Crynodeb cyflym

Cwestiwn:
Pa fodelau cyflawni sy'n bodoli ar gyfer brechu torfol mewn lleoliadau nad ydynt yn rhai gofal iechyd, er enghraifft, brechu drwy ffenestr y car neu gyfleusterau symudol? Pa fodelau yw'r rhai mwyaf effeithlon neu effeithiol?

Crynodeb byr:

Rydym wedi nodi wyth o ganllawiau neu lawlyfrau/offer gweithredu[1-8], un adolygiad systematig[9], a 15 o astudiaethau achos disgrifiadol[10-24] sy'n berthnasol i'r cwestiynau hyn o'r chwiliad o lenyddiaeth a gynhaliwyd ym mis Mehefin 2020.

Nodwyd y modelau canlynol drwy'r astudiaethau achos disgrifiadol o frechu torfol y tu allan i leoliadau gofal iechyd.

Clinigau brechu drwy ffenestr y car wedi'u lleoli mewn:

- Stadia/canolfannau chwaraeon[9]
- Meysydd parcio mawr agored neu dan do[9,10,16]
- Garej bysiau ysgol gaeedig[9]

Clinigau cerdded drwodd wedi'u lleol mewn:

- Arena chwaraeon ar gampws prifysgol[11]
- Gorsafoedd pleidleisio[17]
- Pabell awyr agored mewn cyfleuster meddygol[18]
- Ysgolion[19-24]

Clinigau ar y safle/symudol wedi'u lleoli mewn:

- Banciau bwyd neu lochesi i bobl ddigartref[12] neu eglwysi[15]
- Cyfleusterau byw â chymorth[13]

Mae manylion lleoliad/proses/cynllun y gwahanol fodelau brechu torfol sydd wedi'u cynnwys yn y llenyddiaeth a adolygwyd gan gyfoedion wedi'u cynnwys yn Nhablau 3 a 4.

Mae argymhellion ar gael ar gyfer cynllun a llif clinigau, gorsafoedd a phrosesau ar gyfer clinigau brechu torfol cerdded drwodd traddodiadol ar gyfer y ffliw mewn lleoliadau nad ydynt yn rhai gofal iechyd ar gael mewn nifer o ganllawiau gan sefydliadau iechyd/llywodraethau wedi'u lleoli yng Ngogledd America[1-4] (Tabl 1).

Crynodeb cyflym

Mae dau ganllaw diweddar yn cynnwys sylwadau ychwanegol mewn cysylltiad ag opsiynau ar gyfer clinigau ffliw yn sgil COVID-19 y gellir eu cyffredinoli ar gyfer clinigau sy'n cynnig brechlyn ar gyfer COVID-19[7, 8]. Mae'r ddau ganllaw yn awgrymu mesurau penodol i gefnogi dulliau atal a rheoli'r clefyd (Tabl 2).

Mae'r canllawiau gan system iechyd milwrol yr Unol Daleithiau[7] yn cynnig tri dewis amgen i ddigwyddiadau imiwneiddio torfol traddodiadol mewn lleoliadau nad ydynt yn rhai gofal iechyd, gan nodi manteision a chyfyngiadau pob model:

Model	Manteision	Cyfyngiadau
Clinigau Imiwneiddio Cadw Pellter Cymdeithasol Imiwneiddio torfol mawr traddodiadol ond wedi'u dosbarthu mewn ardal ffisegol fwy yn yr awyr agored neu dan do	Effeithlonrwydd	Ar gael i nifer fawr o bobl yn yr un lleoliad dros gyfnod byr o amser, gan gynyddu'r risg o drosglwyddo'r haint Yn fwy anodd rheoli mesurau cadw pellter cymdeithasol Argaeledd dewisiadau addas o safleoedd mewn rhai lleoliadau.
Clinigau Imiwneiddio Drwy Ffenestr y Car	Strategaeth fwy effeithiol er mwyn cadw pellter cymdeithasol	Logisteg a lleihad mewn effeithlonrwydd Risg uwch o dechneg imiwneiddio wael o ganlyniad i leoliad neu fynediad at safle pigiad anatomig
Timau symudol bach Timau bach yn darparu gwasanaethau imiwneiddio mewn safleoedd niferus	Lleihau grwpiau mwy yn yr un lleoliad/lleoliad newydd, yr un pryd ac yn ystod cyfnod o nifer o oriau. Yn cyfyngu'r amlygiad o fewn y grwpiau hyn.	Logisteg a'r posibilrwydd o leihad mewn effeithlonrwydd o ganlyniad i symud timau bach i leoliadau niferus Diffyg rheolaeth dros y lleoliadau hynny Heriau dogfennaeth

Roedd yr adolygiad systematig yn ceisio nodi arferion ac argymhellion effeithiol ar gyfer gweithredu clinigau brechu drwy ffenestr y car fel pwynt dosbarthu[9]. Ystyriwyd bod defnyddio cerbyd fel siambr ynysu yn un o fanteision unigryw'r clinigau hyn yn hytrach na chlinigau cerdded-i-mewn traddodiadol, er mwyn cadw pellter cymdeithasol. Gallai modelau

Crynodeb cyflym

o’r fath gynnig mynediad hefyd i’r rhai sy’n cael anhawster i sefyll/aros mewn clinigau cerdded-i-mewn am gyfnodau estynedig[16] ond ni fyddent yn hygyrch i bobl nad oes ganddynt fynediad i gerbyd[14].

Nodwyd bod cynyddu’r nifer cyffredinol o fynychwyr ond lleihau arhosiad mynychwyr ar yr un pryd yn arfer effeithiol hollbwysig yn y clinigau brechu drwy ffenestr y car. Mae Tabl 3 yn darparu manylion ychwanegol am hwyluswyr y llif a’r ystod o ddigwyddiadau niweidiol posibl, strategaethau lliniaru posibl ac amcangyfrifon o’r risg o ddigwyddiadau niweidiol.

Roedd un model a nodwyd gan yr adolygiad systematig yn awgrymu y gallai pwyntiau dosbarthu niferus (h.y. cyfuniad o gyfleusterau cerdded-i-mewn traddodiadol a brechu drwy ffenestr y car) ar draws rhanbarth gynyddu’r llif hefyd gan gynyddu effeithlonrwydd.

Roedd y rhan fwyaf o’r ffynonellau yn astudiaethau achos disgrifiadol. Er y gall y rhain roi rhyw syniad o lif neu’r nifer o ddigwyddiadau niweidiol a nodwyd, nid yw’n bosibl dod i unrhyw gasgliad o ran pa un sy’n cynnig y llif mwyaf a/neu sy’n cyfyngu fwyaf ar ddigwyddiadau niweidiol posibl. Gallai gwahanol fodelau a lleoliadau fod yn briodol ar gyfer poblogaethau penodol.

