Cost Comparison of Two Mass Vaccination Campaigns against H1N1 Influenza in New York City

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Background

In 2009 the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) conducted one of the nation's largest efforts to deliver influenza A (H1N1) 2009 monovalent vaccine. Two components of this vaccination effort were:

- School-located campaign; and
- Points of Dispensing (PODs) campaign.

Despite the potential value of these vaccination approaches, no studies have compared the resources required to conduct them, because few situations have emerged to allow real-world testing of both approaches simultaneously.

Objective

To estimate and compare total costs and costs per dose of the school-located and POD vaccination campaigns; and to assess the change in costs per dose had demand for vaccination been higher.

Methods

Setting: The school-located campaign was conducted in New York City elementary schools. PODs were held throughout in the 5 boroughs of New York City.

Expenses were calculated in 2009-2010 U.S. dollars from DOHMH's perspective. Costs were obtained from invoices or expended resources were estimated. The value of supplies and vaccine provided in-kind by the U.S. federal government were also included. Vaccination data were obtained from the Citywide Immunization Registry (CIR) and POD reports. Projected capacity was estimated by applying the number of doses administered at high performing sites to all schools and PODs. The sensitivity of cost per dose was assessed by varying both personnel costs and projected capacity by 20% in each direction.

Results

School-located Vaccination

- Visited 1,232 schools
- Provided an estimated 240,205 vaccinations (includes second doses for those eligible)
- Vaccination rate of about 21.5%
- Cost included $12.8 million in in-kind resources
- In addition to contract nurses, over 2,500 City staff and 800 City school health nurses contributed over 200,000 hours of labor
- At projected capacity, excluding the value of in-kind resources, cost per dose is for $16
- Cost per dose at projected capacity ranged from $45 to $79

Community-based Points of Dispensing

- 58 PODs were held over 5 weekends
- Provided an estimated 49,986 vaccinations
- Costs included $3.4 million in in-kind resources
- In addition to contract nurses, over 2,500 City staff and 200 volunteers contributed over 65,000 hours of labor
- At projected capacity, excluding the value of in-kind resources, cost per dose is $24
- Cost per dose at projected capacity ranged from $39 to $67

Summary

Successful implementation of both campaigns required significant resources. As conducted, the school-located campaign delivered vaccines at a lower cost per dose than PODs. Projected capacity was a greater determinant of cost per dose than personnel costs. For both campaigns, cost per dose could have been lower if vaccination capacity had better matched demand.

Table 1. Breakdown of costs, H1N1 vaccination campaigns, New York City, 2009-2010

	School-located Campaign	% of Total Cost	PODs	% of Total Cost
Personnel*	**$ 10,146,879**	**58%**	**$ 4,829,936**	**64%**
Planning Staff	$ 518,721	3%	$ 249,321	3%
DOHMH Operational Staff	$ 1,309,573	7%	$ 979,573	13%
Other City Agency Operational Staff*	$ 658,698	4%	$ 1,130,848	15%
DOE On site School Staff	$ 1,797,496	10%		0%
Vaccinators	$ 3,753,447	21%	$ 662,702	9%
Police		0%	$ 436,269	6%
EMS		0%	$ 10,100	0%
Volunteers*		0%	$ 110,491	1%
Fringe benefits	$ 2,108,944	12%	$ 1,250,633	17%
Supplies and Equipment	**$ 2,989,120**	**17%**	**$ 738,791**	**10%**
Vaccine	$ 2,378,030	13%	$ 494,861	7%
Ancillary Supplies	$ 441,391	3%	$ 92,779	1%
Refrigerators/Thermometers	$ 169,700	1%	$ -	0%
Other		0%	$ 151,150	2%
Logistics	**$ 1,945,780**	**11%**	**$ 712,008**	**10%**
Printing of Materials	$ 401,629	2%	$ 281,370	4%
Translation of Materials	$ 12,242	0%	$ 21,759	0%
Transportation/Storage	$ 1,049,741	6%	$ 52,923	1%
Disposal of medical waste	$ 52,000	0%	$ 12,938	0%
Information Technology	$ 376,783	2%	$ 80,495	1%
Other	$ 53,384	0%	$ 262,523	4%
Overhead Costs	**$ 2,535,658**	**14%**	**$ 1,209,321**	**16%**
Total	**$ 17,617,438.12**	**100%**	**$ 7,490,056**	**100%**

*For PODs, these personnel could have served as vaccinators as well.

Table 2. Cost per dose in school-located campaign and PODs

		School-located Campaign	PODs
As campaigns occurred	Total Cost:	$17,617,438	$7,490,056
	Number of vaccines administered	240,205	49,986
	Cost per dose administered	$73	$150
Projected capacity scenario	Total Cost:	$18,358,203	$8,758,719
	Number of vaccines administered	312,616	174,000
	Cost per dose administered	$59	$50

Discussion

- While this study attempts to capture planning costs, prior investment in emergency preparedness activities was critical. The costs of these preparations are not included in our estimates despite leveraging these resources.

- The cost per dose for both campaigns is higher than other published cost estimates. However, other studies do not consistently include the costs of staff time for planning, campaign operations, fringe benefits, and overhead.

- Even at projected capacity and if some of the vaccine costs were eliminated to account for free vaccine available through the Vaccines for Children program, the total cost of providing each dose is still higher than New York State's Medicaid reimbursement rate ($17.85) for vaccinating eligible children, which is already higher than most other states.

Conclusions

- Both campaigns were aspects of a larger vaccination effort in NYC and were important approaches to increase vaccination coverage; they should both be considered during future emergency and non-emergency situations.

- The school-located campaign reached an especially large number of children and should be considered as a worthwhile public health program for continued investment.

- The lack of financial incentive for providers and public health agencies may be a barrier to improving vaccination rates.

- Third party payers should consider mass vaccination strategies to increase vaccination rates for both children and adults while efforts are made to conduct them as efficiently as possible to prepare for future threats.

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