

Hospital Pharmacy Contribution to COVID-19 Vaccination Rollout in Rural Communities

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INTRODUCTION

Vaccination is a key strategy to protect against coronavirus disease 2019 (COVID-19). In December 2020, Ontario started its COVID-19 vaccination rollout, beginning with the Pfizer-BioNTech COVID-19 vaccine. A phased approach was implemented to prioritize individuals at the greatest risk of severe disease.¹ This approach was also used for booster doses. Hospital clinics and mass immunization clinics were some of the earlier settings for vaccine administration. As the vaccination rollout evolved, more COVID-19 vaccines and administration channels became available.

The storage and handling requirements for the Pfizer-BioNTech COVID-19 vaccine posed many operational challenges. The lack of ultra-low-temperature freezers, the difficulty of transporting vaccines across large geographic areas, and the scarcity of health human resources were particularly difficult for rural communities to tackle in the initial stage of the rollout.² Leveraging staff pharmacists' and pharmacy technicians' expertise in medication management and their skills in administering injections, the Pharmacy Department of the Norfolk General Hospital (NGH), in Simcoe, Ontario, pivoted quickly to address these challenges and support local vaccination efforts across the counties of Haldimand and Norfolk.

DESCRIPTION OF THE PROGRAM

The NGH is a community hospital that provides a range of clinical services to the more than 64 000 residents of Norfolk County. This hospital shares several members of the management team, including the director of pharmacy, with West Haldimand General Hospital (WHGH), a rural hospital serving the nearly 46 000 people of Haldimand County, which includes a larger proportion of Indigenous peoples, such as the Six Nations of the Grand River and the Mississaugas of the New Credit First Nations, compared with Norfolk County. With consideration of space, equipment, and health human resources, NGH and its Pharmacy Department were identified as being better equipped to be the primary hospital partner, collaborating with

Haldimand Norfolk Health Unit (HNHU) on the vaccination campaign to serve approximately 110 000 residents over an area of about 2900 km².

The NGH became a designated vaccine delivery site, following the Pharmacy Department's purchase of an ultra-low-temperature freezer at the beginning of 2021. From then until June 2022, the Pharmacy Department dedicated 1.2 full-time equivalent pharmacy technicians (out of a total of 6 on staff) to COVID-19 vaccine-related tasks; the then-director of pharmacy (K.W.L.) and the hospital's clinical pharmacists also took on additional duties during that time.

Receipt, Storage, and Transport of COVID-19 Vaccines

The NGH received its first shipment of Pfizer-BioNTech COVID-19 vaccine in the second week of January 2021. With input from the NGH Purchasing Department, Maintenance Department, and security personnel, pharmacy staff prepared a standard operating procedure in alignment with the product monograph and Ontario's *General COVID-19: Vaccine Storage and Handling Guidance*.² This procedure ensured timely notification of shipment arrival, secure movement to the storage location, and proper placement into storage equipment without causing temperature excursions.

Furthermore, the Pharmacy Department played an integral role in the transport of Pfizer-BioNTech COVID-19 vaccines across the catchment area of HNHU. Pharmacy staff championed the training of external partners, such as paramedics and staff at congregate living settings, on cold chain and vaccine transport. In addition to transferring vials from one storage condition to another and securely packing them to avoid potential agitation during transport by the external partners, pharmacy staff were heavily involved in logistics, coordinating with HNHU for just-in-time delivery of vaccines in a frozen state on the morning of each clinic day.

Hospital On-Site Vaccination Clinic

After supporting the immunization of older adults in congregate living settings, such as long-term care and retirement homes, with their first doses, NGH opened

its vaccination clinic in the third week of February 2021. Before this launch, internal and external stakeholder meetings were held to review clinic flow, infection prevention measures, and other operational requirements, including repurposing of hospital offices and conference rooms. The director of pharmacy was responsible for management of the vaccine inventory and later oversaw the entire operation of the clinic.

The clinic was typically staffed with 3 registration clerks, 5 immunizers, and 1 pharmacy technician. The pharmacy technician, paired with 1 immunizer to perform an independent double check, prepared COVID-19 vaccines in unit-dose syringes twice daily, before clinic opening and in the early afternoon, according to the vaccine shelf-life, the number of appointments, the potential for cancellations, and possible no-shows. Different colours of syringe labels were used to differentiate the various vaccines and dosages.

Through a temporary amendment of Ontario Regulation 107/96, pharmacy professionals, among others, were able to administer COVID-19 vaccines in selected settings.³ This led to an expansion of the pool of immunizers from nurses to include pharmacists and pharmacy technicians.

