Understanding the risk to healthcare workers

Bill Borwegen
Occupational Health and Safety Director
Service Employees International Union

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Injury and Illness Burden

BLS 2005 (rates per 100 workers)

Hospital workers  8.1
Nursing and residential care workers  9.1
Manufacturing  6.3
Construction  6.3
Mining  3.6
All private sector  4.6
Why does health care lag behind? (Levy, 2000)

- False perception that the industry is self-regulated

- Few OSHA standards

- Health care traditionally seen as “clean industry”

- Focus on “curative” rather than “preventive” care

- Patient vs. HCW focus

- Primarily a female workforce, therefore perception is must be safe

- Low unionization rate
Death of the “Droplet Only Spread” Mythology
2008 IOM Report: Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers

“On average, a cough with a velocity of 10 meters per second contains hundreds of thousands of particles, while a sneeze can result in thousands to more than a million particles”
2008 IOM Report: Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers

“Without knowing the contributions of each of the possible route(s) of transmission, all routes must be considered probable and consequential . . . .”
... reiterate and emphasize the importance of consistent and precise application of recommended infection control precautions for patients with suspect, probable or confirmed Influenza A (H1N1) virus infections. This includes the use of an N95 respirator, eye protection, contact and standard precautions.

DPH has received reports of seven (7) Wisconsin health care workers (HCW) with confirmed H1N1 Influenza A virus infections who were not wearing appropriate Personal Protective Equipment (PPE) during patient care activities.
Novel Influenza A (H1N1) Virus Infections Among Health-Care Personnel — United States, April–May 2009

<table>
<thead>
<tr>
<th>Job type</th>
<th>Transmission type</th>
<th>Facility type</th>
<th>Gloves</th>
<th>Gown</th>
<th>Surgical mask</th>
<th>N95 respirator</th>
<th>Eye protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing assistant</td>
<td>Probable patient to HCP</td>
<td>Inpatient, acute care</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Medical assistant</td>
<td>Probable patient to HCP</td>
<td>Outpatient</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Licensed practical nurse</td>
<td>Probable patient to HCP</td>
<td>Outpatient</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Physician’s assistant</td>
<td>Probable patient to HCP</td>
<td>Outpatient</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Registered nurse</td>
<td>Probable patient to HCP</td>
<td>Outpatient</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Nursing assistant</td>
<td>Possible patient to HCP</td>
<td>Inpatient, acute care</td>
<td>Always</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Physician</td>
<td>Possible patient to HCP</td>
<td>Inpatient, acute care</td>
<td>Always</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Licensed practical nurse</td>
<td>Possible patient to HCP</td>
<td>Inpatient, long-term care</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Never</td>
<td>Never</td>
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<tr>
<td>Nurse anesthetist</td>
<td>Possible patient to HCP</td>
<td>Inpatient, acute care</td>
<td>Always</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Registered nurse</td>
<td>Possible patient to HCP</td>
<td>Inpatient, acute care</td>
<td>Always</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Medical assistant</td>
<td>Possible patient to HCP</td>
<td>Outpatient</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
</tr>
<tr>
<td>Physician</td>
<td>Possible patient to HCP</td>
<td>Inpatient, acute care</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

* When with presumed source patient.

† All exposures occurred ≤7 days before symptom onset. Probable patient to HCP transmission was defined as exposure to a patient with known novel influenza A (H1N1) virus infection without using a surgical mask or N95 respirator. Possible patient to HCP transmission was defined as exposure to a patient with known novel H1N1 virus infection while using a surgical mask or N95 respirator or exposure to a patient with respiratory illness (i.e., pneumonia, upper respiratory tract infections, or influenza-like illness) regardless of the use of respiratory PPE.

