

Estimated School Influenza Vaccination Clinic Cost – 2009-2010 Influenza Season in the State of Maine

Bo-Hyun Cho, Ph.D.¹, Garrett Beeler-Asay, Ph.D.², Suchita A. Lorick, DO, MPH², Meredith Tipton, Ph.D.³, MPH, Nancy L. Dube, RN, MPH⁴, Mark L. Messonnier, Ph.D., M.S.²

¹Carter Consulting Inc., Atlanta, GA, ²Immunization Services Division, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, GA,

³President, Tipton Enterprizes, Inc., Portland, Maine, ⁴School Nurse Consultant, Maine Department of Education, Augusta, Maine

Background

- School influenza vaccination (SIV) considered viable option to reach school-aged children
 - Normally during school hours, on school campuses, targeting school-enrolled students
- During 2009-2010 pandemic influenza season, H1N1 vaccination was recommended for people at highest risk for complications or those caring for the high-risk including school-aged children
- In Maine, over 600 schools reported conducting or participating in SIV clinics (out of 785 schools)
 - As of March 2010, over 97,000 doses of vaccine administered
 - Higher flu vaccine coverage (60.2%) achieved for children and adolescents 6 months to 17 years (National median=36.8%) according to BRFSS 2009 and NHFS 2010

Objectives

- Estimate the total cost of conducting SIV clinics
 - Productivity
 - per-clinic and per-dose average cost
- Implications to future SIV program
 - Impact of volunteers on the clinic cost
 - Sustainability of SIV program (under progress)

Methods

- Total Costing Approach
 - Valuing economic cost of all resources used in SIV clinic except vaccines provided
- Retrospective survey
 - Convenience sampling: 7 school nurses (41 schools in seven school districts)
 - conducted with School nurses and School administrators

Data Collection

- Clinic Day Survey (N = 6 clinics)
 - Staffing: Time spent on various activities during clinic day
 - Supplies and materials: Vaccines (# dose), medical supplies and equipment, office supplies and equipment
- Wages and prices data
 - BLS databases (Average wages)
 - Online catalogs for school nurses or schools
 - conducted with School nurses and School administrators

