Influenza in the Elderly and Persons with Comorbidities: Promoting Independence and Preventing Disability through Vaccination

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Non-Communicable Diseases

Major risk factors for disability and death

- Leading cause of death worldwide (36M of the 57M deaths in 2008) (cardiovascular and respiratory diseases, diabetes, cancers)
- 80% of deaths from NCDs are in low- and middle-income countries (29% in the under 60 population vs. 13% in developed countries)
- NCDs will cost over $30 trillion during the next 20 years, and push millions of people into poverty
- NCDs are major risk factors for complications of influenza that lead to hospitalization, disability and death
- Estimated costs of influenza between €5.9 billion and €27.7 billion per year

Case Scenario

75 yo woman previously active and independent in the community

- Lifelong non-smoker who had been independent in her home. She has hypertension stable on medications and stable heart disease.
- On New Year’s day developed sudden onset of muscle aches, feverishness and cough - 24 hours later intubated in the ICU
- 10-day hospitalization including 3 days in ICU - discharged to rehab facility with diagnosis of exacerbation of COPD.
- On admission to geriatric rehabilitation, required assistance for transfers and difficulty walking.
- *Her question:* Will I ever be able to go back to my home?
Successful Aging

Usual Aging

Chronic diseases that increase risk for influenza and complications of infection are very common in older adults
The Effect of Immunosenescence

Incidence of serious outcomes of influenza ↑

- 90% of influenza deaths occur in older people
- For every influenza death, there are 3–4 influenza hospitalizations

Response to vaccination ↓

CURRENT INFLUENZA VACCINE

- Efficacy is 60–90% in preventing respiratory illness in healthy adults and only 27–40% in older people
- BUT are cost-saving - indicates a clear margin for improvement
Traditional measures of influenza BOD

Influenza and Pneumonia: Predictors of Hospitalization and Death

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td></td>
</tr>
<tr>
<td>&lt;70</td>
<td>0</td>
</tr>
<tr>
<td>70-74</td>
<td>14</td>
</tr>
<tr>
<td>75-79</td>
<td>28</td>
</tr>
<tr>
<td>80-89</td>
<td>42</td>
</tr>
<tr>
<td>≥90</td>
<td>56</td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
</tr>
<tr>
<td>Outpatient visits in previous year</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-6</td>
<td>11</td>
</tr>
<tr>
<td>7-12</td>
<td>22</td>
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<tr>
<td>≥13</td>
<td>33</td>
</tr>
<tr>
<td>Previous hospitalization for</td>
<td>63</td>
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<tr>
<td>pneumonia or influenza</td>
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<tr>
<td>Comorbidity</td>
<td></td>
</tr>
<tr>
<td>Pulmonary disease</td>
<td>18</td>
</tr>
<tr>
<td>Heart disease</td>
<td>6</td>
</tr>
<tr>
<td>Renal disease/transplant</td>
<td>12</td>
</tr>
<tr>
<td>Dementia or stroke</td>
<td>22</td>
</tr>
<tr>
<td>Nonhematological and hematological cancer</td>
<td>48</td>
</tr>
</tbody>
</table>

Hospitalization due to influenza and pneumonia, and death to any cause

Hak et al. JID 189:450, 2004
Influenza: Predictor of Excess Mortality

Poor Outcomes Associated with Hospitalization: United States 1993-1997

65+ population are hospitalized 3X more often than younger adults; 37% of discharges, 50% of inpatient days, and 60% of expenditures

65+ population – 80% have one chronic disease; 50% have two

5% die in hospital, 20-30% die in the year after hospitalization

At discharge, **33% are more disabled and one half never recover**

Elixhauser A et al; AHRQ Pub. No. 00-0031, HCUP Fact Book No. 1, 2000
Vaccine Preventable Disability

Catastrophic disability

- Defined as a loss of independence in ≥ 3 ADL
- 72% who experience catastrophic disability have been hospitalized
- Leading causes of catastrophic disability
  1. Stroke
  2. CHF
  3. Pneumonia and influenza
  4. Ischemic heart disease
  5. Cancer
  6. Hip fracture

Ferrucci et al. JAMA 277:728, 1997
Clinical Frailty Scale:

1. **Very fit** – robust, active, energetic, well motivated and fit; exercise regularly, are in the most fit group for their age

2. **Well** – without active disease, less fit than people in category 1

3. **Well, with treated chronic disease** – symptoms are well controlled compared to those in category 4

4. **Apparently vulnerable** – not frankly dependent, but commonly complain of being “slowed up” or have disease symptoms

5. **Mildly frail** – limited dependence on others for instrumental activities of daily living

6. **Moderately frail** – help is needed with both instrumental and basic activities of daily living (e.g. climbing stairs and bathing)

7. **Severely frail** – mostly dependent on others for the activities of daily living

8. **Very severely frail** – completely dependent on others for the activities of daily living

9. **Terminally ill**

Rockwood et al; CMAJ; 173:489-495, 2005
Vitality and Independence
Vaccines: Promoting Independence Preventing Disability

Cardiovascular Disease
Diabetes
Osteoporosis
Chronic Lung Disease
Cognitive Impairment

Dynamic Frailty

Usual Aging

IADL Frailty

ADL Frailty

Age

80 80 80 80 80
Summary: Meeting the challenges of chronic diseases in an aging population

- Influenza BOD (and cost!) may be underestimated by failure to recognize long-term impact on functional status, independence and need for increased care.

- Degree to which influenza vaccine prevents reductions in function and catastrophic disability should be evaluated.

- Goals of influenza vaccination in the elderly should address impact of vaccination on ability to remain active through late life.
Acknowledgements

- Dr. Janet McElhaney

Thanks for your attention!