Emerging Respiratory Viruses: Are Healthcare Workers Protected?

Dr. Virginia Roth, The Ottawa Hospitals & University of Ottawa

A Webber Training Teleclass

Outline

- SARS 2003
- Novel H1N1 2009
- MERS CoV 2012
- Ebola 2014
- Lessons for Future Outbreaks

Severe Acute Respiratory Syndrome (SARS)

- Feb 28: Identified in a Hanoi patient with atypical pneumonia (Dr. Carlo Urbani)
- Mar 7: First Canadian case admitted to hospital
- Mar 10: 22 HCW in Hanoi fall ill
- Mar 11: Hospital outbreaks in Hong Kong
- Mar 12: WHO alert issued
- Impact: 8,096 cases, 774 deaths

SARS: Vulnerability of Healthcare Workers

- 54 year old family physician, Toronto
- Apr 1-2: examined 3 patients with undiagnosed SARS
- Apr 4: fever, myalgia, diarrhea, cough
- Apr 8: admitted to hospital
- Apr 13: respiratory failure to ICU
- BiPAP, difficult intubation
- Aug 13: succumbed to SARS

“Protected HCW” Get SARS

- 9 HCW caring for Dr. Yanga developed SARS
  - 6 present during intubation
  - Intubation: negative-pressure HEPA filtered room
  - All wore recommended PPE
    - Gowns, gloves, PCM2000 mask, goggles /face shield

SARS in Protected HCW

- Toronto, 2003
- 18 suspect / probable cases
- Associated with high-risk procedures / patients
- Incorrect use of PPE:
  - Formal training before SARS assignment = 31%
  - Inadequate eyewear = 67%
  - Moist mask = 25%
  - Failure to change b/w patients = 19%

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“Possibility of self-contamination”

Virus Transfer from PPE to HCW Skin and Clothing

- PPE contaminated with non-enveloped non-pathogenic RNA virus and glo-germ
- 10 volunteers took BP from mannequin
- Instructed to remove PPE following CDC protocol


Conclusions:
- Need altered protocols
- Importance of hand hygiene between steps

SARS Response

- Changing directives
- New equipment
- Increased complexity
- Difficult removal
- Clinical challenges


Table 1 Numbers of Probable Cases of SARS, Deaths, and Healthcare Workers Infected in Selected Countries and Globally

<table>
<thead>
<tr>
<th>Country</th>
<th>Cumulative No. of Cases</th>
<th>Deaths No. (%)</th>
<th>Workers Infected No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>251</td>
<td>41 (17)</td>
<td>108 (43)</td>
</tr>
<tr>
<td>China</td>
<td>5,537</td>
<td>349 (7)</td>
<td>1,002 (19)</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1,755</td>
<td>299 (17)</td>
<td>386 (22)</td>
</tr>
<tr>
<td>Taiwan</td>
<td>346</td>
<td>37 (11)</td>
<td>66 (20)</td>
</tr>
<tr>
<td>Philippines</td>
<td>14</td>
<td>2 (29)</td>
<td>4 (29)</td>
</tr>
<tr>
<td>Singapore</td>
<td>238</td>
<td>33 (41)</td>
<td>97 (41)</td>
</tr>
<tr>
<td>Thailand</td>
<td>9</td>
<td>2 (29)</td>
<td>1 (11)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>63</td>
<td>5 (57)</td>
<td>36 (57)</td>
</tr>
<tr>
<td>Global</td>
<td>8,098</td>
<td>774 (21)</td>
<td>1,707 (21)</td>
</tr>
</tbody>
</table>

Chan-Yeung, Int J Occup Environ Health 2004

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Protected Code Blue
“My ‘problem’ is that emergency physicians and nurses thrive in heroics and do this by nature. So we need evidence-based information and to clearly show them why they must not do that which they gravitate towards.”

Psychological Impact of SARS
- Fear – unknown virus, sick colleagues
- Anger – insufficient protection
- Confusion – constant change in practice
- Isolation – “work quarantine”, family separation
- Ostracism – public prejudice
- Exhaustion – added equipment, stress
- Reduced human contact – barrier equipment

Right to Refuse Work
Argument
- Firefighters don’t get to select which fires to attend
- Police don’t get to select which dark alleys they walk down

Counter Argument
- We don’t expect firefighters to jump into a burning pit
- We don’t expect police to jump in front of a bullet

Professional Organizations
Nurses’ Association: Nurses have a right to refuse to work where unsafe conditions exist and they cannot be adequately protected …

Medical Association: Physicians are not all required to be heroes, especially if they could do more good for patients by staying away from dangerous front-line situations.

The Ethics of SARS
- HCW have a duty to:
  – care for the sick
  – care for themselves in order to carry out duties
- Institutions have duty to:
  – support and protect HCW
  – provide safe environment
- Public / leaders have a duty to:
  – recognize heroism of front-line medical workers

Novel Influenza A (pH1N1)
- March 2009: First cases in Mexico and US
- June 11, 2009: WHO declares global pandemic
- Sept 2009: > 296,000 cases, ~ 3500 deaths worldwide
- Affected children and young adults (median age = 18)
- Ability to cause severe pneumonia
- Higher risk of complications in pregnancy
- Community exposure

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Ebola in Madrid

- Oct 6: Nurse’s aid confirmed positive for Ebola
- Treated 2 missionaries who died of Ebola Aug-Sep 2014
- Followed protocol (touched her face with her gloves?)
- Spokesperson – “It’s obvious that the patient herself has recognized that she did not strictly follow the protocol.”
- “We’re really angry” said one nurse. “She is the victim, and they are criminalizing her as if she was the one responsible for all that has happened”
- Oct 12: Concerns about training and safety standards lead to work refusals

Ebola in US

- Sep 20: Liberian man arrives in Dallas
- Sep 24: Low-grade fever, abdominal pain, headache
- Sep 26: Presents to ED - sent home
- Sep 28: Worsens - return to ED and placed in isolation
- Sep 30: Confirmed Ebola – Moved to isolation unit, addition of PPE layers
- Oct 8: Dies
- Oct 10: Nurse develops low-grade fever
- Oct 12: CDC confirmed Ebola positive
- Oct 14: 2nd nurse confirmed positive

Why did Dallas Nurses get Infected?

- Following recommendations
- Responsive administration
- Competent committed staff
- Heroic measures (dialysis):
  - “We never recommend, in Africa, to do that type of thing … It’s very risky and the likelihood of saving someone is very low. When every organ starts to fail, you’re not going to save them.”

Dr. Pierre Rollin CDC

ED screening
Communication
High-risk procedures
Self-contamination
PPE removal without supervision
Variability in PPE
Conflicting recommendations

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Nurses’ Perspective

• US – National Nurses United
  – Nurses “strongly feel unsupported, unprepared, lied to and deserted to handle their own situation”

• Spain - Juan Jose Carlos, Satse nursing union
  – “Their children aren’t being invited to birthday parties and their friends are cancelling joint holiday plans”
  – “They’ve become known as the Ebola nurses. And it’s not fair.”

Ebola cruise ship ‘in utter panic’ as Mexico and Belize refuse to let it dock

Bellevue hospital (NY)

• More than a dozen employees report discrimination
• Not welcomed at business or social events
• Refused services

PPE Challenges

Are Healthcare Workers Protected?

Depends on…
• Risk assessment
• Availability of PPE
• Proper use of PPE
• Preventing self-contamination

Lessons for Future Outbreaks

1. Screening
2. Thoughtful PPE selection
3. Minimize change
4. Training / retraining
5. Supervision
6. Minimize high risk procedures
7. Hospital / public responsibility

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