

CTICC Vaccination Centre of Hope: The value of a pharmacist in a nurse driven mass vaccination centre in the Western Cape

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Since the end of March 2020, pharmacists have worked on the frontline of the COVID-19 pandemic response and prevention, and as the world grappled to find solutions to abate the ongoing waves, the formulation of viable vaccines became a reality.¹ Today, with the ongoing pandemic, COVID-19 testing and roll-out of approved vaccines introduced to combat the spread of the virus, pharmacists continue to play a crucial role in our country's recovery.²

Once the COVID-19 vaccines were made available in South Africa, the government focused on providing and implementing a vaccine programme to ensure maximum inoculation of the population in the shortest possible time frame. This led to the establishment of a number of vaccination centres which included the Cape Town International Convention Centre (CTICC) Vaccination Centre of Hope.³ The CTICC had previously served as a world-class field hospital at the beginning of the pandemic so was perfectly placed to fulfil this role as the Western Cape's first mass vaccination site.⁴ What made this site unique was that it was a pioneering public-private collaboration between the Western Cape Government Health, the City of Cape Town, Discovery Health and the CTICC. The City of Cape Town worked to ensure the site was fully operational before handing over to the Western Cape Government and Discovery Health. The Western Cape Government was primarily responsible for the overall coordination, supply of vaccines, clinical and facilities management, and Discovery Health was responsible for the client experience, various aspects of the technology solutions and some administrative functions.⁵ The Lean Institute Africa was appointed by WCGH as support to the management team to help improve the operational system of the vaccination site. By leveraging the combined resources and capacity of both the public and private sectors, it was set to be one of the largest and most sophisticated vaccination sites in the country and with ease of access, it was envisaged that the site would be equipped for high volumes of vaccinations.

The CTICC Mass Vaccination Centre opened its doors on Wednesday, 7 July 2021, and at its peak, it was estimated to have the capacity to vaccinate just over 4 000 people per day, with 50 vaccination stations, each of which being capable of administering 100 vaccinations daily.⁶ As per the trend countrywide and as at other vaccination sites, vaccine hesitancy led to lower than expected numbers in vaccinees presenting, so the team strategised and looked at options to reach the greater community. CTICC was registered as a fixed site linked to New Somerset Hospital that provided the oversight. Groote Schuur Hospital was also linked, and an outreach to the out-patient department at Groote Schuur Hospital was started whereby vaccinators travelled to the hospital with vaccines. Question and answer sessions were also

held at some of the bigger businesses in the city centre to promote the use of COVID-19 vaccines. As of 3 December 2021, when the site was officially closed, 140 486 people had received their COVID-19 vaccination here, earning it the title of having the largest number of people vaccinated at a single site in the Western Cape.

The integration of all the various teams assigned to working at the site led to its success and highlighted the benefit of cooperation. From the onset, pharmacy services were involved at the site, right through from commissioning to decommissioning. The added benefit was also in the appointment of a full-time pharmacist and pharmacist assistant who would be based at the site and would be actively involved in the COVID-19 vaccination programme. Nursing staff were primarily responsible for the clinical aspects of the vaccination, including the preparation and administration of the vaccine, whilst the pharmacist had several responsibilities pertaining to, but not limited to, vaccine supply management. This required solid integrated working relationships with the various role players and health disciplines.

In most clinical settings and community pharmacies, the pharmacist will mainly be found in the dispensary, thus limiting interaction and working relationships with other healthcare workers. It was therefore quite unique to have the preparation process of the vaccines, by professional nurses, led by a pharmacist. The teamwork proved to be beneficial to the success of the Vaccination Centre. The pharmacist was able to support and work with the nursing staff in the prefilling area, a separate restricted access room where the vaccines were reconstituted for distribution to the vaccinators. This was to ensure as far as possible all aseptic techniques could be strictly adhered to, and to ensure the high quality of prefilled vaccine syringes.⁷⁻⁹ The pharmacist oversaw and managed the process pertaining to vaccine preparation, all documentation and record-keeping of vaccines supplied.

The role of the pharmacist at the Vaccination Centre included: (1) stock management, (2) vaccine storage and monitoring, (3) oversight of the vaccine preparation process, (4) managing the demand for vaccines, (5) documenting and reporting stats, and (6) ensuring pharmacy regulations and laws pertaining to cold chain management were adhered to.