Vaccination of Inpatients

On inpatient units, clinical pharmacists helped identify patients eligible for COVID-19 vaccines; they also answered vaccine-related questions from other health care providers. Upon receiving an order, a pharmacist confirmed the dose, especially in the case of the Moderna COVID-19 vaccine, for which the dose varies according to a multitude of factors, such as age, immunocompetency, and previous COVID-19 vaccination history. Then, the pharmacist relayed the information to the mobile vaccination team to organize vaccine administration.

Off-Site Vaccination Clinics

The NGH Pharmacy Department also assisted other vaccination clinics in various ways. Hospital leaders, including the director of pharmacy, were part of a logistics working group led by HNHU, which participated in the dry run for the mass immunization clinic in Dunnville, Ontario. In addition, pharmacy staff worked at several mass immunization clinics across Haldimand–Norfolk and helped with vaccine preparation at specialized clinics for Indigenous persons organized at and with partners on the reserve. Finally, pharmacy staff, working with HNHU staff, supported a pop-up clinic held at WHGH for immunization of hospital workers.

EVALUATION OF THE PROGRAM

As of June 24, 2022, the number of doses of various COVID-19 vaccines administered across Haldimand–Norfolk was approximately 214 000. The NGH Pharmacy

Department participated in the transfer of vaccine supplies for the majority of those doses, given that it was involved in transferring all of the Pfizer-BioNTech vaccines. Vaccines were transferred from NGH to its own vaccination clinic, HNHU-led mass immunization clinics, local physician and primary care offices, and local pharmacies, where the quantities desired were less than the distributor's minimum of 10 vials per order. No instances of temperature excursion were reported at any stage of the transport process.

The NGH vaccination clinic operated 5 days per week from its inception until its closure on June 24, 2022, with a temporary reduction in hours (to 3 days per week) in September and October 2021, when community vaccine demand was at its lowest. Occasional weekend pop-up clinics were held to ensure local access to vaccines in early 2021. On average, the daily throughput was nearly the maximum feasible, at 300 doses, decreasing only when community demand declined. Throughput was limited primarily by the space of the post-vaccination monitoring area, to allow for 15-minute monitoring and safe physical distancing.

In 2021, a total of 51 548 doses were administered, with 202 doses (0.39%) wasted. Most wastage occurred during the “Last Mile Strategy” in fall 2021, which aimed to increase vaccine uptake among individuals not yet fully vaccinated and in communities with a low overall vaccination rate. In Haldimand–Norfolk, local vaccination coverage increased steadily in the early months of the vaccination campaign, and uptake for subsequent doses was generally slower (Figure 1). The NGH vaccination clinic supported the administration of all eligible doses to eligible populations during its time open (Table 1). The established process involving clinical pharmacists allowed for the timely provision of primary series and booster doses of COVID-19 vaccines to inpatients and hospital staff members. Although no formal evaluation was conducted, the tone of feedback received from partners, hospital staff, and the community was overwhelmingly positive.

IMPLICATIONS AND SIGNIFICANCE FOR PRACTICE

The rollout of COVID-19 vaccines across Ontario has required collaborative engagement of health care providers from all levels of care and from all public health units. Hospital pharmacies are uniquely positioned to take on a critical role in this pandemic response, given hospital pharmacists' and pharmacy technicians' knowledge and skills in cold chain management, sterile compounding, medication safety, and inventory management. The NGH Pharmacy Department filled the gaps in local rural communities by offering the above-mentioned expertise to launch and sustain the vaccination campaign with HNHU.

As local health human resources became more strained, pharmacists and pharmacy technicians at NGH

further supported vaccination clinics through administration of COVID-19 vaccines. Normally, the scope of practice of pharmacy professionals can be affected by their practice setting; the vaccines that pharmacy professionals can administer are also strictly specified. To address these potential barriers, a temporary amendment to Ontario Regulation 107/96 was issued, allowing pharmacy

professionals to administer COVID-19 vaccines that would otherwise be out of scope.³ The inclusion of pharmacy professionals in the immunizer pool increased system capacity for the local vaccination rollout. Based on this experience, discussions were underway at NGH and WHGH, at the time this manuscript was submitted (in late spring 2022), to explore the inclusion of pharmacists in the medical