Cyfyngiadau: Gallai’r crynodeb hwn fod yn ddefnyddiol er mwyn nodi pwyntiau allweddol ar y pwnc, fodd bynnag, nid yw ansawdd yr ymchwil a gynhwyswyd wedi’i asesu ac mae’n deillio o ystod eang o ddeunyddiau cyhoeddedig.

Dulliau

Mae chwiliad o gronfeydd data a llenyddiaeth lwyd a sgriniad (manylion ar gael ar gais) wedi nodi 25 o ffynonellau sy’n berthnasol i’r tri chwestiwn hyn. Cynhaliwyd y mwyafrif o’r gwaith sgrinio gan un adolygydd. Cynhaliwyd gwiriadau cysondeb ar fwy nag 20% o’r cofnodion. Ni chynhaliwyd unrhyw werthusiadau beirniadol o’r ffynonellau sydd wedi’u cynnwys. Dim ond ffynonellau o wledydd y Sefydliad ar gyfer Cydweithrediad a Datblygiad Economaidd (OECD) yn ogystal â Hong Kong, Singapôr neu Taiwan sydd wedi’u cynnwys.

Mae gwybodaeth fwy manwl o’r canllawiau a gyhoeddwyd yn 2020, yr adolygiad systematig a’r ymchwil sylfaenol wedi’u dyfynnu yn Nhablau 2-

4 yn yr adran echdynnu data. Caiff y tablau data eu grwpio yn ôl y math o ffynhonell.

Appendix

Table 1: Guidelines and resources for traditional mass immunisation clinics/programs

Reference	Scope of content
1. Centers for Disease Control and Prevention (CDC). Guidelines for Large Scale Novel H1N1 Influenza Vaccination Clinics. Atlanta, GA (US): CDC; 2009 [06/07/2020]. Available here	This document covers a range of point including: 1. Determining resource needs 2. Identifying Potential Clinic Sites 3. Obtaining authorisation to administer influenza vaccination 4. Planning training 5. Publicising the Clinic
2. Centers for Disease Control and Prevention (CDC). CDC guidelines for large-scale influenza vaccination clinic planning. Atlanta, GA (US): CDC; 2015 [06/07/2020]. Available here	This a webpage from CDC which is more recent and also provides guidelines for large-scale influenza vaccination clinic planning. It covers: 1. Leadership roles 2. Human resource needs 3. Vaccination clinic location 4. Clinic Layout and specifications 5. Crowd management outside the clinic 6. Crowd management inside the clinic 7. Clinic Security 8. Clinic advertising
3. Public Health Agency of Canada (PHAC). Canadian Pandemic Influenza Preparedness: Planning Guidance for the	This document includes programmatic lessons learned from the 2009 H1N1 pandemic and planning guidance for mass-immunisation clinics. It does not discuss drive-

Reference	Scope of content
Health Sector. Vaccine annex Canada: PHAC; 2017 [09/07/2020]. Available here	through models but does include a clinic algorithm as well as information on clinic planning and clinic operations
4. Contra Costa Health Services (CCHS). Mass vaccination point of dispensing walk-through clinic California (USA): CCHS; 2010 [06/07/2020]. Available here	This is a field operation guide (FOG) to assist the Point of Dispensing (POD) site manager and support personnel to establish and operate a non-traditional walk through clinic site (POD) to offer seasonal flu and other vaccinations.
5. Centers For Disease Control and Prevention (CDC). Large-scale vaccination clinic output and staffing estimates: An example. Atlanta, GA (US): CDC; 2009 [06/07/2020]. Available here	This document describes the different activities needed for the administration of influenza vaccine as well as examples of personnel estimates for clinic staffing.
6. Centers for Disease Control and Prevention (CDC). Resources for Hosting a Vaccination Clinic. Atlanta, GA (US): CDC; 2019 [06/07/2020]. Available here	This webpage links to tools that can be used when organising satellite, temporary or off-site vaccination clinics

Data extraction:

The tables below give the reference of the paper, access to the paper where freely available, key relevant findings, any considerations that arise and any caveats to bear in mind about the quality or limitations of the included articles.

Table 2: Guidelines that include recommendations for infection prevention and control at mass immunisation clinics

<table>
<tr><th>Reference</th><th>Summary of content relevant to the question</th></tr>
<tr><td>7. Military health system. Recommendations for Mass Immunization Events During Pandemic Conditions. Falls Church, VA (US): Health.mil; 2020 [06/07/2020] Available here</td><td>Written to support Department of Defence personnel preparing for mass vaccination events to include measures to decrease the risk of transmission for COVID-19. It has a focus on delivering influenza vaccine during a pandemic. It offers 3 models in non-healthcare settings.
<table>
<tr><th>Model</th><th>Benefits</th><th>Limitations</th><th>Location</th><th>Special considerations</th></tr>
<tr><td>Social Distancing Immunisation Clinics
Traditional large mass immunisation but distributed over larger indoor or outdoor physical area</td><td>Efficiency</td><td>Access by large numbers of persons in the same location over a short time period increasing transmission risk

Harder to control social distancing

Availability of adequate site</td><td>Outdoor
Track oval
Stadium
Large open field area
Indoor
Large gym
Cafeteria
Conference centre</td><td>Avoid high-risk participant clustering or bottlenecks such as from the parking lot to the entrance and exit to vehicles.

Encourage persons with difficulty walking to bring their own outdoor folding chairs. Planners can consider provision of wheelchairs or electric carts for elderly/handicapped, possibly with a reservation system.

Plan for weather requirements if the event will be outdoors.</td></tr>
</table></td></tr>
</table>

Reference	Summary of content relevant to the question				
			options at some locations.		
	Drive Through Immunisation Clinics	More effective social distancing strategy	Logistics and loss of efficiency Increased risk of poor immunisation technique due to positioning or anatomic injection site access	Consider location and timing to accommodate expected vehicle traffic flow and minimise impact on usual activities at selected location Planners will need to develop a circulation control plan accommodating motor vehicles and local traffic patterns. The plan may need to be able to accommodate splitting of lanes for screening stations, vaccination stations and parking for 15-minute wait.	Strict enforcement of the 15-minute wait is strongly encouraged for drivers. Proof of documentation could be withheld until after the 15 minute wait time is completed. Planning considerations need to include the ability to position the patient and vaccinator in correct orientation. Attention to correct technique and anatomic site selection and access need to be maintained to avoid vaccine injury due to inappropriate needle placement. Recipients could be expected to exit their vehicle (both vaccinator and patient standing) or use of chairs next to vehicle (both sitting) or vaccinators next to open car doors (sitting). Planners may consider minimum age limits for this event, as young children cannot reliably comply with positioning and with physical requirements while in a vehicle.

