Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Overview

• Why this policy?
• Influenza
  – epidemiology
  – transmission
  – vaccine
• Vaccine or mask policies
  – development and implementation
• Other approaches
• Conclusion
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Influenza or mask policy

Receive the influenza vaccine by the start of influenza season

OR

Wear a surgical mask in clinical areas for the duration of the season

Arguments in support

• Influenza kills the elderly and infirm
• We cannot wait for better studies
  – Precautionary approach
  – It would be unethical to do further studies
  – Randomized controlled trials are gold standard
• Patient safety comes first
• The policy is better than nothing
• Moral/ethical obligation
• Nothing else works to increase vaccination rates
• Patients support it
• Others countries are doing it

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Policy decisions
Moral, ethical, safety consequences
Scientific evidence

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

How many people die from/with influenza each year (CDN data)?

- 4000-8000?
  - mathematical models typically assign all/majority of excess winter mortality to influenza
  - clearly an overestimate
- <500?
  - actual number of deaths with influenza that are reported
  - Not all cases detected
  - clearly an underestimate

Excess Winter Mortality

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Is it fair to assign excess winter mortality to influenza?

- Some, yes (estimated 10%)
- But average community attack rate is roughly 10-20%
- Influenza is a minority cause of influenza-like illness (ILI) so it should not be used as a surrogate

CDN 2014-2015 influenza

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

CDN 2014-2015 Non-influenza

All viruses combined

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)

A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

NZ 2012 data influenza

![Influenza Virus Temporal Distribution](image)

NZ 2012 data Non-influenza

![Non-influenza Virus Temporal Distribution](image)

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)

A Webber Training Teleclass

www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

NZ all viruses combined

How often do we catch influenza?

- Examined antibody levels to 9 influenza strains from 1968-2009 in China
- Roughly 2 infections per decade > age 40

Kucharski et. al. PLOS Biology 2015

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

3-8 patients/ 10 000 admissions develop nosocomial influenza
What proportion comes from healthcare workers?
1. All of it
2. Some of it
3. We have no idea

(Answer: 3)

Healthcare workers with influenza

• Prospective study of ill healthcare workers
  – 54% had a viral pathogen
    • 8% had influenza
      – 51% of these were febrile
      – no difference in fever if vaccinated/unvaccinated (45% vs 61%, p=0.32)

• If using fever as a work exclusion criteria, will miss half of staff with influenza


Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

asymptomatic transmission?

Carrat et. al., 2008

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Vaccine Effectiveness, 2005-2015
Table. Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2015

<table>
<thead>
<tr>
<th>Influenza Season</th>
<th>Reference</th>
<th>Study Site(s)</th>
<th>No. of Patients</th>
<th>Adjusted Overall VE (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-05</td>
<td>Brinjikji 2009</td>
<td>WI</td>
<td>762</td>
<td>10</td>
<td>-36.40</td>
</tr>
<tr>
<td>2005-06</td>
<td>Brinjikji 2009</td>
<td>WI</td>
<td>346</td>
<td>21</td>
<td>-52.59</td>
</tr>
<tr>
<td>2006-07</td>
<td>Brinjikji 2009</td>
<td>WI</td>
<td>871</td>
<td>52</td>
<td>22.70</td>
</tr>
<tr>
<td>2007-08</td>
<td>Brinjikji 2011</td>
<td>WI</td>
<td>594</td>
<td>37</td>
<td>22.49</td>
</tr>
<tr>
<td>2009-10</td>
<td>Griffith 2011</td>
<td>WI, MI, NY, TN</td>
<td>6757</td>
<td>36</td>
<td>22.75</td>
</tr>
<tr>
<td>2010-11</td>
<td>Trusser 2011</td>
<td>WI, MI, NY, TN</td>
<td>4757</td>
<td>60</td>
<td>53.66</td>
</tr>
<tr>
<td>2011-12</td>
<td>Orme 2014</td>
<td>WI, MI, PA, TX, WA</td>
<td>4771</td>
<td>47</td>
<td>36.56</td>
</tr>
<tr>
<td>2012-13</td>
<td>McLane 2014</td>
<td>WI, MI, PA, TX, WA</td>
<td>6452</td>
<td>49</td>
<td>43.55</td>
</tr>
<tr>
<td>2013-14</td>
<td>Unpublished</td>
<td>WI, MI, PA, TX, WA</td>
<td>5990</td>
<td>51</td>
<td>43.58</td>
</tr>
<tr>
<td>2014-15</td>
<td>Flannery 2015</td>
<td>WI, MI, PA, TX, WA</td>
<td>2321</td>
<td>23</td>
<td>8.36</td>
</tr>
</tbody>
</table>