‡ Information not available.
Pneumonia and Respiratory Failure from Swine-Origin Influenza A (H1N1) in Mexico
Rogelio Perez-Padilla, M.D., et.al.
N Engl J Med 2009;361

“The experience in our institution highlights the need to reinforce precautions and use of personal protective equipment to prevent the infection of health care workers.”
Pneumonia and Respiratory Failure from Swine-Origin Influenza A (H1N1) in Mexico
Rogelio Perez-Padilla, M.D., et.al.
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“Within 7 days after contact with the initial case patients, a mild or moderate influenza-like illness developed in 22 health care workers …”

“After infection-control measures were strictly enforced — with patients confined and isolated in three hospital areas and N95 respirators used in addition to goggles, gowns, and gloves, as well as liberal use of gel-alcohol hand sanitizer — no more health care workers had influenza-like illness …”
H1N1 is Different than Seasonal flu
Pathogenesis and Transmission of Swine-Origin 2009 A(H1N1) Influenza Virus in Ferrets


National Influenza Center and Department of Virology, Erasmus Medical Center, Rotterdam, the Netherlands. National Institute for Public Health and the Environment, Bilthoven, the Netherlands.

Science Express, 2 July 2009 / Page 1 / 10.1126/science.1177127
- A(H1N1) influenza virus more pathogenic than a seasonal flu virus.

- More extensive virus replication occurring in the respiratory tract.

- Virus shedding was more abundant from the upper respiratory tract for H1N1 vs. seasonal virus.

- Transmission via aerosol or respiratory droplets was equally efficient.

- Replication of seasonal virus was confined to the nasal cavity of ferrets, but 2009 A(H1N1) influenza virus also replicated in the trachea, bronchi, and bronchioles.
H1N1 (Swine Origin) Influenza, as of July 7, 2009
New York City Department of Health and Mental Hygiene

<table>
<thead>
<tr>
<th>Age</th>
<th>Hospitalizations</th>
<th>Deaths**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New*</td>
<td>Cumulative</td>
</tr>
<tr>
<td>0-4</td>
<td>4</td>
<td>208</td>
</tr>
<tr>
<td>5-24</td>
<td>8</td>
<td>278</td>
</tr>
<tr>
<td>25-65</td>
<td>17</td>
<td>379</td>
</tr>
<tr>
<td>66+</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>909</td>
</tr>
</tbody>
</table>

•Since last update, 7/1/09. No further updates are planned at this time.

** Preliminary data on underlying medical conditions shows that most of the decedents had one or more established underlying risk factors for developing severe influenza or complications.

The cumulative number of 'confirmed' cases in NYC to date is 1,291. This number does not reflect the overall incidence of H1N1 flu, since only select cases are tested for H1N1. Most cases of influenza-like illness do not need to be tested for H1N1, so they are not included in this count.
909 NYC Hospitalizations

0-4 years (23%)  
5-24 years (31%)  
25-65 years (42%)  
66+ years (5%)

It is remarkably not like seasonal flu – a disease that targets the elderly

H1N1: “A disease of children and workers.”
2008 IOM Report: Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers

Surgical Masks vs. Respirators:

“Medical masks are not designed or certified to protect the wearer from exposure to airborne hazards”

“...because of their loose-fitting design, medical masks and their lack of protective engineering, medical masks are not considered PPE”
Estimated effectiveness of various forms of respiratory protection

Surgical Mask  2.5X  better than nothing
N95 Respirator  17.5 X better
Elastomeric  45.5 X better
Powered Air Purifying  238 X better

The Occupational Health and Safety Act of 1970

“Each employer shall furnish to each of his employees a place of employment which is free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees.”
The Occupational Health and Safety Act of 1970

OSHA Respirator Standard:

The minimum level of protection from an airborne hazard is a NIOSH certified respirator.
Interpretation of the OSHAct

Language

From a practical standpoint: employers must take feasible steps to reduce exposure.

Using government certified N95s that cost about a $1 each meets this definition of feasibility.
Surgical Masks fail:

1) **On scientific grounds**: Not sufficiently protective against airborne respirable particles

2) **On legal grounds**: Do not meet the test for what is considered feasible under the OSHA Act
Half Mask Elastomeric Respirator:
Approx $20 each vs. $1 per N95
2008 IOM Report: Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers

“Employer and employee commitment to worker safety and appropriate use of PPE should be strengthened.”

“Healthcare facilities should establish and promote a culture of safety”
“There is no longer any excuse for governments or hospitals to be caught off guard, no longer any excuse for health workers not to have available the maximum reasonable level of protection through appropriate equipment and training, and no longer any excuse for patients and visitors not to be protected by effective infection control practices.”

SARS Commission Final Report 2007