

Inpatient COVID-19 vaccination rollout: Improving access to vaccination

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ABSTRACT

Background

We were aware of high numbers of inpatients unvaccinated against COVID-19 at Guy's and St Thomas' NHS Foundation Trust (GSTT). Due to this, an inpatient vaccination protocol was set up in July 2021, with initially limited uptake.

Methods

From October 2021, a multidisciplinary team worked to improve the protocol for inpatient vaccination, with the development of a system that gave ownership to clinical teams.

Results

In 4 months (July 2021 to November 2021), 20 inpatients had been vaccinated at GSTT. Following our intervention, rates of uptake increased, and 34 patients were vaccinated in less than 2 months (November 2021 to January 2022). Forty-five patients who had been referred were discharged without vaccination; attempts were made to invite them to receive a vaccine.

Conclusion

An improved pathway and referral process increased the number of inpatient vaccinations delivered. Further work is required in order to ensure that more patients who have been referred are vaccinated.

KEYWORDS: COVID-19, vaccination, quality improvement

DOI: 10.7861/clinmed.2022-0132

Introduction

Background

The first COVID-19 vaccine in the UK was administered on 08 December 2021, and vaccination remains highly effective in preventing hospitalisation and death.^{1,2} The subsequent rollout of a national vaccination programme had resulted in over 50 million individuals receiving at least one dose by November 2021.³

Hospital inpatients are a group who are potentially at risk of missing out on the opportunity to receive timely vaccine doses.^{4,5} Prior to the COVID-19 pandemic, inpatient vaccination programmes for other diseases (including influenza and pneumococcus) have been successfully implemented in hospitals.^{6,7}

We were aware of high numbers of inpatients at Guy's and St Thomas' NHS Foundation Trust (GSTT) not fully vaccinated against COVID-19 and sought to improve their access to vaccination while in hospital.

Developing an inpatient vaccination programme

At the time of writing, there were no national guidelines on vaccinating inpatients. GSTT began to establish processes to vaccinate inpatients in July 2021, with the trust's vaccination team piloting a protocol in one wing of St Thomas' hospital towards the aim of eventually implementing it trust wide.

Locally, COVID-19 infection and vaccination status were not readily available at the bedside, therefore, processes were put in place to highlight those in need of COVID-19 vaccination. A data quality team would send the vaccination team a list of current inpatients from a wing of St Thomas' Hospital; the vaccination team would then check the National Immunisation and Vaccination System (NIVS) to see if the patient had received any COVID-19 vaccines. If the patient was eligible to receive any doses, the team would then contact the ward to discuss with the patient's clinical team whether it would be appropriate and possible to offer a vaccine and, if so, to arrange an appointment to do this. A summary of the process is outlined in Fig 1.

