

# Covid-19: A glimpse behind the scenes at Groote Schuur Hospital

By [James Stent](#)

12 Aug 2021

Health workers at Groote Schuur have given fascinating insight into how one of the biggest and most famous hospitals in the country adapted to the unprecedented demands of the Covid-19 pandemic.



Groote Schuur is one of South Africa's biggest teaching hospitals. Archive photo: Ashraf Hendricks

Professor Lance Michell and colleagues have published a [paper](#) in the *Southern African Journal of Critical Care* explaining how the intensive care unit (ICU) dealt with the pandemic.

Covid-19 required hospitals around the world to change the way that they operate, particularly ICUs. These are specialised units of a hospital for patients who are at risk of dying. These patients require constant care and specialised equipment and medicine to keep them alive. Many Covid-19 patients experience lung failure, known as severe acute respiratory distress syndrome (ARDS), and are unable to breathe by themselves, so they have to be put onto a ventilator.

While international guidelines were rapidly developed and refined, in countries with more limited healthcare resources like South Africa, different approaches and innovations were needed to meet the pandemic's challenge.

Before the pandemic, Groote Schuur had 25 ICU beds over four divisions, and faced high demand for these beds. There was one nurse for every two patients, and medical care was managed by specialists, registrars in rotation undergoing specialist training, and ten medical technologists.

## Expanding ICU capabilities

Preparations for the local epidemic began in February 2020 at the provincial and national level, and in late February, the hospital took steps to expand its ICU capabilities.

ICU beds require a lot of surrounding infrastructure: two oxygen points, two suction points, and 14 electrical sockets. Groote Schuur found 60 such spaces that could meet the requirements of an ICU bed. 60 ventilators were acquired, including machines that had been retired. Medicine was stockpiled. But key equipment shortages were identified, including monitors and the beds themselves.

A specialised triage tool was developed, alongside palliative care guidelines. Teams were trained in intubation, equipment care, and other techniques, and staff redeployed according to their skills. Nurses were trained by managers while in service.

The first lockdown, announced on 15 March, eased the hospital's ICU burden as trauma cases dipped dramatically and elective surgeries were postponed. The non-Covid ICU consisted of six beds, and coped with the patient levels.

The hospital's first Covid-19 ICU patient - a member of the hospital staff - was admitted on 5 April.

The first wave began slowly, and then quickly ramped up. After four weeks with seven Covid ICU beds in use, each subsequent week brought large numbers of patients requiring ICU treatment. At the peak of the first wave, almost 45 ICU beds were in use for seven consecutive weeks.

Week-by-week, as more cases were registered, the hospital had to identify new areas to host ICU patients. The hospital used emergency purchase orders to hasten the buying of the equipment for these make-do ICUs.

As patient numbers grew, new wards were designated for Covid-19 ICU care, ultimately growing to 11 wards managed by 95 doctors. The ICU medical staff were organised into 'firms'. There were three Covid ICU firms and one non-Covid ICU firm, with each firm managing between 12 and 18 beds. Older staff and those with comorbidities were put on the non-Covid firm.

## Staffing

But the hospital could only expand so much with what it had at its disposal - most critically, additional professional nurses with ICU experience were needed. Each new area of six beds required 28 nurses. The ratio of professional nurses to patients was reduced from one nurse to every two patients, to one to every three. Nurses would work a 12-hour shift, with an hour break. Nurses were drafted from other units and caps on overtime were removed. But the hospital could not rely on nurses through agencies, as many of these were snapped up by the field hospitals.

Weekends and public holidays ceased to exist, although care was taken to ensure that doctors had enough time off to cope with the crushing demands.

Staff in the ICU used personal protective equipment in line with World Health Organisation guidelines. Surgical masks were used except for procedures where there was more infectious material about; in which case N95 masks and visors were used. Sanitiser, gloves and plastic aprons were put on when attending to patients. Doctors had elastomeric respirators available to use (imagine gas masks without eye protection), but could not communicate with these on, so these were shelved.