1. Stock management. Due to the large scale, the management of the COVID-19 vaccines required a hands-on approach. The ordering process was based on the ever-fluctuating increase or decrease in demand for vaccinations and, as such, the continual monitoring of the varying expiration dates of the vaccines was imperative to ensure minimal wastage and expiry of vaccines. Demand varied

substantially week on week, and vaccine usage was monitored daily and then analysed to project weekly order quantities. To highlight this, it can be noted that in August, we reached over 3 000 vaccinees per day yet reaching as low as 336 vaccinees per day by November (Figure 1). These projections were essential as once an order was placed, the Cape Medical Depot, the distributors of the vaccine for the Western Cape Government (WCG), would remove the bulk stock from the -70 °C /- 20 °C freezers, thus resulting in a 31 day/3 month expiry of the thawed Pfizer-BioNTech COVID-19 Vaccine and Janssen Ad26.COVS COVID-19 vaccines respectively.¹⁰ Other factors, such as a set weekly delivery day for the vaccines, had to be taken into consideration to ensure that the site did not run the risk of depleting all available stock before the next possible delivery.

As the demand for the vaccine decreased significantly towards the latter quarter of 2021, the various vaccination sites of the WCG as well as some private sector vaccine sites collaborated by using a common platform of communication set up for managers and facilities to collaborate and redistribute vaccines as needed. This platform was an efficient and effective system and unique in having many districts and sub-district working together in partnership on one platform.

2. Vaccine storage and monitoring. Maintaining the cold chain process throughout from receipt of delivery to ultimate usage was extremely important to ensure the quality, viability, and stability of the vaccines. A continuous temperature monitoring device with a built-in SMS warning system was used at all times to monitor the vaccine fridge (ensuring 2–8 degrees range), and twice daily temperatures were recorded.

3. Oversight of the vaccine preparation process. A separate access controlled and designated cordoned off area, away from the public (to ensure safety of the vaccines), was set up whereby the trained professional nurses prepared the vaccines and accurately prefilled syringes for administration.^{7,9} This was to ensure strict aseptic technique and accurate preparation of the doses. The entire process was overseen by the pharmacist who, as support, ensured that the professional nurses all had the required equipment, consumables, documentation such as stats sheets and labels to fulfil their duties.

4. Managing the demand for vaccines by determining the number of vaccines to be prepared. The pharmacist was tasked with ensuring the steady flow and distribution of vaccines into the vaccination area to limit vaccinees waiting times. This required careful monitoring of expiry times of both the prefilled vaccines in the vaccination area as well as any unused prefilled vaccines at the vaccinator stations (even more so as the various vaccination teams rotated through their respective tea and lunch breaks). Systems, which included tracking sheets, were designed, and implemented that aided in determining the demand vs excess at any given time. This included tracking the vaccine vial from the time of removal from the fridge, to the vial subsequently being pierced to start the prefilling process, through to the safe distribution of the vaccines to the vaccinator. This was a complex process, bearing in mind the very high throughput initially of just over 3 000 vaccinees per day, and it also required two systems to be used, one for the Pfizer-BioNTech COVID-19 vaccine and one system for the Janssen Ad26.COVS COVID-19 vaccine.

In the morning, a push system in conjunction with an electronic client data system (managed by Discovery Health which gave a live count of the number of vaccinees presenting at the site), was used by the pharmacist to determine the quantity or number of Pfizer-BioNTech COVID-19 vaccine prefilled vaccine syringes that would be required to allow for a “buffer” or excess. Designated staff members at the site were used to evenly distribute the prefilled vaccine syringes to the vaccination stations, ensuring each vaccinator had anywhere between 1 to 4 prepared and prefilled vaccine syringes at any given time during the first half of the day.

At 14:00, all operations were temporarily halted whilst a live count of waiting vaccinees vs prefilled syringes was done. Vaccine preparation was then adjusted according to a pull system whereby only the exact number of vaccines would be prepared according to the number of presenting vaccinees. This process required constant communication between the vaccinators and the pharmacist to ensure a steady supply of vaccines, and to not increase the waiting times of the vaccinees. It also meant we could keep wastage to an absolute minimum.

5. Documenting and reporting stats. Various tracking systems and controlled measures were implemented to ensure that the most accurate and precise vaccine usage and wastage was documented. Each Professional Nurse in the prefill area had their own stat sheet which had a unique code so that the pharmacist could track by name the amount of prefilled vaccine syringes prepared and to which vaccinator these had been issued. This was essential in ensuring accountability but also meant that each vaccinator was assured of receiving vaccines of the highest quality and that if there were any queries, we were able to identify who had drawn the syringe. At the end of each working day all stats were reconciled and recorded on the National Department of Health’s Stock Visibility System (SVS) (a mobile application that enables the electronic communication of medicine data from primary healthcare level into an upstream electronic stock management systems). The pharmacist also reported accurate daily stats, which were submitted to the head of operations of health in the Western Cape.