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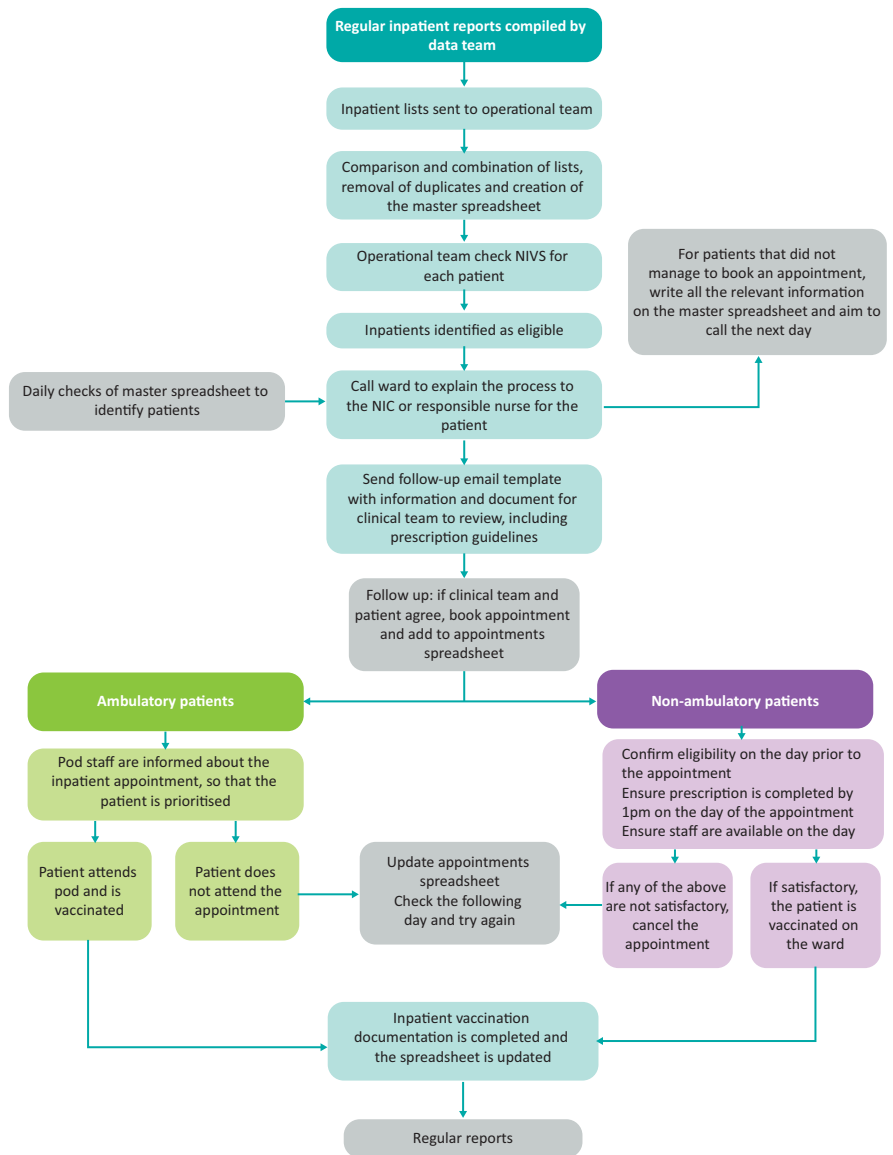


Fig 1. Process to highlight inpatients in need of COVID-19 vaccination and provide a vaccine where appropriate. NIC = nurse in charge; NIVS = National Immunisation and Vaccination System.

It was, however, quickly acknowledged that there were a number of pitfalls in this system (outlined in Fig 2).

- > The vaccination team would need to screen 200–300 patients daily; a very significant amount of work. Extending this to the entire trust would prove challenging.
- > If a patient was identified as potentially eligible, the ward would need to be contacted to arrange the logistics of vaccination; it often required multiple attempts in order to find an appropriate person who had the time to discuss this.
- > Patients identified by the vaccination team would sometimes be deemed unsuitable by clinical teams (eg due to severity of current illness).
- > Some prescriptions would need to be completed by a member of the patient’s medical team (rather than a doctor from the trust’s vaccination hub). Due to a lack of familiarity in prescribing vaccines (despite an available guideline), reluctance

from ward doctors to prescribe a vaccine resulted in delays and missed opportunities.

- > Managing large volumes of data proved challenging, with complex data processing and multiple spreadsheets to keep track of all patients screened.

From 15 July 2021 to 17 November 2021, only 20 inpatients received a dose of a COVID-19 vaccine. It was clear that significant changes were required. The vaccination team liaised with senior members of the medical team in order to collaboratively design a simple, efficient and reproducible protocol for the vaccination of inpatients at GSTT that addressed the challenges described earlier.

The target agreed was to administer a minimum of five doses of a COVID-19 vaccine per week (chosen as it was felt to be an achievable goal that represented significant improvement from the system in place) following implementation of a new process and maintain this going forwards.

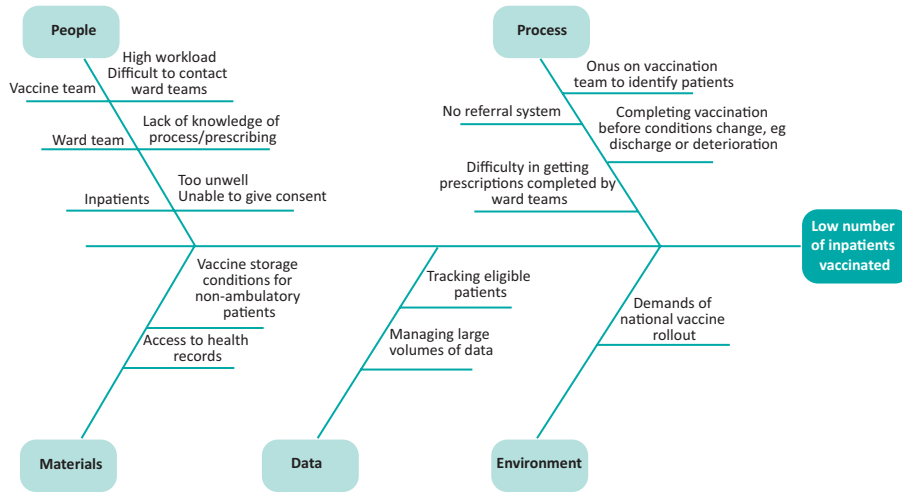


Fig 2. Problems associated with identifying and vaccinating inpatients in need of COVID-19 vaccination.