Reference	Summary of content relevant to the question

Mini mobile teams Delivery of immunisation services by small teams at multiple sites.	Decreases large groups in a same/new setting, both simultaneously and over several hour period. Keeps exposure contained within these groups.	Logistics and potential loss of efficiency of moving small teams to multiple locations Lack of control of those locations Documentation challenges		Sites may be scheduled in appointment time blocks. Medical officers at each site could be responsible for planning and implementing physical logistics and designing throughput at their individual sites.

Specific modifications, relevant to all models of mass immunisation clinics, to support infection prevention and control include:

- Additional resource planning for handwashing stations
- Plan for PPE disposal
- Pre-screening for CVOID-19 by appropriately PPE garbed staff and appropriate referral as per local policy, or an alternative of no screening if all at the site socially distance and mass vaccination staff have appropriate PPE
- Electronic screening and registration completion prior to individuals arriving at the site of the mass immunisation event.
- Electronic information about the vaccine prior to the event or large signage with QR codes at the event
- Back up screening, registration and vaccine information documentation on paper
- Planning for fomite management at immunisation sites to include source control, cleaning, disinfection and disposal measures.

<table>
<tr><th>Reference</th><th>Summary of content relevant to the question</th></tr>
<tr><td></td><td>Utilisation of appointment/ appointment block systems for groups or individuals allows for better simultaneous attendance management. Other less structured approaches could utilise timing with sorting mechanisms such as family surnames (e.g. letters ABC arrive 08:00-09:00).
Strategies to lower risk for persons in high risk categories to COVID-19 may also be considered. Consider alternative smaller events or limited attendance time blocks for identified high-risk groups.
Site consideration to include the ability to maintain social distancing with seating and emergency response access to patients throughout the clinic process including post vaccination observation.
Staff availability may be affected by pandemic conditions and need to be accounted for
Publicity for the clinic to include information about the social distancing strategies that will be employed and their purpose and whether facial covering would be required
Discouraging travel to a vaccination site by persons
not receiving a vaccination, unless they have no household alternative,
symptomatic or ill individuals or persons with recent exposure</td></tr>
<tr><td>8. Government of New South Wales (NSW). Drive-in Immunisation Clinics: Advice for providers during COVID-19 response Sydney (Australia): NSW Government; 2020 [06/07/2020]. Available <u>here</u></td><td>This document was published as guidance for GP practices considering vehicle – based influenza clinic option where no other suitable options are available. Amongst other advice it covers the environment to promote safe physical distancing and avoiding shoulder injury when vaccinating. Some specific items from this document included for mass drive-through clinics to support infection prevention and control include:
Clinic staff must not attend work if they are unwell
Signage adjacent to the immunisation parking bays advising patients not to exit their vehicle unless instructed to do so by clinic staff or in the case of an emergency
Patients advised not to arrive in advance of their appointment
Providers should deliver all vaccinations from the outside of the vehicle. It is acceptable to request that the patient open the car door to allow adequate visualisation of the deltoid area and minimise the risk of inappropriate administration and Shoulder Injury Related to Vaccine Administration (SIRVA). Expose the entire upper arm so that landmarks are easily discernible and find the correct injection site.</td></tr>
</table>

Table 2: Systematic reviews

Reference	Summary of content relevant to the question	Comments
9. Buck BH, et al. Effective Practices and Recommendations for Drive-Through Clinic Points of Dispensing: A Systematic Review. Disaster Medicine and Public Health Preparedness. 2020:1-15. Available here.	The objective of this systematic review was to identify effective practices and recommendations for implementing drive-through clinics (DTCs) for mass prophylaxis during emergency events. It included 13 studies. Review authors note that "**optimal dispensing of mass prophylaxis can be achieved by using (DSSs) and decision support tools** to plan and optimise DTC layouts, location, staffing resources, capacity, medication decision making, disease propagation, attenuation strategies and multiple POD modalities - and through proper staff training, effective traffic management, the establishment of communication channels within the DTC and among participating stakeholders, the provision of sufficient PPE and DTC equipment, and the development and deployment of effective community outreach methods to ensure that the DTC attracts as much of the community as possible." **Locations** in descriptive studies of DTCs included a large covered parking structure, open parking lots, a large stadium, and an enclosed school bus garage. Beneficial **clinic design** aspects identified included: • A large spatial arrangement which allowed vehicles to stack up • Locations near major intersections and streets to increase visibility and accessibility • Screening or triage at the beginning to allow staff to identify patients in need of special assistance • An emergency bypass lane to allow exit from the normal processing lanes should the need arise	The quality of included research was not assessed. Most studies included were descriptive (7/13 studies), four were models / simulation studies and two were summary articles. Studies were heterogeneous and did not allow for adequate comparison and contrast of practices limiting the ability to ascertain best practices. This review was specifically interested in throughput and safety. Authors note that these studies describe simulations or practice events and add that in a real-world emergency, such services may be strained by a large influx of stressed, anxiety-stricken community members inducing a more chaotic environment.

Reference	Summary of content relevant to the question	Comments
	• An evaluation station between registration and dispensing station to determine correct medication for each patient • Use of colour coded tents to help patient identify specific stations In terms of **staffing** allocating registered nurses to clinical stations where they were more familiar with clinical terms was found to be effective. **Increasing overall participant throughput while decreasing participant length of stay** was identified as a critical effective practice. This was facilitated through: • Use of decision support systems and tools • Staff increases when and where necessary • Thorough staff training on the registration form format (i.e. registration station was often found to be the most time-consuming station) • Registration forms provided in large, single-sided print, verbally administered surveys/registration forms, and forms that were completed while patients were in queue helped decrease throughput times • Vehicle stacking at each station allowed the evaluation of multiple vehicles simultaneously • Specification of the optimal number of patients per vehicle (i.e. 3 to 4 patients based on resources and DTC capacity) and encouragement of carpooling • Small trays with supplies carried by multiple staff members allowed vaccination of multiple patients per vehicle • Having plans that address inquisitive patients in a way that decreases questions and maximises throughput	

Reference	Summary of content relevant to the question	Comments
	• One modelling study found that multiple points of dispensing (i.e. combination of traditional walk-ins and DTCs) across a region could also decrease throughput time. A vehicle acting as an isolation chamber was considered a unique advantage of DTCs over traditional walk-in clinics to maintain social distancing. Other strategies and recommendations identified in the included studies to **prevent infection propagation** were: • Screening and triage for patients and staff, e.g. visual screening, measuring temperature, direct questioning or a combination of these techniques • Infection prevention training • Proper hand hygiene • Occupational health techniques • Environmental decontamination • Sufficient and appropriate PPE provision • Potential disease-propagation evaluation within the DTC assessed pre-event so mitigating strategies could be employed **Adverse event prevention** was identified as crucial to DTC implementation. Possible adverse events included carbon monoxide (CO) exposure, aggressive pet interactions. Other issues such syncopal episodes and adverse reactions to medications, vehicle accidents, lane blockage and delays in the transport of critically ill patients are discussed and covered by the OES response to Q6.	

