve as an incentive for companies to upscale capital investments. For instance, China allows a 100% deduction for investment in equipment to expand production capacity. Previously, only equipment valued up to $700 000 qualified.

South Africa's relief measures
South Africa's tax relief package contains four overarching proposals.

First, the existing Employment Tax Incentive regime is expanded by the introduction of a subsidy of up to R500 a month for the next four months. Certain categories of employees qualify. An estimated 4 million workers will benefit from this. The South African Revenue Service will accelerate employment tax incentive reimbursements from twice a year to monthly. This will help compliant employers with their cash flow.

The second and third proposals relate to employees' and provisional taxes. Tax compliant SMEs that meet certain criteria will be allowed to delay 20% of the employees' tax liabilities and a portion of their provisional tax payments without penalties and interest for a number of months. About 75 000 SMEs are expected to be assisted by this intervention.

The fourth proposal creates a special tax dispensation for funds established to assist with the COVID-19 disaster relief effort. These funds, which include the national Solidarity Response Fund, may be approved as public benefit organisations. As a result, donations made to such tax-approved funds qualify for the usual 10 percent income tax deduction.

As South Africa finalises its Disaster Management Tax Relief Bill, a couple of suggestions come to mind. These include allowing a full tax deduction for donations to approved COVID-19 disaster-relief funds

and welfare efforts. Another is to grant zero-rated VAT on hand sanitisers and related medical supplies.

Perhaps the examples highlighted in this article could provide inspiration of what is possible in a time of crisis?

-end

Document updated as at 8 April 2020