CDC, 2015
mean=41%

Research Articles
Interim estimates of 2014/15 vaccine effectiveness against influenza A(H3N2) from Canada’s Sentinel Physician Surveillance Network, January 2015


-8% Vaccine Effectiveness (95% CI: -50 to 23%)

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Vaccination paradox

<table>
<thead>
<tr>
<th>Vaccination History</th>
<th>Total</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current and previous season</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccinated both current and previous</td>
<td>1852</td>
<td>338 (21)</td>
</tr>
<tr>
<td>Vaccinated current only</td>
<td>425</td>
<td>60 (27)</td>
</tr>
<tr>
<td>Vaccinated previous only</td>
<td>202</td>
<td>98 (29)</td>
</tr>
<tr>
<td>Not vaccinated in either season</td>
<td>1827</td>
<td>649 (26)</td>
</tr>
<tr>
<td>Current and five year history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current season: vaccination + frequent vaccination</td>
<td>1103</td>
<td>248 (22)</td>
</tr>
<tr>
<td>Current season: vaccination + infrequent vaccination</td>
<td>531</td>
<td>192 (18)</td>
</tr>
<tr>
<td>Current season: vaccination + no vaccination</td>
<td>619</td>
<td>188 (17)</td>
</tr>
<tr>
<td>No Current season: vaccination + frequent vaccination</td>
<td>547</td>
<td>32 (22)</td>
</tr>
<tr>
<td>No Current season: vaccination + infrequent vaccination</td>
<td>496</td>
<td>134 (26)</td>
</tr>
<tr>
<td>No Current season: vaccination + no vaccination</td>
<td>1000</td>
<td>318 (26)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

McLean et. al., CID 2014

Conclusions

• Influenza causes a minority of influenza-like illness
• <<1% of patients will get nosocomial influenza
• The risk of influenza transmission to patients from healthcare workers is unknown
• The vaccine is mediocre and repeat vaccination may make it more so
• Asymptomatic transmission is likely negligible

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

On to the Randomized Controlled Trials

4 RCTs in long term care

• Pooled data (3 studies) showed no significant impact on influenza-specific (or even influenza-related) outcomes
• Pooled data (3 studies) showed a significant reduction in all cause mortality
  – CDC RR=0.71 (0.59-0.85)—29% reduction
  – Cochrane RR=0.66 (0.55-0.79)—32% reduction

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

How can this be?

• In two studies most of the differences in all cause mortality occurred before the onset of influenza activity
• The reduction in mortality is greater than that for all excess winter mortality
  – only 10% is believed to be due to influenza
• The vast majority of healthcare workers remained unprotected

Hayward et. al.

• 35% vaccination coverage
• 30% reduction in all-cause mortality

“the number of staff needed to be vaccinated to prevent one death... was 8”

What?

Hayward BMJ, 2006

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Why influenza-specific mortality matters

- Total cases of ILI=100
  - Influenza: 15/100 = 15%
  - Non-flu: 85/100 = 85%

- With placebo (effectiveness 0%)
  - % reduction in flu = 0
  - % reduction in non-flu = 0
  - % total reduction = 0

60% effectiveness (assuming 100% vaccine penetration)

- Total cases of ILI=91
  - Influenza: 6/91 = 7%
  - Non-flu: 85/91 = 93%

- % reduction in flu: 60%
- % reduction in non-flu: 0%

Total reduction:
(100-91/100)*100=9%

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Example: Pneumococcal vaccine

• decreased risk of invasive pneumococcal disease OR 0.26 (0.14-0.45)
• decreased all-cause pneumonia (low income population) OR 0.54 (0.43-0.67)
• no effect on all-cause mortality

Moberley et al. Cochrane database 2013

A decrease in all cause illness > specific illness is mathematically impossible

• The long term care RCTs must have inherent biases
  – Not-blinded
  – Other outbreaks
  – Changes in behaviour that affected flu rates
    • other infection control practices
    • biased case detection
  – note that inadequate influenza diagnosis is very unlikely in these trials

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

The reason there is no reduction in influenza-specific mortality is because the vaccine has very little impact on this outcome

The Acute care RCT

• Studied the impact of an educational intervention on vaccination rates
• Secondary outcomes:
  – nosocomial influenza + pneumonia
• 11% increase in vaccination rates resulted in a 50% decrease in influenza/pneumonia on one ward
• Researchers acknowledged many sources of potential bias

Riphagen-Dalhuisen et. al., Eurosurveillance 2013

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Are all clinical settings the same?