6. Ensuring pharmacy regulations and laws pertaining to cold chain management were followed. The pharmacist was responsible for ensuring that vaccines are transported, stored, and managed according to Good Pharmacy Practice cold chain requirements as well as keeping and maintaining temperature logs and updating all stock cards. The correct removal and destruction of all waste generated in the prefill area was also managed by the pharmacist.

Main challenges

There were a few challenges pertaining to the management of vaccines on such a large scale, and consistent monitoring of the vaccines was required due to their sensitivity to light, temperature, and short expiration time.

One of the biggest challenges was to ensure that vaccinators received vaccines delivered to their individual stations timeously whilst ensuring vaccinees had minimal waiting time. Pre-empting

this without the assurance that vaccinees would present meant consistently monitoring demand vs supply to prevent wastage.

Managing two different vaccines was a challenge due to the differences in preparation requirements, expiry times and the criteria for administration.

Frequent questions from vaccinees were often directed to the pharmacist and besides the time this demanded, the pharmacist needed to be well informed to provide the correct information and advice. Vaccine hesitancy became an increasing challenge as time went on and this added to the unpredictable demand and need for vaccines.

Strategies that were developed and implemented

1. *Various tracking mechanisms:* These included tracking sheets noting when vaccines were removed from the refrigerator, reconstitution, and expiry times, and were constantly updated with updated relevant information being displayed to the staff in the prefill area. Each Professional Nurse who prefilled vaccines had their own stat sheet, which had a trackable unique code.
2. *Prefilled vaccine delivery system:* Prefilled vaccine syringes with capped needles were distributed in sealable containers (two per container and sanitised between issues) which included a label with a unique code, batch number, manufacturer and name of vaccine, and expiration times. This was crucial to ensure the vaccines were delivered safely and the quality was not compromised.
3. *Control measures:* The pharmacist and pharmacist assistant were the only one allowed to receive and manage the delivery of vaccines. Various stock cards and dispensing sheets were used daily to track the vaccines. The refrigerators were locked at the end of each day and only the pharmacist and pharmacist assistant had access to the storage area of the vaccines.
4. *Training sessions with the nurses:* The pharmacist assisted with the training of all professional nurses on aseptic and reconstitution techniques in short information sessions. Additional ongoing training and oversight was provided in the prefill area. All relevant standard operating procedures (SOPs) were written and approved.

Highlights

The WCG opened further mass vaccination sites after the opening of the CTICC Mass Vaccination Centre of Hope. One of which was the Athlone Stadium Vaccination Centre of Hope which officially opened on 17 August 2022, for both walk-in vaccinations as well as offering a drive-through section, which at full capacity was set to be on par with the CTICC site, followed by the UCT Community of Hope Vaccination Centre, which opened on 30 August 2022. As we had efficient systems in place, we were asked to assist and guide the pharmacy teams in the setting up of these vaccination sites.

The International Association of Public Health Logisticians (IAPHL) together with SAPICS (an organisation providing training and conferences to supply chain professionals that support public health) asked Professor Norman Faull, of the Lean Institute, to speak on the overall contribution that the Lean Institute Africa made, both nationally

and in the Western Cape, to the South African vaccination campaign. As part of this, Dominique was invited to speak on the “journey” of the vaccine from receipt at CTICC through to delivery of the prefilled syringes at the vaccination cubicles, and in particular the system that has enabled the CTICC to have a very low wastage of doses.

“I was extremely honoured to share my experience and the processes that I had implemented on an international platform. As a newly qualified pharmacist, I was given quite an extensive task of managing the vaccines on such a mass scale and I did not take this responsibility lightly. I gave over and above of what was expected from me and I always strived to ensure that I would add value to the vaccination programme. The working relationships that was developed between the entire team was truly the biggest highlight for me and I was so proud to be part of the entire programme. I am especially grateful to my mentor, Carrie de Beer, for her guidance, support and trust in my capabilities” Dominique Boswell-October, Pharmacist.