Reference	Summary of content relevant to the question	Comments
	Exposure to toxic levels of CO was primarily a concern for indoor/ sheltered DTCS that lacked sufficient ventilation *Possible mitigation* • Shutting off vehicles before staff approached • Identifying vehicles in disrepair with potential to emit high levels of CO before entrance and processing those outside or in an expedited fashion. *Suggestion* • Purchasing CO monitors or collaborate with local agencies for access to wearable CO monitors for staff. Vaccination of patients outside vehicles is suggested if patients are accompanied by **aggressive pets**. **Contraindications** to medication were avoided through utilisation of a medication algorithm. A review article, included in the systematic review, gave the following estimates for adverse events based on 15 years of DTC data: • The highest probability of an adverse event (syncopal or vehicular accident) occurring during a 2-day DTC event (16 hours) was estimated to be 0.8 percent. • 1 adverse event will occur for every 2.5 million immunised	

Table 4: Primary research published in peer-reviewed journals

Reference	Summary of content relevant to the question	Comments
Papers involving a venue which is not a school		
10.Banks LL, et al. Throughput times for adults and children during two drive-through influenza vaccination clinics. Disaster Medicine & Public Health Preparedness. 2013;7(2):175-81. Included in SR (9) Available here Descriptive case study, US	Describes throughput times for adults and children during two drive-through influenza vaccination clinics located in non-enclosed parking lots. The median length of stay and the time to administer vaccinations based on the number of individual vaccinations given per vehicle were calculated. Vehicles in which children (aged 9-18 years) were vaccinated to those in which only adults were vaccinated were also compared. Each vaccination station (table and tent) was staffed by 15 to 20 students or instructors. After a vehicle came to a stop, participants could ask questions regarding the vaccination process or the forms, and then were administered the vaccination in the upper arm, usually while remaining in the vehicle. Multiple vaccination per vehicle were managed by multiple students who carried small trays with their supplies. Multiple vehicles per lane were processed simultaneously as students became available. **Findings:** The median throughput time 5 minutes, median vaccination time 48 seconds. Optimum number of vaccinations per vehicle to maximise efficiency was between 3 and 4. The data suggest a maximum effect at the level approaching 4 people per vehicle, possibly due to the physical challenge of vaccinating people in interior seat positions and the need for these passengers to exit the vehicle.	Authors report that throughput time measured as time the vehicle entered a processing lane until it left via the single exit out of the parking lot. This measure does not include the time required to review vaccination information statements and sign vaccination consent forms. Participants who had additional questions or who required special processing because of physical needs were directed out of the processing lanes and into a pre-selected area to prevent traffic congestion. Thus these figures do not reflect the overall process time or include any special processing. Given the times specified for throughput and a lack of detail in the paper it is unclear how

Reference	Summary of content relevant to the question	Comments
	The presence of children raised the total number of vaccinations given per vehicle and, therefore, the total vaccination processing time per vehicle. However, the median individual procedure time in the vehicles with children was not significantly increased, indicating no need to calculate increased times for processing children 9 years of age or older during emergency planning. Authors note that delivery of medical countermeasures (MCM) via drive-through clinics potentially mitigates some barriers to successful dispensing, particularly during severely hot and cold weather and for participants with mobility impairments and pose less risk of disease transmission although infection control practices must still be followed to protect workers. They also suggest the model could be complementary to walk-in clinics in that many of those might pose difficulties to some potential recipients because of a lack of available parking. They add that human behaviour caused by the fear or uncertainty related to a public health emergency would also be different during a crisis and would result in tight security processes and traffic control that would likely have a negative impact on throughput time.	post vaccination observation was managed and accounted for as part of the time needed for the process.
11. Capitano B, et al. Experience implementing a university-based mass immunization program in response to a meningococcal	Describes the implementation of a university-based mass immunisation program in response to a 2015 meningococcal B outbreak in Oregon. Following the death of the fourth MenB case, the University received a joint recommendation from the CDC, State Health Authority and County Public Health to vaccinate 22,000 students at the earliest opportunity.	Does not discuss infection control or social distancing. It might contribute insight on locations, resource requirements and potential to access students as a group

Reference	Summary of content relevant to the question	Comments
B outbreak. Hum Vaccin Immunother. 2019;15 (3):717-24. Available here. Descriptive case study, US	Four mass immunisation “opt-in” clinics, a number of smaller clinics and arrangements with local pharmacies were set-up. The mass immunisation clinics took place at the campus sports arena. This provided sufficient space to allow for the several sequential checkpoints and stations required for appropriate handling and flow of approximately 22,000 eligible students. **Findings:** Approximately 30 staff volunteers from the University participated in each clinic shift; approximately 2000 person-hours were logged by staff over the course of four mass-immunisation clinics. These four clinics immunised 8014 students.	It also demonstrates using complementary approaches such using pharmacies to reach desired levels of coverage.
12. Hays A, et al. Fostering Interprofessional Education Through a Multidisciplinary, Community-Based Pandemic Mass Vaccination Exercise. American Journal of Public Health. 2018;108(3):358-60. Available here. Descriptive, US	Describes the four-year experience (2011 to 2014) of a community-based pandemic mass vaccination single-day event targeted at economically disadvantaged individuals in Northern Illinois USA. Medical, pharmacy, and nursing student volunteers from regional four-year universities and colleges in and around the Rockford, Illinois region, were recruited to participate in the planning and execution of the event. Local community outreach organisations such as food banks and homeless shelters were chosen as points of distribution on the basis of participation requests, location, and accessibility to the economically disadvantaged population. **Findings:** The paper (table 1 below) gives an indication of the number of students used in each single-day event, the number of sites and the number of vaccinations provided.	Reported that local community outreach organisations (e.g. food banks, homeless shelters) were used as points of distribution, but did not specify the exact ones Does not discuss social distancing measures.

<table>
<tr><th>Reference</th><th>Summary of content relevant to the question</th><th>Comments</th></tr>
<tr><td></td><td>
<table>
<tr><th colspan="5">TABLE 1—Student-Driven Mass Vaccination Event Results: Rockford, IL, 2011–2014</th></tr>
<tr><th></th><th>Year 1: 2011, No.</th><th>Year 2: 2012, No.</th><th>Year 3: 2013, No.</th><th>Year 4: 2014, No.</th></tr>
<tr><td>Sites</td><td>1</td><td>4</td><td>12</td><td>13</td></tr>
<tr><td>Partners</td><td>3</td><td>6</td><td>9</td><td>28</td></tr>
<tr><td>Student volunteers</td><td>30</td><td>150</td><td>150</td><td>>200</td></tr>
<tr><td>Vaccinations administered</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>150</td><td>430</td><td>650</td><td>839</td></tr>
<tr><td>Flu</td><td>150</td><td>430</td><td>650</td><td>524</td></tr>
<tr><td>Tdap</td><td>0</td><td>0</td><td>0</td><td>315</td></tr>
</table>
</td><td></td></tr>
<tr><td>13. Lam AY, et al. Establishing an on-site influenza vaccination service in an assisted-living facility. J Am Pharm Assoc (2003). 2008;48(6):758-63.