Methods

Development of a new protocol

The development of a new protocol involved team members from multiple disciplines including medical teams, vaccination managers, nursing staff, pharmacy staff, data managers, IT staff and medical students.

The main barrier identified was that the vaccination team were having to initiate the vaccination referral. We chose to change the process to allow a patient's clinical team to take the initiative

and make a referral for vaccination when they felt it would be clinically safe and appropriate. To do so, we designed a 'COVID-19 vaccination order' form that would be sent to the vaccination team on the trust's electronic patient record (EPR) system, which is already routinely used to make referrals to other teams. We aimed to make this as simple to fill in as possible to minimise the workload for clinical teams by asking only a few questions (with answers available from drop down menus) and for contact details to arrange the appointment and clarify any medical issues. The design of the form is shown in Fig 3.

Fig 3. COVID-19 vaccination order form on the electronic patient record.

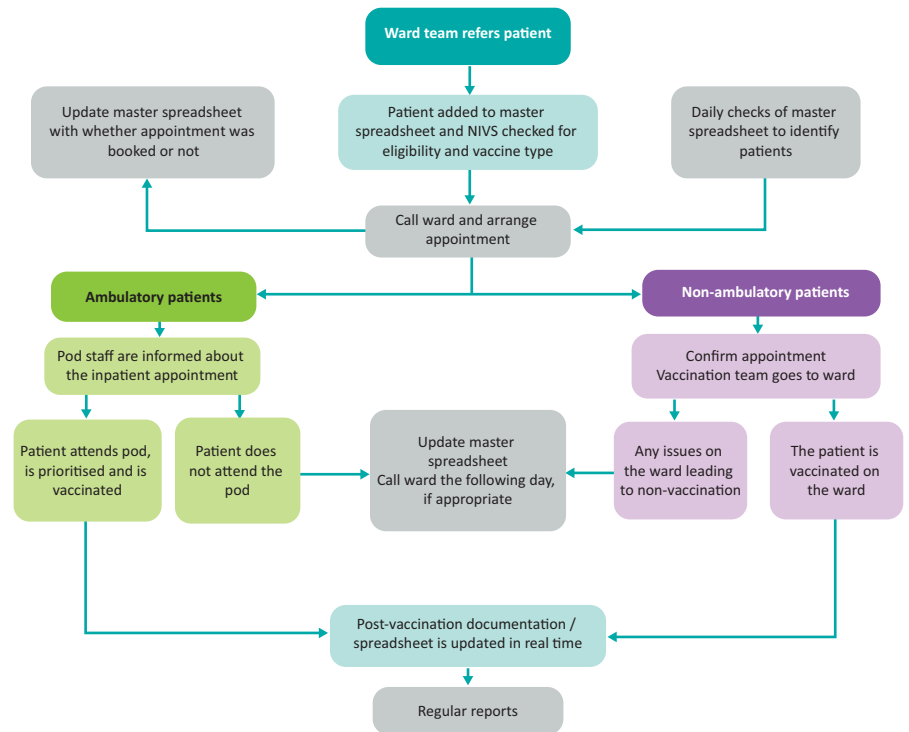


Fig 4. Simplified flowchart for the vaccination team to use as an operating procedure. NIVS = National Immunisation and Vaccination System.

This request covered key issues in the vaccination process identified by the multidisciplinary team including consideration of a patient's capacity to provide consent to vaccination; this was included after discussion with trust experts and included guidance for when a patient did not have capacity. It also allowed the vaccination team to cross-check vaccine records on NIVS, and to prioritise those who had not yet received any vaccines.