“New Somerset Hospital was identified as the pharmacy to be partnered with the Vaccination Site, and as such, I was involved from relatively early in the planning of the project. Being involved with the initial set up of both the site and initial operational systems, solidified for me the importance of accessible, efficient, available, and integrated healthcare for all. Once I had appointed Dominique, I managed pharmacy services mostly off-site, which afforded me the opportunity to empower, guide and coach Dominique, who proved herself to be an invaluable member of the vaccination team” Carrie De Beer, Assistant Manager Pharmacy Services, New Somerset Hospital.

“Although CTICC Vaccination Centre of Hope was a nurse driven service, the pharmacist role was pivotal in making the site a success. The pharmacist was instrumental in managing the vaccine supply daily with the expectation to have zero wastage. The site wastage for the period was less than 1% for the whole duration of operation. This can be contributed to the creativity and the initiatives of the pharmacist. Standard operating procedures and tools were created to monitor and evaluate the flow and improvement strategies were implemented on reviews. The aforesaid could not be achieved without having a pharmacist on-site with the support and supervision from an off-site pharmacist supervisor. It was an immense honour to have worked with such a dynamic team that had such an immense contribution to the success of the site” Laetitia Saville, Deputy Manager Nursing, Facility Manager CTICC Vaccination Centre of Hope.

With thanks to Helen Hayes, Manager Pharmaceutical Services Western Cape Health; Jacqueline Voget, Pharmaceutical Policy specialist Western Cape Health; and Helimamy Moeng, Manager Pharmaceutical Services Western Cape Health.

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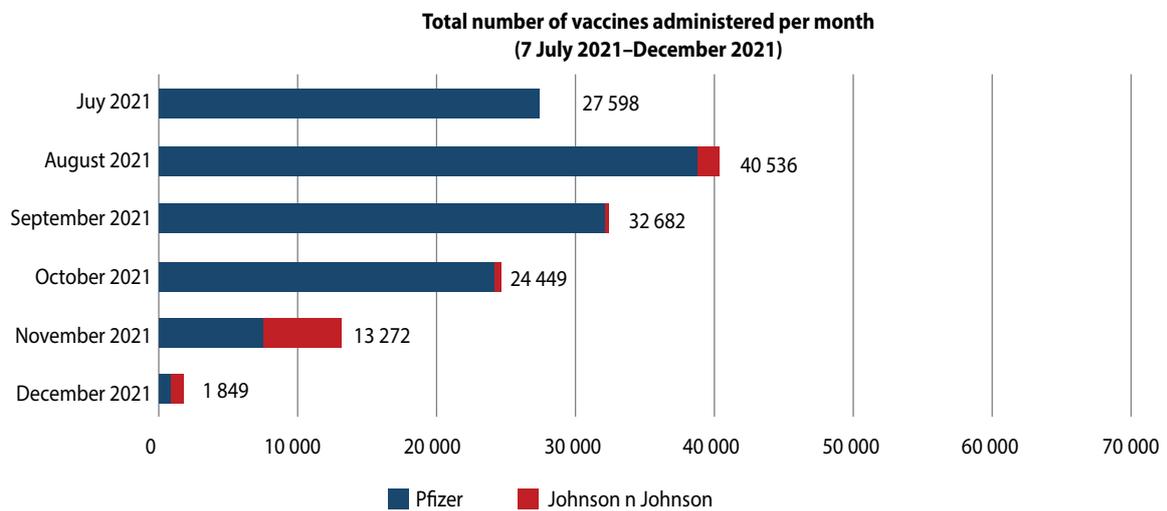


Figure 1: Total number of COVID-19 vaccines administered at CTICC Mass Vaccination Centre of Hope



Professional nursing staff drawing up COVID-19 vaccines

Left to right: Nomthandazo Tabhu, Lizanne Jansen, Ntabiseng Baza, Elizabeth Ernstzen, Ayanda Bashe, Beverley Kaylor, Nondumiso Feleza, Charlene Jasson, Annzita November, Thembanani Ndlovu, Farren Franke, Andrienne van Gensen



Back row left to right: Elizabeth Ernstzen, Andrienne van Gensen, Farren Franke, Ayanda Bashe, Annzita November, Charlene Jasson, Nozipho Dlamini, Nondumiso Feleza, Nomthandazo Tabhu, Nenekazi Khubani, Nthabiseng Baza

Front row left to right: Caroline de Beer, Dominique Boswell-October



Left to right: Dominique Boswell-October, Nozipho Dlamini (pharmacist and pharmacist assistant)



Front to back: Thembani Ndlovu, Dominique Boswell-October, Simbongile Mengezeleli