Relationship between antiviral chemoprophylaxis and resident deaths during influenza outbreaks in long-term care facilities during the 2010/11 influenza season in Pennsylvania

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Introduction

• Influenza causes morbidity and mortality among long-term care facility (LTCF) residents
  • LTCFs: skilled nursing, rehabilitation, assisted living, personal care homes
  • Influenza outbreaks in LTCFs
  • 3 or more cases of laboratory-confirmed influenza (any testing method) in an LTCF resident
  • Control of LTCF influenza outbreaks is especially challenging
• Antiviral treatment and post-exposure chemoprophylaxis are recommended for cases and contacts during LTCF outbreaks
  • 80% of seasonal influenza-related deaths occur among the elderly

Background

• Pennsylvania long-term care facilities
  • Nursing homes: 669 facilities
  • Personal care homes: 1261 facilities
• Personal care facilities, assistance and supervision
  • to ≥ 4 residents
• Inspected and licensed by PA Department of Public Welfare
• These totals exclude facilities in Philadelphia

Study Purpose

To evaluate the relationship between reported resident deaths and antiviral treatment and chemoprophylaxis during LTCF influenza outbreaks.

Methods

Outbreak Reporting
  • A standard data collection worksheet is used to assess:
    • Facility characteristics (facility type, number of residents)
    • Outbreak size and duration (total ill residents, onset and resolution dates)
    • Severe outcomes: resident hospitalizations and deaths
    • Laboratory confirmation (rapid and confirmatory influenza testing)
    • Antiviral treatment and/or prophylaxis among residents and staff
  • Influenza vaccination among residents and staff

Data Analysis
  • Evaluated outbreaks reported September 2010 to April 2011
  • Excluded outbreaks if final summary reports or laboratory confirmation were unavailable
  • Analysis was performed using SAS 9.3
  • Odds ratios were calculated using logistic regression

Table 1. Characteristics of Pennsylvania long-term care facilities reporting outbreaks during the 2010/11 influenza season (N = 179)

<table>
<thead>
<tr>
<th>Facility Type*</th>
<th>Skilled nursing</th>
<th>Rehabilitation</th>
<th>Assisted living</th>
<th>Personal care home</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>137/177</td>
<td>43/24</td>
<td>16/9</td>
<td>24/13</td>
<td>N = 179</td>
</tr>
</tbody>
</table>

Table 2. Reported illness and severe outcomes during influenza outbreaks in Pennsylvania long-term care facilities

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Any resident deaths</th>
<th>Any resident hospitalizations</th>
<th>Only 1 ill resident</th>
<th>≥ 4 residents</th>
<th>Any resident hospitalizations or deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>41/25</td>
<td>167/25</td>
<td>12/5</td>
<td>12/5</td>
<td>21/25</td>
</tr>
</tbody>
</table>

Table 3. Reported use of treatment and prophylaxis for ill and well residents and employees of Pennsylvania long-term care facilities

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Any antiviral treatment given to ill residents</th>
<th>Any antiviral treatment given to ill employees</th>
<th>Any antiviral prophylaxis given to exposed residents</th>
<th>Any antiviral prophylaxis given to exposed employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>14/12</td>
<td>14/12</td>
<td>14/12</td>
<td>14/12</td>
</tr>
</tbody>
</table>

Table 4. Unadjusted odds of severe outcomes during outbreaks in facilities reporting treatment and/or prophylaxis of residents

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Any Resident Hospitalizations</th>
<th>Any Resident Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>127/25</td>
<td>127/25</td>
</tr>
</tbody>
</table>

Table 5. Proportion of residents who received antiviral treatment and chemoprophylaxis during LTCF influenza outbreaks

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Proportion</th>
<th>Proportion</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>0.0 - 2.25</td>
<td>2.3 - 4.6</td>
<td>6.7 - 14.5</td>
</tr>
</tbody>
</table>

Results

• During the 2010/11 influenza season, 199 influenza outbreaks were reported: 20 (10%) outbreaks were excluded
  • 179 included outbreaks occurred in 158 facilities
  • Represents 2,235 total ill residents
  • Median ill residents per outbreak = 7 (range 1 - 136)
  • Mean percent ill residents per outbreak = 11% (range 0.3% - 50%)
  • During about 16% of all outbreaks, only a single case was reported

• Treatment and Prophylaxis
  • Treatment was provided to ill residents in 91% of outbreaks
  • Prophylaxis was provided to exposed well residents in 49% of outbreaks
  • Overtreatment was used more commonly for treatment (98%) and prophylaxis (90%)

Discussion

• Facilities reporting resident deaths were more likely than those not reporting deaths to have provided prophylaxis to well, exposed residents, perhaps as part of ongoing outbreak control measures
  • This finding may be a marker for outbreak severity, as timing of prophylaxis could not be assessed

• Data were only available from LTCFs that reported outbreaks
  • All data represent point prevalence; timing of treatment/prophylaxis in relationship to illness and other outcomes are not recorded
  • All data were collected in aggregate
  • Data from Philadelphia, the largest population center in PA, were not included in this analysis

Summary

• Systematic data collection during influenza outbreaks in long-term care facilities allows identification of trends and evaluation of intervention strategies
  • Facilities where resident deaths are reported may be more likely to provide prophylaxis to exposed, well residents

Acknowledgements

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