To minimise disruption to the vaccination hub's usual activity, we agreed that, if possible, patients should travel to the vaccination hub (accompanied if necessary). However, we recognised that, for a small number of patients, this would not be feasible (eg bedbound patients), therefore, we offered the alternative of vaccination on the ward. The vaccination team were to use the contact details provided to arrange appointments. In cases of vaccinations on the ward, we would aim to complete as many as possible on the same day to reduce vaccine waste and improve efficiency.

To overcome hesitancy in vaccine prescribing, we agreed that vaccination hub doctors familiar with the process would complete all prescriptions using the same model that is done for the public, utilising an electronic 'patient specific direction'. In this method (one of the legal mechanisms set out by NHS England for administering vaccines), a vaccinator would complete a series of questions regarding suitability for vaccination, which would be reviewed and signed by a doctor.⁸ This method also ensured a second safety check prior to vaccination.

After vaccination, the vaccination team would document administration on the trust's electronic noting system and electronic prescribing system, and mark the initial request as complete. This was to ensure that clinical staff were aware that a vaccine had been given, particularly in case of later deterioration or concerns. To measure the effect of the intervention, weekly and monthly reports on utilisation of the EPR order were generated. Vaccination managers were also

to keep a record of all referrals received in a single spreadsheet, and update this with whether the vaccination was completed or not.

This process was summarised into a flowchart for the vaccination team to use as an operating procedure; Fig 4 is a simplified version of this flowchart.

Implementation

The EPR order went live on the 18 November 2021. Any healthcare professional on the wards at GSTT had the ability to fill in the request. On the 14 December 2021, an amendment was made with a check box added to ensure that the person filling in the form had discussed the patient with the medical team.

Communication

To advertise the new system, we created a flowchart detailing the process that ward teams should follow to request an

Table 1. Weekly inpatient vaccination data

Week commencing	Referrals received	Vaccinations completed
18 November 2021	3	0
25 November 2021	12	4
02 December 2021	12	5
09 December 2021	15	5
16 December 2021	17	9
23 December 2021	21	6
30 December 2021	6	5
Total	86	34

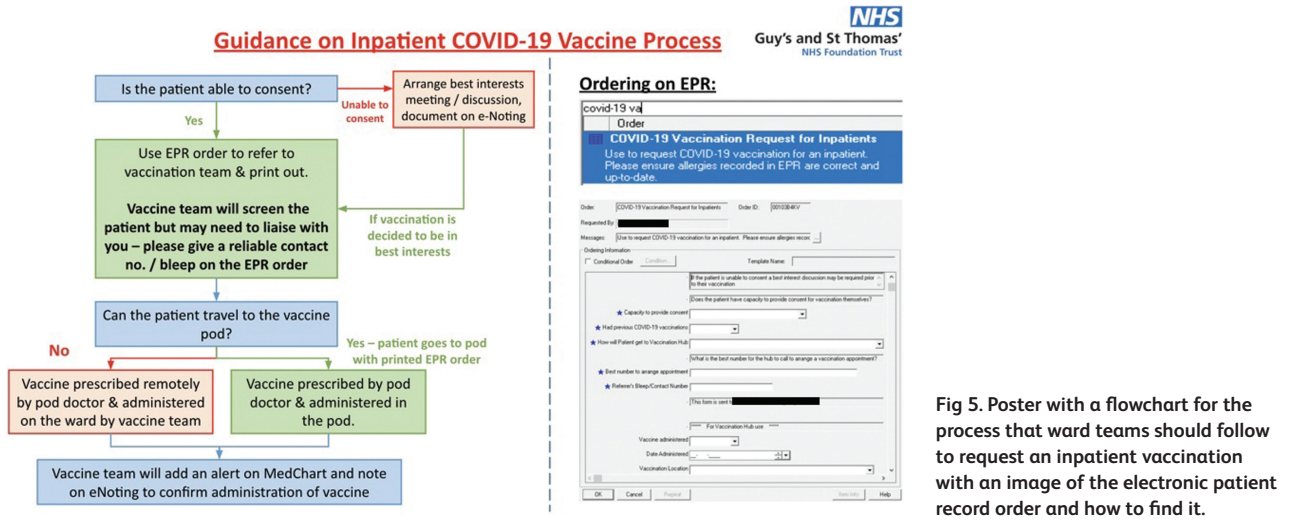


Fig 5. Poster with a flowchart for the process that ward teams should follow to request an inpatient vaccination with an image of the electronic patient record order and how to find it.

inpatient vaccination, which was incorporated into a poster alongside an image of the EPR order and how to find it (Fig 5). This was placed into a highly visible area of 40 wards between the 14 December 2021 and 16 December 2021, and distributed (alongside a description of the process) to all doctors in the trust in a weekly COVID-19 update email sent by the infection team on 10 December 2021. The process was also advertised at junior doctor teaching; once by medical students on 29 November 2021, and then by the medical lead for vaccination on two occasions between 01 December 2021 and 10 December 2021.