- Long term care
- Acute care
- Complex continuing care
- Home care
- Ambulatory care

A trip to the family doctor

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Conclusions

• The available evidence is significantly flawed
• All-cause mortality decrease cannot be due to vaccinating healthcare workers
• To cite these studies as definitive (or even moderate) proof that healthcare worker vaccination saves lives is to mislead.
• Patient care settings are not the same

What about this past CDN influenza season?

• Vaccine effectiveness is zero for H3N2
• Vaccinated staff do not need to mask, even when ill
  – not necessarily required to take prophylaxis during outbreaks
• Unvaccinated staff need to mask, even when not ill
  – must take prophylaxis during outbreaks

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

How not to develop policy

Policy decisions
Morale, ethical, safety consequences
Flawed scientific evidence

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?

Dr. Michael Gardam, University Health Network, Toronto

Broadcast live from the New Zealand Infection Prevention and Control Nurses College

“Misleading towards the truth”

- Misleading toward the truth is exceedingly common. It is well-intentioned – or at least it is grounded in a normal mix of self-serving and altruistic intentions.

- So what’s the problem? Misleading people, even toward the truth, is a very dangerous behavior. If and when people learn they have been misled, they have great trouble thereafter believing the truth they were misled toward. If and when they discover that the company or agency they have been listening to cannot be trusted, they jump to the conclusion that the facts it withheld or papered over must be damning. In our field, risk communication, this is predictable – as sound as Sound Science gets.

Sandman and Lanard

How anti-vaxxers have scared the media away from covering vaccine side effects

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)

A Webber Training Teleclass

www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Is moral indignation a sound basis for policy?

Consequences of this policy

• Negligible impact on patient safety
• Eroded medical and scientific credibility
• Ammunition for the anti-vaccination movement
• Disenfranchised and potentially disciplined staff
• Wrongful dismissal suits

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Arguments in support of the policy

- Influenza kills the elderly and infirm
- We cannot wait for better studies
  - Precautionary approach
  - It would be unethical to do further studies
  - Randomized controlled trials are gold standard
- Patient safety comes first
- The policy is better than nothing
- Moral/ethical obligation
- Nothing else works to increase vaccination rates
- Patients support it
- Others in Canada and the USA are doing it

Policy alternative

- Encourage influenza vaccination
- Avoid coming to the healthcare setting with influenza-like illness symptoms
- If you must attend work/visit, wear a mask while ill

Sounds simple, but is isn’t.
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Final conclusions

• Vaccine or mask policies are fatally flawed
• They will not significantly improve patient safety
• They will potentially cause harm
• There is a better, more logical policy alternative

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

Questions

haere mai! haere mai! haere mai!
Nga manumahure, nga marangatanga, tika koutou, haere mai
Visitor from afar, respected guests, greetings to you all and welcome.

he pouha heaera
he ope tamariki rua
a kaha e rapa.

NZ information on Middle East Respiratory Syndrome (MERS-CoV)
For NZ information on Middle East Respiratory Syndrome (MERS-CoV) please click here

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com
Is mandatory influenza vaccination the best way to protect our patients?
Dr. Michael Gardam, University Health Network, Toronto
Broadcast live from the New Zealand Infection Prevention and Control Nurses College

September 17  CAN ENERGY MANAGEMENT BENEFIT INFECTION PREVENTION?
Andrew Streifel, University of Minnesota

September 24  (Free Teleclass)
EVIDENCE VS. TRADITION: EXAMINING THE EVIDENCE OF BATHING TO REDUCE HAI'S
Kathleen Vollman, Advanced Nursing LLC
Sponsored by Sage Products (www.sageproducts.com)

September 28  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
WHAT DID THE ROMANS EVER DO FOR US?
Carole Fry, Healthcare Infection Society

September 30  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
The Emergence of MERS: From Animal to Human to Human
Carole Fry, Healthcare Infection Society

Thanks to Teleclass Education
PATRON SPONSORS

Sponsored by Johnson & Johnson (www.jnjnz.co.nz) and Schülke (www.schuelke.com)
A Webber Training Teleclass
www.webbertraining.com