Association of Increasing Age with Hospitalization Rates, Clinical Presentation, and Outcomes Among Older Adults Hospitalized with Influenza—U.S. Influenza Hospitalization Surveillance Network (FluSurf-NET)

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Background

- Adults 265 years old suffer the most severe health effects of seasonal influenza (1).
- There are limited data on the epidemiology of influenza among adults 265 years old according to age strata.
- We evaluated age-related differences in influenza-associated hospitalization rates, clinical presentation, and outcomes among older adults according to finer age strata using population-based surveillance data from the U.S. Influenza Hospitalization Surveillance Network (FluSurf-NET) (2-4).

Methods

- We conducted a cross-sectional evaluation of adults 265 years old hospitalized with laboratory-confirmed influenza at 14 FluSurv-NET sites during the 2011-12 through 2014-15 influenza seasons.
- FluSurv-NET covers 267 hospitals and has a total catchment area of >27 million persons (2).
- Patients were hospitalized 514 days after and 53 days before a positive influenza test.
- Laboratory testing was ordered at the discretion of the healthcare provider.
- FluSurv-NET staff conducted medical record review.
- Age strata were 65-74, 75-84, and 85+ years old.
- Outcomes were 1) community-acquired pneumonia and 2) influenza hospitalization.
- We adjusted hospitalization rates for other detection and assessment for age-related trends in risk factors and symptoms.
- We used logistic regression to calculate odds ratios for pneumonia and in-hospital death adjusted for season, sex, nursing home residence, smoking, medical comorbidities, influenza vaccination, study site, and for death outcome, antiviral therapy.

Clinical Presentation

Table 1. Demographics and clinical history of patients hospitalized for influenza by age—FluSurf-NET, 2011-12 through 2014-15 influenza seasons (N=10,780).

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N (%)</th>
<th>65-74 Years old</th>
<th>75-84 Years old</th>
<th>85+ Years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5,956 (87.1)</td>
<td>3,733 (62.6)</td>
<td>987 (16.6)</td>
<td>666 (11.3)</td>
</tr>
<tr>
<td>Male</td>
<td>4,824 (12.9)</td>
<td>2,817 (47.4)</td>
<td>441 (7.4)</td>
<td>300 (5.0)</td>
</tr>
<tr>
<td>Race</td>
<td>5,956 (87.1)</td>
<td>3,733 (62.6)</td>
<td>987 (16.6)</td>
<td>666 (11.3)</td>
</tr>
<tr>
<td>White</td>
<td>5,609 (87.3)</td>
<td>3,454 (57.3)</td>
<td>947 (16.0)</td>
<td>629 (10.6)</td>
</tr>
<tr>
<td>Black</td>
<td>133 (2.2)</td>
<td>99 (1.5)</td>
<td>30 (0.5)</td>
<td>24 (0.4)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>345 (12.3)</td>
<td>209 (33.0)</td>
<td>77 (1.3)</td>
<td>29 (0.5)</td>
</tr>
<tr>
<td>Age at Onset of Influenza</td>
<td>5,956 (87.1)</td>
<td>3,733 (62.6)</td>
<td>987 (16.6)</td>
<td>666 (11.3)</td>
</tr>
<tr>
<td>2011-12</td>
<td>5,609 (87.3)</td>
<td>3,454 (57.3)</td>
<td>947 (16.0)</td>
<td>629 (10.6)</td>
</tr>
<tr>
<td>2012-13</td>
<td>345 (12.3)</td>
<td>209 (33.0)</td>
<td>77 (1.3)</td>
<td>24 (0.4)</td>
</tr>
<tr>
<td>2013-14</td>
<td>345 (12.3)</td>
<td>209 (33.0)</td>
<td>77 (1.3)</td>
<td>24 (0.4)</td>
</tr>
<tr>
<td>2014-15</td>
<td>345 (12.3)</td>
<td>209 (33.0)</td>
<td>77 (1.3)</td>
<td>24 (0.4)</td>
</tr>
</tbody>
</table>

ORs: *p < 0.05; †p < 0.01

Conclusions

- There are important age-related differences in the epidemiology, clinical presentation, and outcomes of laboratory-confirmed influenza hospitalization among adults traditionally grouped together in surveillance by age 265 years.
- Rates of influenza hospitalization increased in a stepwise fashion such that for patients 285-year-old patients were 2.6 times greater than those for patients 65-74 years old, with the greatest rate difference during AH1N2/M2019 predominants.
- Patient demographics, comorbidities and acute symptoms and signs evolved with age.
- Compared to 65-74-year-old patients, 75-84-year-old patients had a 40% increased risk of death, and 285 year old patients were more than twice as likely to die during their hospitalization.
- Study strengths included a large population sample, laboratory-confirmed outcomes, rate estimates, and detailed clinical data.
- Limitations included potential selection bias due to provider testing and admission practices, lack of data on frailty or functional status, and inability to determine causal associations.
- Public health epidemiologists should consider using finer age strata, if possible, when analyzing and reporting influenza surveillance data for older adults in order to better inform public health prevention and response efforts.

References


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