Results

From 18 November 2021 (the date of EPR order implementation), the team has prospectively collected data on the number of EPR orders submitted and vaccinations completed. This only included vaccines administered following an EPR request.

In total, 86 requests were submitted in the 7 weeks following implementation (up to 06 January 2022). From these, 34 vaccines were administered at GSTT (22 patients had been primarily

under the care of medical teams, 11 under surgical teams and one referral came from the emergency department). Data are summarised in Table 1 and Fig 6.

Efforts were made to review the vaccination records of those who did not receive a vaccine as requested during their inpatient stay and to contact them to invite them back for vaccination. A breakdown of the outcome (up to the first week of March 2022) of the requests and contact attempts is summarised in Table 2.

Discussion

From our data, it is apparent that the EPR order and new inpatient vaccination process successfully resulted in increased delivery of COVID-19 vaccines to hospital inpatients. In the 7 weeks post-implementation, we had administered more than the number vaccines that were administered in the preceding 17 weeks. The target of five vaccines administered per week was met in 5 of the 7 weeks and, following the implementation, there was a shift above the previous median weekly number (Fig 6).

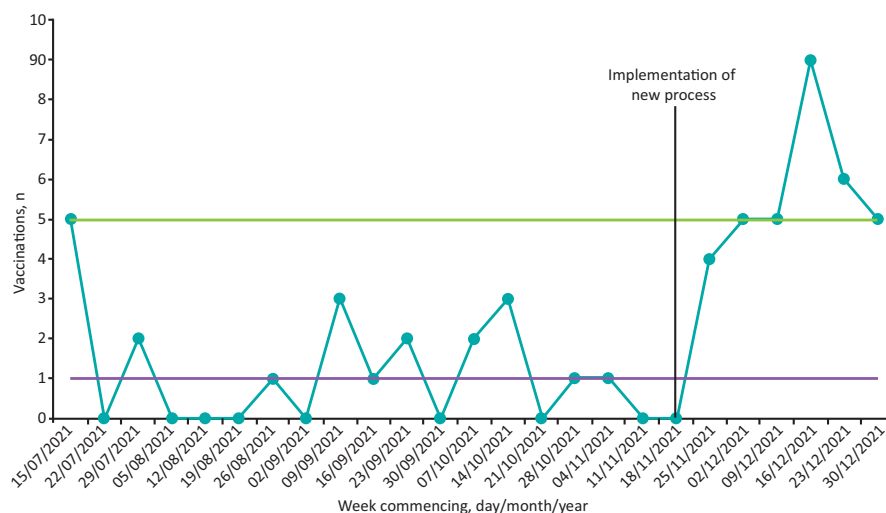


Fig 6. Weekly number of inpatient vaccinations. Purple line = median pre-implementation; green line = target.

Table 2. Outcome of vaccination requests (up to the first week of March 2022)

Outcome of request	Number	Additional information
Not required	3	Three patients had already received their full vaccination course.
Pending	4	Four patients remained as inpatients and were still awaiting vaccination.
Vaccinated	34	Twenty-eight patients received their vaccine while an inpatient, and two returned at a later date after discharge. Four outpatients were vaccinated following submission of a request.
Not vaccinated as requested and discharged	45	Three patients died after discharge (not COVID-19 related). Eight were not contactable. Fifteen had received a vaccine dose at another location. Five had made plans in their local area for vaccination. Three had been asked by their medical team to delay vaccination (eg due to chemotherapy). Two declined vaccination. Two wanted time to consider whether they wanted a vaccine before arranging an appointment. Four informed the team they would make an appointment locally. One patient was booked for a dose at GSTT at their request. One was under the age of 18 and not contacted. One had been discharged to a care home and was unable to consent to vaccination (their GP was informed of the situation to consider whether vaccination would be in their best interest).

GP = general practitioner; GSTT = Guy's and St Thomas' NHS Foundation Trust.