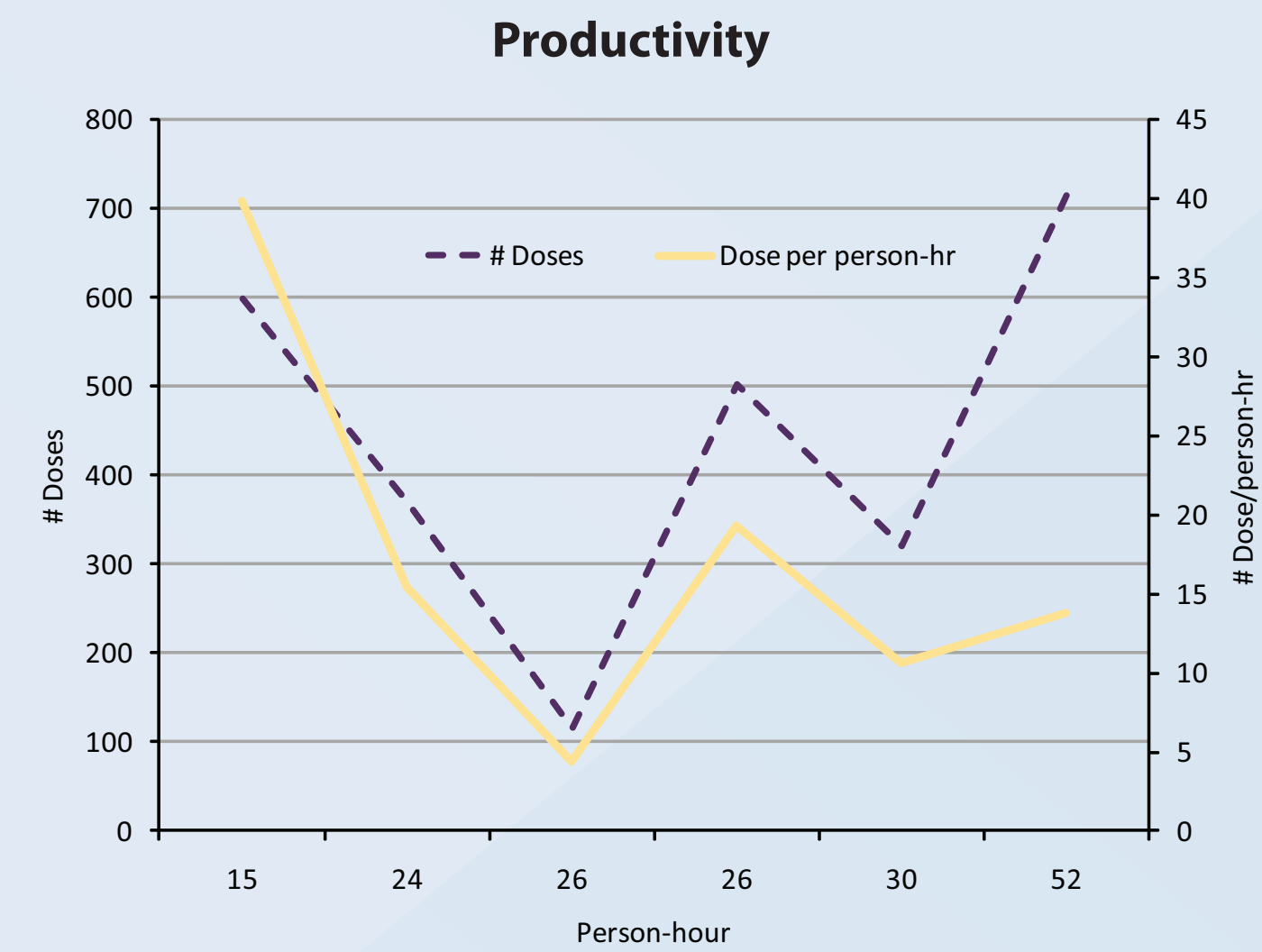
Outcome Measures

- Productivity: # dose per vaccinator-hour
 - Total # doses administered divided by total vaccinator-hour
 - Total vaccinator-hour = the sum of the hours each vaccinator spent at the SIV clinic
- Average cost: per-clinic or per-dose
 - Total clinic cost divided by # of clinics (=6)
 - For each clinic, total cost divided by # doses given
- All measures calculated for each clinic
 - Descriptive statistics presented

Results

Productivity (N=6)

	# doses	# Vaccinators	Vaccinator-hour	# dose per vaccinator-hour
Mean	437	7	29	17
Min	115	4	15	4
Max	715	12	52	40



Dose per vaccinator-hour

- 17 doses per vaccinator-hour or 3-4 minutes per dose
- Productivity varies a lot (4-40 doses per vaccinator-hour)
- As # vaccinators (or vaccinator-hrs) are non-substitutable, they are likely over-staffed to vaccinate at the maximum capacity during public health emergency.

Per-Clinic Average Person-Hour and Average Labor Cost by Role

Role /Title	Average Person-Hour (hr)	(%)	Average Cost (\$)	(%)
Lead School Nurse	8.67	11.64%	\$ 292.94	16.61%
Vaccinators	28.83	38.72%	\$ 816.19	46.29%
School support	16.30	21.89%	\$ 352.02	19.96%
Community Support	20.67	27.75%	\$ 302.12	17.13%
Total	74.47	100%	\$ 1,763.27	(100%)

Per-Clinic Average Labor Cost by Affiliation

Affiliation	Average Cost (\$)	Proportion (%)
School/School district	\$ 964.77	54.72%
Visiting Nurses Association	\$ 171.84	9.75%
Public Health/Emergency Preparedness Agencies	\$ 129.39	7.34%
Local Community	\$ 497.27	28.20%
Total	\$ 1,763.27	100.00%

Labor Time/Cost

- Time
 - Vaccinator > community support > school staff > lead nurse
- Cost
 - Vaccinator > school staff > community support > lead nurse
- School and community absorbed the most labor cost, 55% and 28%, respectively.

Per-Clinic Average Supplies/Material Cost

	Purchased	Stock	Donated	Total (%)
Medical	\$198.26	\$219.12	\$382.89	\$800.27 (59.26%)
Non-medical	\$144.88	\$118.94	\$286.24	\$550.06 (40.74%)
Total (%)	\$343.14 (25.41%)	\$338.06 (25.04%)	\$669.13 (49.55%)	\$1,350.32