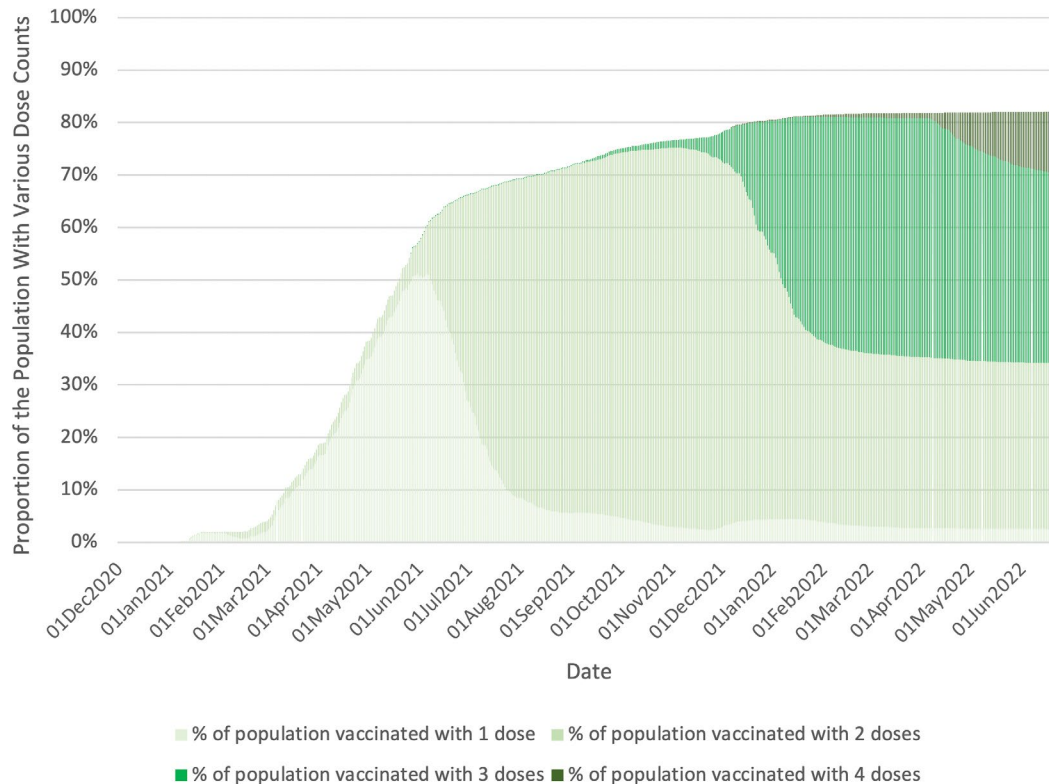


FIGURE 1. Vaccination coverage rates in the catchment area of Haldimand Norfolk Health Unit from initiation of Ontario vaccination program in December 2020 to June 24, 2022.

TABLE 1. Vaccine Product Types Available at Norfolk General Hospital (NGH) Vaccination Clinic and Respective Eligibility Considerations, Labelling Practices, and Number of Doses Administered (as of June 24, 2022)

Vaccine Type	Eligible Population ⁴	Label Colour	No. of Doses Administered
Pfizer-BioNTech COVID-19 vaccine			
For those 12 years of age or older	Any individual ≥ 12 years of age, any dose number ^a	White	52 066
For those 5–11 years of age	Individuals 5–11 years of age, 2-dose primary series only	Pink	1 245
Moderna COVID-19 vaccine			4 125 ^b
100 µg	Individuals ≥ 18 years of age (Pfizer preference for individuals < 30 years); primary series doses or doses for immunocompromised or those aged ≥ 70 years for any dose number	Green	
50 µg	Individuals ≥ 18 years of age (Pfizer preference for individuals < 30 years); booster doses only for those with sufficient immune status and < 70 years	Yellow	
Total no. of doses administered at NGH			57 436

^aInitial rollout was phased.

^bThe number of doses of Moderna COVID-19 vaccine could not be split according to dose (100 versus 50 µg) because of database capacity and varying eligibility criteria.

directive for administration of influenza vaccines to hospital staff as a way to ensure sustainability of the annual hospital influenza vaccine campaign, given local health human resources challenges.

CONCLUSION

Overall, pharmacists and pharmacy technicians can greatly contribute to public health through disease prevention and control, specifically by means of vaccine administration.⁵ Such a contribution was observed during the COVID-19 pandemic, when pharmacy professionals used their skill set to contribute to the success of the vaccination rollout. To build system capacity and drive positive public health outcomes, actions in the forms of developing medical directives or making policy changes at the level of individual hospitals or, preferably, government should be considered to allow pharmacy professionals across all settings to practise to their full scope, as well as to allow expansion of the specific vaccines that pharmacy professionals can administer.

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