

# Section 7.2 – Research Involvement

## Research involvement by candidate

- **MMed Research Project**

**Title: An HPLC-based method development for GFR determination using Iohexol clearance**

Involvement: This project is one of the three examination components of the MMed degree and is a requirement for registration as a specialist with the Health Professionals Council of South Africa (HPCSA). The work must be done independently by the candidate, under the guidance of his/her supervisor. The candidate must demonstrate an ability to undertake research, to read and review literature comprehensively and critically, and to analyse results adequately. The outcomes of the research must be written up in the form of a publication-ready article or a monograph.

*Details of Project: Please see [Section 7.6 – Research proposal](#).*

- **COVID-19 Related Laboratory Analyte Changes and the Relationship between SARS-CoV-2 and HIV, TB and HbA1c in South Africa.**

We conducted a retrospective analysis on data of all adults tested for SARS-CoV-2 across our laboratory network in South Africa over a 4-month period.

*Details of Project: Please see [Section 7.1 – Publications by Candidate](#)*

- **Acute Kidney Injury during the COVID-19 Pandemic – Experience from Two Tertiary Centres in South Africa.**

The aim of this study was to describe the prevalence of acute kidney injury (AKI) in hospitalized patients with COVID-19 in two tertiary centres in SA. Patients admitted to two tertiary centres in SA between 18 March and 31 August 2020 were included in the study. Demographic data, pre-existing comorbidities, admission variables, laboratory data, management and hospital outcomes were captured. Outcomes assessed were the need for acute dialysis, recovery from AKI, discharge and death. I was responsible for extracting and filtering the data from the Groote Schuur Hospital's admitted patients. I was also responsible for analysing the data for the Groote Schuur Hospital patients.

*Details of Project: Please see [Section 7.1 – Publications by Candidate](#)*

▪ **COVID Outstanding Test List (OTL) Dashboard**

The aim of this project, even though not technically a research project as such, but more a data science project, was to create a real-time dashboard, during the heat of the onset of the COVID-19 pandemic, to enable the Virology Department, as well as the COVID Expert Committee to track the outstanding tests in various parts of the Western Cape, as they were referred. This dashboard was updated twice per day, at 6am and 6pm daily, and provided detailed information which could be used to advise area, business, and laboratory managers on the possible locations / bottlenecks in the COVID PCR test process.

*Details of Project: Please see [Section 7.8 – COVID OTL Dashboard](#) or see it in [Real-time on Google Data Studio](#)*

▪ **Variability of the serum electrolytes Calcium, Magnesium And Phosphate in patients With Severe COVID-19 disease**  
(ongoing project)

Observations were made that in many COVID-19 cases individual patient's serum calcium, magnesium and/or phosphate (CMP) results were highly variable. This within-subject variation (CVw) was noted to be vastly in

excess of normal biological variation (BV). In some cases for example, phosphate levels exceeded both the upper and lower reference interval within periods as short as 24 hours. Serum CMP results were extracted for adult patients tested positive for SARS-CoV-2 from March 2020 until March 2021 using data as part of routine management. In this project I have used a data extraction script by means of a web scraping technique which I have learned throughout my time as registrarship.

▪ **Acute Kidney Disease Incidence in South Africa** (ongoing project)

The national laboratory services database will be accessed to determine the incidence of AKI in people who have had their renal function checked in South Africa over a ten year period. Patients with impaired renal function will have follow up data assessed to determine if there is an acute element to the renal dysfunction. Should there be renal dysfunction requiring hospital admission the creatinine on admission will be documented. Any prior creatinine will be documented and subsequent creatinines will be reviewed to determine if there was any form of renal impairment on admission or during the hospital stay. In order to differentiate between acute and chronic renal disease a large data set is required to determine the markers.

Follow up renal function will be recorded, along with referral to the Renal Service either as an in patient or an outpatient. Follow up creatinine and outcomes will be determined up to one year. Type of admission (medical, surgical, obstetric) will be assessed to determine departmental incidence.

The data accessed will be to determine incidence of AKI. The data will be accessed as anonymous data and will be stored on password protected computers. Only the clinicians involved in the study will have access to the data. These data will allow us to determine the trend of

acute kidney disease in the last ten years.

- **Inherited Metabolic Disease Audit at Red Cross Children's Hospital laboratory** (ongoing project)

The aim of this project is to describe the inherited metabolic diseases detected at the Red Cross Metabolic laboratory over the last 14 years. A data extraction has been performed on all urine organic acid profiles reported from 2007 to 2021. This dataset includes roughly 18 000 reported urine organic acid profiles, which will be classified into their respective diagnoses.

- **Creation of a lysis buffer for COVID PCR tests**

The aim of this project – although not published or written up as such – was to attempt to create a suitable viral lysis buffer for RNA extraction upon the heat of the COVID pandemic in 2020. South Africa had just gone into lockdown and some of the reagents, one of which was the viral lysis buffer, which is used to lyse the viral lipid bilayer to expose the RNA for extraction, had neared the last or so batch and no commercial buffer could be obtained. I created an “expert group” in our centre, where we brain-stormed ideas, collated expert opinions and I set off to create our very own RNase-free lysis buffer with a suitable surfactant and the works. The virology registrars tested this compared to the commercial extraction buffer which was still available and according to them it performed similarly, without much difference. They were barely able to observe a Ct-value difference in the tested samples, indicative of extraction efficiency. Luckily the supplier was able to obtain the commercial reagent again, which meant our unverified reagent was left on the shelf where it likely will stay until the next lockdown.

- **ORCHID Study**

I am involved often in advising prospective researchers on particulars about laboratory tests and ensuring tests are done as best intended. We also try to assure that

the pre-analytical factors are put in place to ensure quality results. In this study, which is titled: Obesogenic origins of maternal and child metabolic health involving dolutegravir (ORCHID), I have advised on various aspects where results may be affected: hemolysis which falsely decreases insulin, dilutions possible with our measurement method of C-peptide and measuring limits have been clearly explained.