There are some factors that may have prevented further doses being administered in this time. No vaccines were administered over the Christmas bank holidays as the hubs were closed and, until the new year, there were reduced services. The emergence of the Omicron variant of SARS-CoV-2 in late November resulted in an expanded national booster vaccination programme and increased demand in the hubs. With finite staff, this resulted in some delays for inpatients being able to receive a vaccine, some of whom were discharged before they could receive a dose.

Not all patients that were referred received the requested vaccination. Some of the issues identified by vaccination hub staff for this included difficulty getting in touch with wards to arrange the appointment (despite the request asking for a 'best contact number'), and changes in a patient's status following referral (such as changes in medical condition or awaiting the final outcome of a best interests discussion). These issues resulted in delays and, at times, missed opportunities before discharge.

We recognise the importance of reducing delays and ensuring more of those referred for vaccination do receive their dose, and aim to implement further changes to improve this. Other areas for consideration include adding alerts to patient records as a reminder to clinical staff to consider vaccination status for patients, and implementing a process for requesting vaccinations for outpatient areas.

Conclusion

The new protocol that was implemented resulted in an increase in COVID-19 vaccination delivery to inpatients. At present,

there is still a need to continue as a significant proportion of the population have not had a 'booster' dose.³ The lessons learned from this project will also be valuable to our team when planning vaccination projects in future (eg with seasonal influenza vaccines). We hope our success in implementing an effective inpatient vaccination protocol will drive similar projects at other trusts. Although reproducibility will be dependent on local resources and processes, successful inpatient vaccination projects in the USA have demonstrated that this can be done using different methods.^{9,10}

As the landscape of the pandemic evolves, the need for further vaccinations and demand for vaccines may change and influence how this project continues. Nevertheless, at present, we will continue to collect data and aim to improve access to vaccination for patients. ■

Acknowledgements

Thanks to the GSTT COVID-19 vaccination team for their work in implementing the processes to deliver inpatient vaccinations.

References

- 1 BBC News. *COVID-19 vaccine: First person receives Pfizer jab in UK*. BBC, 2020. www.bbc.co.uk/news/uk-55227325 [Accessed 17 January 2022].
- 2 UK Health Security Agency. *COVID-19 vaccine surveillance report: Week 2*. UK Health Security Agency, 2022. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047814/Vaccine-surveillance-report-week-2-2022.pdf [Accessed 17 January 2022].
- 3 GOV.UK. *Coronavirus (COVID-19) in the UK*. GOV.UK. <https://coronavirus.data.gov.uk> [Accessed 01 June 2022].

- 4 Pike J. *COVID-19: No change to inpatient vaccination policy for elderly, Sky News learns*. Sky News, 2021. <https://news.sky.com/story/covid-19-no-change-on-inpatient-vaccination-regime-for-elderly-sky-news-learns-12242338> [Accessed 17 January 2022].
- 5 Anderson E, Kao C, Yildirim I. Hospitalization is an underutilized opportunity to vaccinate for influenza. *Mayo Clinic Proceedings* 2019;94:377–9.
- 6 Rees S, Stevens L, Drayton J, Engledow N, Sanders J. Improving Inpatient Pneumococcal and Influenza Vaccination Rates. *Journal of Nursing Care Quality* 2011;26:358–63.
- 7 Mette S, Valenti A, Boyle B *et al*. *An institutional strategy for inpatient immunization*. Institute for Healthcare Improvement, 2006. www.ihc.org/resources/Pages/ImprovementStories/AnInstitutionalStrategyforInpatientImmunization.aspx [Accessed 03 March 2022].
- 8 NHS England. *Legal mechanisms for administration of the COVID-19 vaccine(s) v2 –10 December 2020*. NHS. www.england.nhs.uk/coronavirus/documents/legal-mechanisms-for-administration-of-the-covid-19-vaccines-v2-10-december-2020 [Accessed 01-Jun-2022].
- 9 Freiser D, Roca M, Chung T *et al*. The evolution of a hospital-based COVID-19 vaccination program for inpatients. *NEJM Catal Innov Care Deliv* 2022;10.1056/CAT.21.0340.
- 10 Berger R, Diaz D, Chacko S *et al*. Implementation of an Inpatient Covid-19 Vaccination Program. *NEJM Catal Innov Care Deliv* 2021;10.1056/CAT.21.0235.

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