Available here.

Descriptive,
US</td><td>Describes a pharmacist-conducted pilot project to implement an on-site influenza vaccination service delivered in an assisted-living facility (ALF) serving indigent, multi-ethnic, older Asian adults.

Setting was a 75-unit senior housing complex in Seattle during the 2004 flu season. Patients were 58, older Asian adult patients; 44 were ALF residents and 14 were adult day but independent-dwelling clients. The majority of the ALF residents received medical care in an adjacent community health clinic, which has an on-site pharmacy. The pharmacy resident of the clinic completed this pilot project during the flu season in 2004.

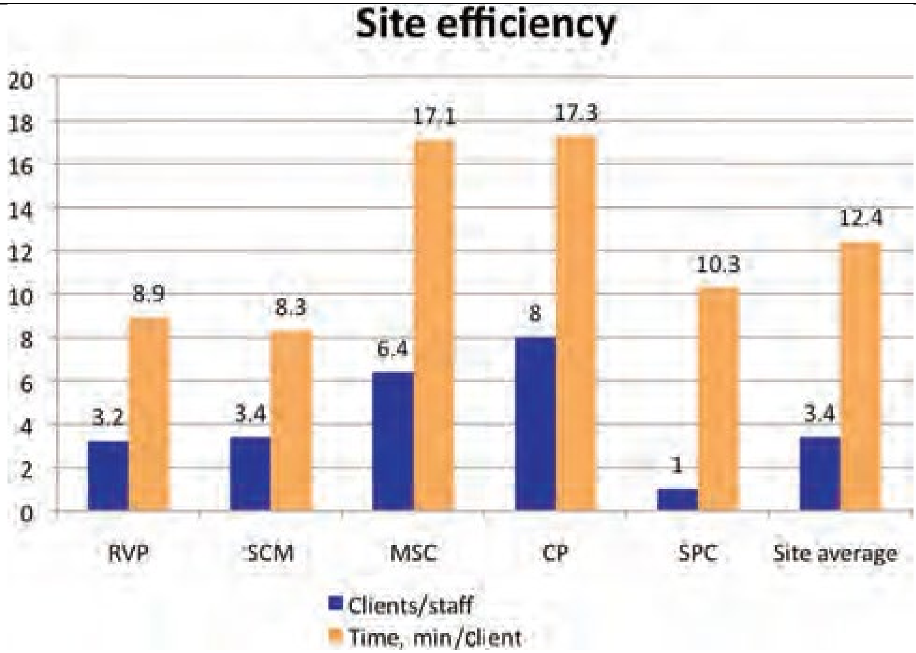
Implementation of the pilot service were as follows:
1. Pre-implementation planning</td><td></td></tr>
</table>

Reference	Summary of content relevant to the question	Comments
	2. Establishing vaccination policy and procedures 3. Educating staff and clients 4. Conducting chart review 5. Vaccine administration **Findings:** In two 2-hour sessions, 58 ALF residents and adult day health clients (age 83.5 ± 7.7 years [range 65–98]) were vaccinated. The immunisation rate in the population improved from 64% in the previous year to 83% with the on-site service. No incidents of adverse or allergic reaction occurred. Both the clients and the facility staff rated the service highly. The pharmacist spent a total of 22 hours in vaccination-related activities; of these, 11 hours were spent in preparation, implementation, and documentation. Another six hours were spent conducting chart reviews and five hours performing patient education. This paper notes advantages of onsite vaccination for this population as • Improved access and convenience for those with a lack of mobility • Time-saving for assisted living facility staff • Improved safety for residents by avoiding the risk of falls during travel	
14. Kwon KT, et al. Drive-Through Screening Center for COVID-19: a Safe and Efficient Screening System	Describes a drive-through (DT) screening system for COVID-19 and notes advantages and limitations of adopting this system. Model used four steps: registration, examination of body temperature, specimen collection and instructions. The DT system was adopted by 68 COVID-19 screening centres in Korea.	Describes drive through COVID-19 screening model but may be relevant to mass vaccination

Reference	Summary of content relevant to the question	Comments
against Massive Community Outbreak. J Korean Med Sci. 2020;35(11):e123. Available here. Descriptive case study, Korea	**Findings:** The entire service takes about 10 minutes for one test (one third shorter than the conventional screening process) thereby increasing testing capacity to around 100 tests per day. Authors note the following points which may also be relevant to drive through vaccination: • Large parking lot preferred. Small parking lots can work if you have appointments. • Entrance and exit should be strictly guided and movement controlled at every step • Participants not to leave their cars • All communication made via mobile phone except for specimen collection • An open tent or temporary building can be used for work booths. Open tents are lower cost and provide natural ventilation but are vulnerable to the outdoor environment, including weather conditions. A temporary building type has higher initial costs but is more secure for healthcare workers (HCWs) and equipment within the facility against outdoor conditions. This can be used as either a clean or contaminated zone depending on the design of the process. • Personal protective equipment (PPE) of inner and outer gloves, N95 respirator, eye–shield/face shield/goggles, and hooded coverall/gown was required for the HCWs who may have direct contact with testees. Composition of PPE can be adjusted depending on the level of contact with the testees and/or supply capacities. Continuous work over 4 hours wearing a N95 respirator should be avoided, rotating work is preferable	

Reference	Summary of content relevant to the question	Comments
	• Disposable gowns and gloves worn over PPE and changed between testees as well as hand sanitisation • For public information, a simplified illustration of the DT COVID-19 screening centre should be provided through internet websites or leaflets **Advantages reported by the authors:** • Prevention of cross-infection between attendees in the waiting space • Improved efficiency over walk-in centres in terms of cleaning requirements **Disadvantages reported by the authors:** • Protection of staff from the outdoor atmosphere is challenging. A warming source near healthcare workers is recommended in cold seasons • Dehydration may matter in the case of long working time wearing PPE • Prompt management for the medically unstable participants may be limited if the DT screening centre is located far from hospitals. • Only attendees with their own cars can visit the DT screening centre	
15. Lawrenz J, et al. A community outreach influenza vaccination drive as a model for mass disaster prophylaxis. Am J Disaster Med. 2013;8 (4):287-92.	Describes a community outreach influenza vaccination drive targeting homeless and impoverished individuals, conducted in October 2012, as a model for mass disaster prophylaxis. Point of dispensing (POD sites) were at local churches or a food pantry working with these individuals. Four of the five sites were indoors using church facilities, whereas the fifth site was inside a decontamination tent outdoors and adjacent to the food pantry.	It is unclear from the paper whether data given for site efficiency documents time for vaccination only or whether it includes other healthcare services provided