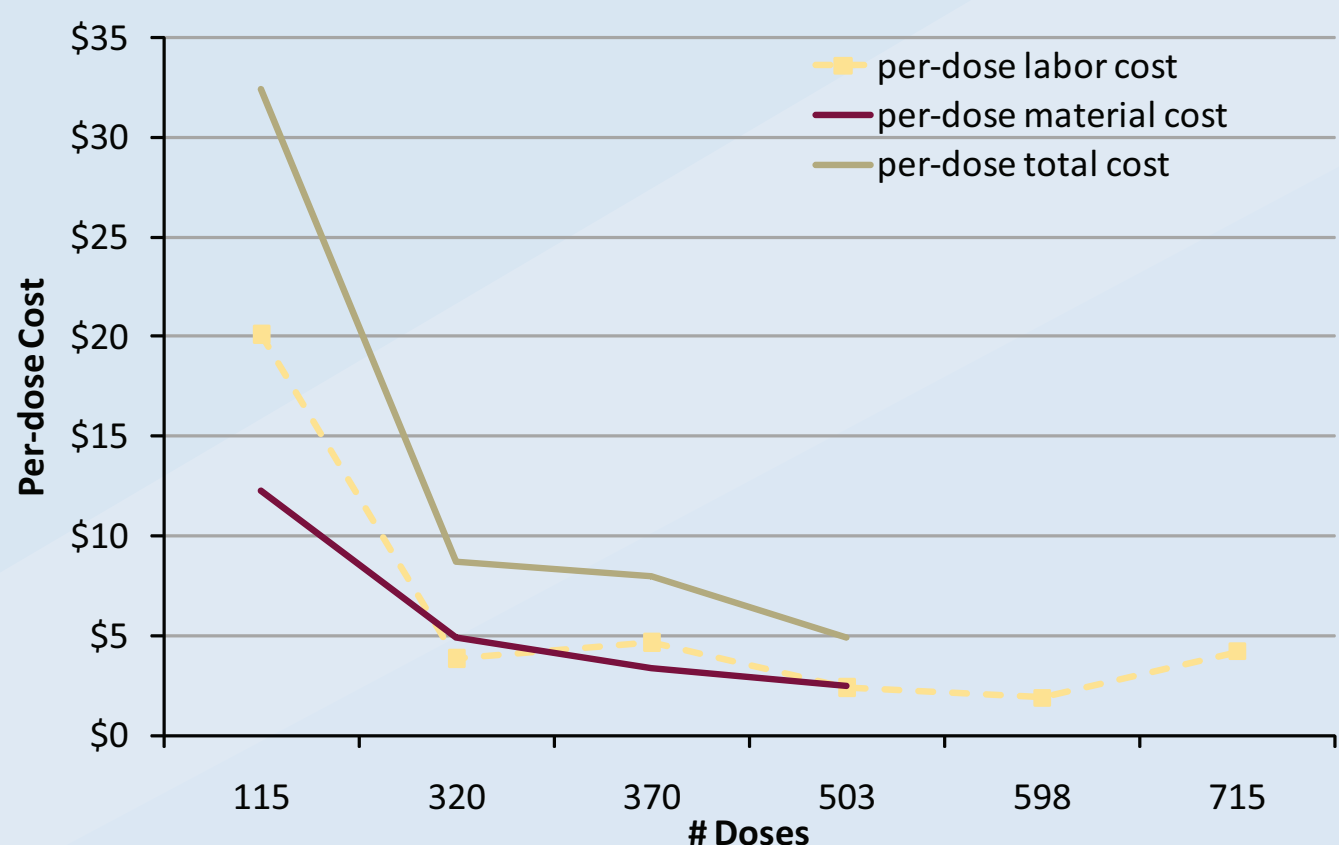
Material Cost

- No vaccine cost included
- 60% of material cost incurred to acquire medical supplies
- About 50% of material came from donation
- Newly purchased materials and materials from school are 25% of material cost each

Per-dose Average Cost

	Mean	Min	Max
Total (=A+B+C)	\$ 13.51	\$ 4.91	\$ 32.39
Paid Labor & Purchased Material (A)	\$ 6.94	\$ 1.56	\$ 19.54
Materials from stock (B)	\$ 1.33	\$ 0.53	\$ 2.63
Unpaid Labor & Donated Materials (C)	\$ 5.24	\$ 1.48	\$ 10.22

Average Cost (per-dose)



Per-dose Cost

- Average per-dose cost estimated \$13.51
 - Including labor and material costs
 - Only comparable with vaccine administration cost
 - Excluding the economic value of donation or volunteers, per-dose cost is \$8.27 (61% of \$13.51)
- Economics of Scale
 - Average per-dose cost appears declining with # of doses administered



Discussion

- Previous Studies
 - Hawaii: \$27.37 per dose including vaccine price
 - \$14.15 per dose when average vaccine cost per dose is assumed \$13.22.
 - In Minnesota, \$9.78 per dose (with free LAIV)
- Productivity is not consistent with # of doses
 - Potentially over-staffing in some clinics
- Average per-dose cost shows returns-to-scale
 - Per-dose cost decreases as # of doses increases
- Impact of volunteer
 - Economic value of volunteers and donated materials assessed (39% of total cost)
 - Yet, volunteers may not be always available for emergency
 - Planners should prepare to pay more for resources in case of lower community support

Limitations

- 2009-2010 Pandemic Influenza Season
 - Higher attention and more community support facing public health emergency
- Small convenience sample and not representative
 - 6 SIV clinics in Maine
- Vaccines types may affect productivity and cost
 - Vaccine type: injectable vs. nasal spray
- No overhead cost included
- No “outside” clinic cost considered
 - Planning and coordination outside clinics are not considered here.

Acknowledgements

- Interviewees and survey participants
 - Maine CDC staff
 - Portland and Bangor public health department staff
 - School Nurses and administrators
 - Home Health VNA, VNA Home Health & Hospice
- Dr. Dora Mills*, Maine DOE, U. of Southern Maine, Muskie School
- CDC
 - Ricardo Basurto-Dávila, PhD

*Health Officer of Maine CDC during this evaluation