The set-up worked well to protect the ICU staff - infections were not widespread. In the first wave, seven out of 219 ICU

nurses were infected (five of whom were in Covid-19 teams), and no doctors were infected. In the second wave, seven Covid-19 ICU nurses were infected, alongside 15 non-Covid ICU nurses, and four doctors. No ICU staff experienced serious illness, and there was no evidence that staff had been infected at work.

## High-flow nasal oxygen and intubation

Covid-19 patients were kept together in designated wards and referred to ICU if they met triage guidelines, as well as meeting other assessment criteria, like exhaustion, difficulty breathing, or if they weren't responding to high-flow nasal oxygen (HFNO — high flow of warmed, humidified oxygen enriched air delivered via special device in the nose of the patient). The median p/f ratio (a measure of lung function) on entry to ICU was 104.5 - anything less than 300 indicates acute failure of the respiratory system.

HFNO was avoided initially for fear that high flow rates would spread Covid-19. But faced with a bed shortage, and with a study suggesting that the risk of spreading infection was not as great as previously feared, HFNO was introduced as a step before intubation, with immediate good results. Patients did not need to be moved onto ventilators as quickly. This eased the burden on nurses and doctors.

Eight machines were available initially, rising to 44. A study that examined this intervention - done at Groote Schuur and Tygerberg - showed that 47% of patients with hypoxia (a dangerous level of oxygen deficiency), did not require ventilation (and did not die). Across the world, when Covid-19 patients are intubated (put onto a ventilator), their risk of death is very high - so any refinement to treatment that could avoid this outcome was welcomed.

A specialised intubation team was put together for the first wave. When a patient was identified as needing ICU treatment and a bed was available, this team would place the patient on ventilation and transfer the patient to ICU, with great care taken to prevent spreading infection. A total of 248 patients were transferred to ICU by this team in the first wave.

The second wave dwarfed the first in the Western Cape, and hit the hospital hard. The trauma cases that followed the lifting of alcohol restrictions, and the resumption of elective procedures, meant that a large proportion of ICU capacity was taken up by non-Covid-19 patients, and registrar doctors could not be transferred from other units to work on Covid-19 patients.

The intubation team that was developed in the first wave could not be brought back either, and so the staff in one the Covid-19 wards were trained in intubation instead. Private hospitals filled up with Covid-19 patients before public hospitals, so agency nurses had already been snapped up to bolster these workforces.

At the peak of the second wave, oxygen supplies in the province were close to exhaustion. The hospital, which usually required one ton of liquid oxygen a day, was using between 11 and 15 tons, and required daily deliveries from tankers.

## Psychological impact

The high rate of cases in the second wave meant that ICU admissions post-triage were limited to only the cases that stood the very best chance of survival. The immense weight of these decisions haunted some doctors, with some reporting that refusing ICU admission was "the worst part of the whole experience".

The psychological stress was profound. A psychiatrist and psychologist ran weekly debriefing sessions, initially online and then in person, to help doctors unburden themselves. Small-group counselling was provided for nurses, and telephonic counselling was always available.

Between 5 April 2020 and 18 April 2021, 461 patients were admitted to Groote Schuur's Covid-19 ICU wards, with the youngest patient 17, and the oldest 77 years old. Of these 161 (35%) survived to discharge. Not all of these patients were in ICU because of Covid-19 - 54 were admitted to ICU with Covid-19 as an incidental infection, and 55% of this group survived.

“As we approach a third wave, we are determined to apply the lessons we have learned,” write the authors of the study. “An expansion plan has been drawn up with defined triggers for reopening ICU areas proactively. Our staff are vaccinated, and we will continue to strive for excellence in patient care.”

Speaking to GroundUp, the paper’s first author, Professor Michell, said: “In non-Covid intensive care our death rate is less than 20%. In our Covid intensive care unit, it’s 65%. It’s frustrating that we can’t save more lives. Some of the people we are treating are young. But the people admitted to intensive care are almost all unvaccinated. I can’t stress enough the importance of getting vaccinated.”

For more, visit: <https://www.bizcommunity.com>