Reference	Summary of content relevant to the question	Comments
Available here. Descriptive case study, US	Clients were directed through the vaccination line in the following sequence: registration, informed consent, review of registration information (including allergies), and vaccination administration. The food pantry site offered blood glucose and blood pressure measurements in addition to vaccination. Medical education and referral information was also offered to recipients based on individual needs. **Findings:** During this 1-day vaccination effort, 430 individuals of the at-risk population were vaccinated against influenza. Approximately, 120 students (medical, pharmacy and nursing) and faculty volunteers were distributed to five PODs. The average time per recipient was 12 minutes and 24 seconds (range 8 min 18 seconds - 17 min 18 seconds). Throughput times were higher in sites with a greater number of clients (e.g. food pantry) and in sites having a lower client to staff ratio.	

Reference	Summary of content relevant to the question	Comments
	 Site efficiency, as measured by both client to volunteer staff ratio, and by time (minutes) per client. RVP, Rock River Valley Food Pantry; SCM, Shelter Care Ministries; MSC, Morning Star Church; CP, Carpenter's Place; and SPC, St. Paul Church of God in Christ.	
16. Rega P, et al. Using an H1N1 vaccination drive-through to introduce	Describes an H1N1 vaccination drive-through used to introduce healthcare students and their faculty to disaster medicine at parking lot on a University Campus. This paper has been included in the systematic review on drive-	

Reference	Summary of content relevant to the question	Comments
healthcare students and their faculty to disaster medicine. Am J Disaster Med. 2010;5(2):129-36. Included in SR (9) Available here. Descriptive case study, US	through clinics as a point of dispensing (9) and most points are covered by data extraction of that reference. The drive through was setup with a leadership meeting at 8am, teams meeting at 9am, vaccination starting at 10.30 and ongoing until 3pm. More than 700 vaccinations were delivered in this time period. Numbers of staff volunteers are unclear in the paper but suggest a minimum of 84 people. This reference does note to make sure the tents and tables at vaccination PODs were large enough for the purpose. It also includes a diagram of the traffic flow and interestingly includes a separate lane for those attending but ineligible for the vaccine to exit quickly. Authors suggest drive-through clinics as useful for special-needs populations unable to stand, walk and wait for long periods of time e.g. pregnant, elderly, families with small children.	
17. Shenson D, et al. Polling places, pharmacies, and public health: Vote & Vax 2012. American Journal of Public Health. 2015;105(6):e12-5. Available here. Descriptive case study,	Describes the 2012 Vote & Vax programme in which vaccination clinics were deployed in 48 US states; Washington, DC; Guam; Puerto Rico; and the US Virgin Islands. Vote & Vax was designed to coordinate the delivery of flu shots through an informal network of community vaccine clinics established by local immunisers at or near polling places. In 2012 Vote & Vax established partnerships with local, regional, and national pharmacy chains. Pharmacies did not provide financial support but were invited to deploy staff at nearby polling places or to create an Election Day event in their retail pace.	

Reference	Summary of content relevant to the question	Comments
US	**Findings:** 1,585 vaccination clinics were deployed. Approximately 934 clinics were located in pharmacies, and 651 were near polling places. Election day polling place clinics delivered more vaccines than did pharmacy clinics: 5,710 (8.8 vaccines per polling place clinic) versus 3,669 (3.9 vaccines per pharmacy clinic). The delivery of vaccines was estimated at 9,379, and approximately 45% of the recipients identified their race/ethnicity as African American or Hispanic. More than half of the White Vote & Vax recipients and more than two thirds of the non-White recipients were not regular flu shot recipients.	
18. Swift MD, et al. Emergency Preparedness in the Workplace: The Flulapalooza Model for Mass Vaccination. American Journal of Public Health. 2017;107(S2):S168 -S76. Available here. Descriptive case study, US	Describes the Flulapalooza model, closed POD model for mass vaccination in the workplace. This was a 1-day event in an outdoor tent at a University Medical Centre in Tennessee, conducted over five successive years (2011-2015). Describes how the process has developed and lessons learned from continuous quality improvement. Diagrams of the before and after layouts, details on clinic operation and training are available in the full paper as well as detailed table of lessons learned. **Findings:** 66,591 influenza vaccines were administered to Vanderbilt employees and students at Flulapalooza events between 2011 and 2015. On average, 13,318 vaccinations per event. The greatest (14,681) was in 2011.	The first event was an official challenge to the Guinness World Record for most vaccinations in an 8-hour period.

Reference	Summary of content relevant to the question	Comments
	The number of vaccines given for each hour of vaccinator time was lowest in 2012 (37.1 vaccines per vaccinator-hour) and highest in 2013 and 2015 (66.7 vaccines per vaccinator-hour). Changes to the physical layout, staffing mix, and documentation processes improved vaccination efficiency 74%, from approximately 38 to 67 vaccines per hour per vaccinator, while reducing overall staffing needs by 38%. Improvements in efficiency were said to be primarily as a result of • Maintaining short clear sightlines between greeters and vaccination stations to minimise vaccinator down time • Using electronic documentation through a touch screen mobile app • Providing substantial non nursing assistance to vaccinators A flag system at each vaccination station allowed vaccinators to raise colour coded flags to summon appropriate supplies or support. Authors suggest businesses, universities, and health care institutions may adopt such onsite vaccination strategies. However, they noted that in this model most participants do not sit down to receive their vaccine and not being required to complete any paperwork, which was acceptable to health care employees, may not be appropriate for a different population. In terms of efficiency, health care and military employers have several advantages that allow for high volume, fast-moving vaccine clinics: access to electronic eligibility files or rosters of employees that reduce the amount of demographic data to collect, employee ID cards with magnetic stripes or electronic chips to eliminate paper registration forms, and an exclusively	

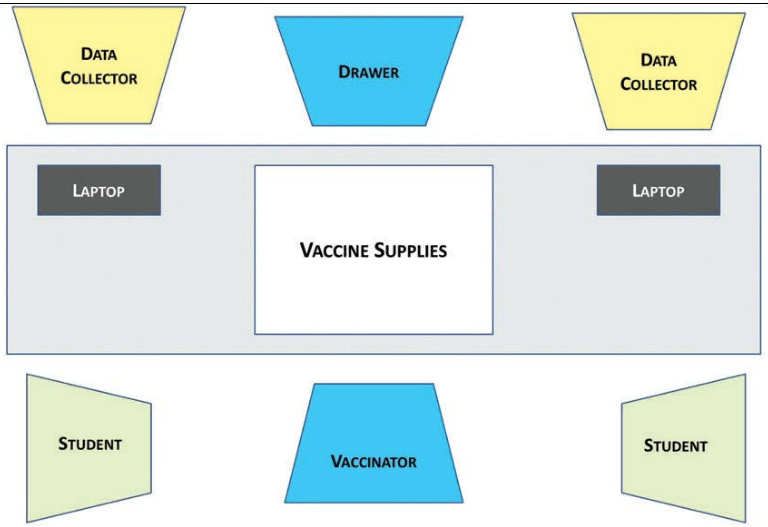
Reference	Summary of content relevant to the question	Comments
	adult population with a low prevalence of illiteracy, language barriers, and other special needs.	
School venues (school-aged or whole community vaccination)		
19. Carr C, et al. Australia's first pandemic influenza mass vaccination clinic exercise: Hunter New England Area Health Service, NSW, Australia. Australian Journal of Emergency Management. 2011;26(1):47-53. Available [here.](#) Descriptive case study, Australia	Describes a pandemic influenza mass vaccination clinic field exercise in a local school conducted in a rural community of 1800 people aged over 6 months in Australia in 2008. The exercise which tested the NSW pandemic influenza mass vaccination clinic response protocols with the aim of evaluating and refining the plans. School front entrance was used as the clinic entry point and each individual was directed and timed through seven stations as per the State Plan: (1) greet, (2) fever assessment, (3) registration, (4) pre-vaccination assessment, (5) clinical administration station, (6) vaccine administration and (7) post-vaccination observation and exit. Registered nurses rotated between the roles of vaccinator and pre-vaccination assessor to alleviate the repetitive nature of tasks and to maximise proficiency. Vaccines were provided in pre-filled syringes. Licensed security officers stationed at the entrance provided support to clinic staff members isolated from main clinic stations. Seven evaluators rotated through clinic stations hourly, using a standardised reporting tool for recording observations and reviewed each clinic function against the effectiveness and efficiency of each position. Detailed time and flow analysis data were collected from each of the seven clinic stations using calibrated clocks to standardise arrival and departure times. After Action	Does not state that social distancing measures were employed.

Reference	Summary of content relevant to the question	Comments
	Reviews (AARs) were convened immediately following the exercise to solicit key points of impact in the running of the exercise. **Findings**: It is unclear exactly how many staff were involved in running the clinic. However, from figure 1 in the paper we estimate this to be 17 or fewer. 498 clients were vaccinated at the clinic over the six hour period. The median time from greeter to post-observation was 22 minutes. The paper provides transition times through the clinic stations and reports considerable variation in the movement through the various stages of the clinic which resulted in periodic bottle-necks during high throughput periods.	

Time (in minutes) through clinic stations						
Time (minutes)	**Station 1-2** Greeter to fever assessment	**Station 2-3** Fever assessment to registration	**Station 3-4** Registration to pre-vaccination	**Station 4** Pre-vaccination to vaccination	**Station 5-6** Vaccination to post-observation	**Station 1-6** Greeter to post-observation
Median	5	7	4	1	4	22
IQR	4	5	4	0	3	12
Range	49	26	15	7	16	78
Maximum	50	26	15	7	16	82

Reference	Summary of content relevant to the question	Comments
	A third of clients (162) failed to leave after the appointed fifteen minutes post-vaccination observation period despite experiencing no vaccine adverse effects. No significant adverse event following vaccination and no safety incidents were reported during the exercise. Vaccinators were initially seated but after the first hour were requested by their Team Leader to stand in order to increase the throughput of their station. Some vaccinators subsequently reported leg and back strain after continual bending to sign vaccination record cards and service records. The paper includes a diagram of the flow of clinic operations as per plan and a revised diagram post exercise with fewer stations. Key issues included: • the number and distance between stations • formal consent and vaccinator documentation requirements • the lengthy post-vaccination observation period • the need for surge capacity, rapidly deployed, to maintain clinic flow. Suggestions by authors to improve throughput include: • more rigorous marshalling of individuals to prevent straying • vaccinators' role should be limited to vaccinating • dispensing with documentation by both clients (written consent) and vaccinators (signing vaccination records) • observation station could be replaced by a first aid point preventing bottle-necks post-vaccination, while simultaneously reducing the risk of contact with undiagnosed cases of pandemic influenza	

Reference	Summary of content relevant to the question	Comments
	Authors also note volunteers could effectively replace health staff for all but clinical roles which would minimise the burden on health services during a pandemic. After evaluation the value of a school as a venue, the need for marshalling to keep the clinic flowing and to get recipients to leave the site, streamlining documentation requirements and the value of having the ability to re-deploy staff within the clinic to meet surge at particular stations were noted. However, the exercise was not re-run to capture data on throughput following implementation of these suggestions.	
20. Caum J, et al. Ready or not: analysis of a no-notice mass vaccination field response in Philadelphia. Biosecurity bioterrorism. 2013; 11(4):262-70. Available here. Descriptive case study, US	Reports a no-notice, unscripted mass influenza vaccination field response for students at an all-boys boarding school in Philadelphia in 2013. Philadelphia Department of Public Health's mass vaccination model typically used a 3-person team (vaccinator, drawer, and data collector) and a range of vaccination stations depending upon the scale of the response. Previously held field responses had established a baseline vaccination range of 32 to 45 individuals processed per station per hour. **Findings:** Paper includes the layout of the vaccination station used for this exercise which involved a 4-person team one of which was clinical. 52 students were vaccinated with no adverse events in 54 minutes, for a vaccinator rate of 57.8 vaccinations per hour. The model was saturated providing a steady stream of work for the vaccination team until completion.	Does not discuss social distancing measures

Reference	Summary of content relevant to the question	Comments
	 Authors however, discuss that staff raised issues of fatigue and the potential for such high-throughput to affect shift-length. Additional factors that facilitated the rapidity of this vaccination process: • Patients waiting in line were instructed to roll up their left sleeves • When patients sat down, they were asked to expose their left deltoid muscle to the vaccinator • The vaccinator was able to pick up a syringe, vaccinate that patient, and then turn to the waiting patient as a new patient was being seated	

Reference	Summary of content relevant to the question	Comments
	• Standardisation of injection site was also helpful to the data collectors, who are required to record the site of the injection to facilitate adverse event tracking • Students were asked to write their names on the vaccination information statements because they were unfamiliar and in different languages and this expedited data entry • School staff dealt with marshalling students to the clinic	
21. Cummings GE, et al. Successful use of volunteers to conduct school-located mass influenza vaccination clinics. Pediatrics. 2012;129 (Supplement 2):S88-S95. Available here. Mixed methods, feasibility study USA	Describes a public health programme conducted during autumn 2005, to determine the feasibility of using medical and lay volunteers to assist in school-located vaccination clinics for influenza. The programme was for healthy children in grades K to 5 in any of the 21 public elementary schools in the Carroll County Public School District. Medical volunteers included physicians, nurses, and pharmacists, and were responsible for administering intranasal vaccine (live, attenuated influenza vaccine [LAIV]). The planning committee estimated that between two and four medical volunteers would be needed per school on each vaccination day. Each public elementary school provided two to three parents or lay staff volunteers to assist the medical volunteers on vaccination days. Fact sheets and consent forms were distributed to parents in mid-September 2005. A signed consent form indicated to volunteers that the student was planning to participate. **Findings:** Overall, 5,319 (44%) of the 12,090 children enrolled in the 21 schools were vaccinated with at least one dose of LAIV. Of the estimated 3,547 (66%) children eligible and consenting to receive a second dose, 3,124 (88%)	Does not discuss social distancing measures.

Reference	Summary of content relevant to the question	Comments
	received it. In total, 8,806 doses of LAIV were administered. At each clinic, staff vaccinated between 132 and 381 (median, 219) children, representing between 32% and 51% (median, 44%) of those children eligible for LAIV vaccine at each school. Additionally, 363 elementary school teachers and staff (90%) received LAIV, ranging from six to 28 (median, 13) in each school. Programme occurred over eight days. Health department nurses worked 42 person-days assisted by medical and allied health professionals volunteering 87 person-days without compensation, totalling 581 person-hours. School nurses reported that collection and organisation of the consent forms before vaccination required ~20 to 40 hours per school. Medical volunteers each spent an estimated 4.5 hours in their assigned schools, administering an average of 15 doses of LAIV per volunteer per hour, including setup and clean-up time in the school, but not including the estimated 1.5 hours needed for training (45 minutes), distribution of vaccine (15 minutes), and travel. In addition at each school two lay volunteers helped medical volunteers prepare the vaccination area and escort the children. Few immediate adverse reactions to vaccination were encountered; none were serious. One pupil was mistaken for another child and vaccinated without parental consent after a breach in protocol.	
22. Curtis MP, et al. Community collaboration in a community H1N1	Describes the processes involved in planning a community H1N1 vaccination programme in St. Louis County USA.	

Reference	Summary of content relevant to the question	Comments
vaccination program. Journal of Community Health Nursing. 2010;27(3):121-5. Available here. Descriptive, USA	On one day in 2009 a County Health Department, assisted by the County Medical Reserve Core (MRC), offered free H1N1 vaccinations at five different high schools in St. Louis County. A mock vaccination exercise beforehand utilised and evaluated the County public vaccination clinics' plans of the Pandemic Influenza Plan, and provided hands-on training for the County Medical Reserve Unit and nursing students from local schools of nursing. Supplies of vaccines were limited so vaccination was limited to compliance with the restricted tier 1 priority groups identified by CDC (pregnant women; children from 6 months to 4 years; caregivers of, and those who live with infants, under the age of 6 months; youth from 5 to 18 years with an underlying health condition that makes them more susceptible to flu complications; and emergency medical service personnel and healthcare workers). Line tickets were distributed beginning one hour prior to the opening of the flu clinics. The line tickets were distributed at a drive-thru distribution area, which expedited the process and avoided long line delays. **Findings:** A total of 5,446 (range = 368–1460; M - 1089; Median = 1197) vaccinations were administered between 8:30 a.m. and 4:30 p.m. with the assistance of 28 nurses from the St. Louis County MRC unit, 106 nurses the from St. Louis County Department of Health, and 107 student nurses.	

Reference	Summary of content relevant to the question	Comments
	The greatest numbers of vaccines were administered between 8:30 am and 11:30 a.m. (3,089 (56.7%). Greatest number of vaccines administered during any one hour at any site was 406 (7.5%), this occurred between 9:30–10:30 a.m. The overall hourly vaccination rate was 136. There were no reported administration errors. Patient flow through the clinic was described as efficient, with minimal wait time and without critical incidents.	
23. Jenlink CH, et al. Influenza Vaccinations, Fall 2009: Model School-Located Vaccination Clinics. Journal of School Nursing. 2010;26(4S):7S-13S. Available here. Descriptive case study, US	Describes models of school-located vaccination (SLV) programs in the US during 2009 H1N1. Only one of these models give data related to throughput. **Findings:** Using a County Health Department model in Illinois, three SLV clinics vaccinated 11,200 in a 5 hr period on one day in October 2009. Appointments were scheduled for every 5-8 minutes. With a need for 200 staff and volunteers at each school, the health department turned to nursing students and agency nurses. School staff and parent volunteers also assisted with the effort.	
24. Narciso HE, et al. Description of a large urban school-	Compared consent and vaccination data for three different schools-based models for the 2009 H1N1 influenza season in New York City.	

Reference	Summary of content relevant to the question	Comments
located 2009 pandemic H1N1 vaccination campaign, New York City 2009-2010. Journal of Urban Health. 2012; 89(2):317-28. Available here. Descriptive case study, US	Three main strategies were employed: • In schools with an enrolment of <400 students, the on-site school nurse was responsible for vaccinating children with signed consent forms; this was in addition to regular duties and largely not done as dedicated clinics. • For schools with 400–600 students, a supplemental contract nurse was assigned for 3–4 days to assist the school nurse with vaccinations. • In schools with >600 students, mobile vaccination teams were assigned for 1–2 days per school. Teams were staffed with eight to nine people: one team leader, three to four support staff, and four nurse vaccinators. It was assumed that each of four nurses supported by a team could vaccinate up to 100 students per school day (300–400 students per team). A school nurse and contract nurse together were expected to vaccinate 40 students per day, while a school nurse alone was expected to vaccinate 10 students per day. **Findings:** Overall, the team model was used most often and predominantly in public schools. Similar consent rates and average vaccination rates were seen across all models; approximately 27% of students had consents, leading to an overall vaccination rate of ~21%. Teams achieved an average of 123 first dose vaccinations per vaccination day. The school nurse plus contract nurse and school nurse models achieved an average of 14 and nine first dose vaccinations per vaccination day, respectively.	

Reference	Summary of content relevant to the question	Comments
	The number of children vaccinated per day by the team model, in particular, was considerably lower than the planning assumption (123 vs. 300–400), which was based on experience with vaccination clinics held at senior centres. Authors speculate that this may be because consent numbers were low and teams could have completed more vaccinations had there been more students to vaccinate, or because the students were younger and possibly less cooperative, requiring more time to vaccinate compared to seniors. Authors considered the team model as the best approach to deliver influenza vaccine in a school setting as it achieved vaccination of more children per day and required fewer vaccination days per school.	