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Original Study

Trends in Influenza and Pneumococcal Vaccination Among US Nursing Home Residents, 2006-2014

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A B S T R A C T

Background: Institutionalized adults are at increased risk of morbidity and mortality from influenza and pneumococcal infection. Influenza and pneumococcal vaccination have been shown to be effective in reducing hospitalization and deaths due to pneumonia and influenza in this population.
Objective: To assess trends in influenza vaccination coverage among US nursing home residents from the 2005-2006 through 2014-2015 influenza seasons and trends in pneumococcal vaccination coverage from 2006 to 2014 among US nursing home residents, by state and demographic characteristics.
Methods: Data were analyzed from the Centers for Medicare and Medicaid Services' (CMS's) Minimum Data Set (MDS). Influenza and pneumococcal vaccination status were assessed for all residents of CMS-certified nursing homes using data reported to the MDS by all certified facilities.
Results: Influenza vaccination coverage increased from 71.4% in the 2005-2006 influenza season to 75.7% in the 2014-2015 influenza season and pneumococcal vaccination coverage increased from 67.4% in 2006 to 78.4% in 2014. Vaccination coverage varied by state, with influenza vaccination coverage ranging from 50.0% to 89.7% in the 2014-2015 influenza season and pneumococcal vaccination coverage ranging from 55.0% to 89.7% in 2014. Non-Hispanic black and Hispanic residents had lower coverage compared with non-Hispanic white residents for both vaccines, and these differences persisted over time.
Conclusion: Influenza and pneumococcal vaccination among US nursing home residents remains sub-optimal. Nursing home staff can employ strategies such as provider reminders and standing orders to facilitate offering vaccination to all residents along with culturally appropriate vaccine promotion to increase vaccination coverage among this vulnerable population.
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Residents of long-term care facilities are at increased risk for hospitalization and death due to influenza and pneumonia.[1–4] Vaccination with influenza vaccine and 23-valent pneumococcal polysaccharide vaccine (PPSV23) have been shown to be effective in reducing the incidence of pneumococcal pneumonia and death due to pneumonia and influenza in this population.[5,6] The Advisory Committee on Immunization Practices (ACIP) has recommended annual influenza vaccination for residents of long-term care facilities, regardless of age, since 1988.[7] Although annual influenza vaccination is currently recommended for all persons >6 months of age without contraindications for vaccination, residents of nursing homes and other long-term care facilities are listed as a group at risk for medical complications attributable to severe influenza for whom priority should be given when vaccine supply is limited.[8] Because of reported outbreaks of pneumococcal disease in nursing homes and other long-term care facilities, in 1997 the ACIP recommended that pneumococcal vaccination status be assessed for residents of nursing homes and other long-term care facilities.[9] During 2002 through 2015, published ACIP recommendations indicated vaccination of nursing home

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The authors declare no conflicts of interest.

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residents with 23-valent pneumococcal polysaccharide vaccine (PPSV23).[10,11] In 2016, the recommendation was clarified to indicate that nursing home residence alone was not an indication for PPSV23 vaccination for adults <65 years; however, these residents should be assessed for pneumococcal vaccination status and vaccinated as appropriate based on medical indications.[12]

A 1996 report by the Institute of Medicine on improving the quality of care in nursing homes recommended that all nursing home residents receive periodic standardized assessment of their functional, medical, mental, and psychosocial status.[13] As a result, legislation requiring uniform resident assessment of all nursing home residents was included in the Omnibus Budget Reconciliation Act of 1987 (OBRA-87).[14] Questions regarding influenza and pneumococcal vaccination status were added to the resident assessment instrument (RAI) in October 2005, when the Centers for Medicare and Medicaid Services (CMS) mandated that all nursing homes offer their residents annual influenza vaccination and at least 1 lifetime pneumococcal vaccination as a condition of certification.[15]

This article reports influenza vaccination coverage for the 2005-2006 through 2014-2015 influenza seasons and pneumococcal vaccination coverage from 2006 to 2014 among residents of CMS-certified nursing homes.

Methods

The data for this analysis were obtained from the Minimum Data Set (MDS), which is maintained by CMS and includes the core set of screening, clinical, and functional status elements collected on the RAI, including immunization assessments. Data collected prior to October 1, 2010, were obtained from the MDS, version 2.0, and data collected from October 1, 2010, onward were obtained from the MDS, version 3.0.[16,17]

In accordance with OBRA-87, facilities are required to conduct assessments on all residents at admission, quarterly, annually, whenever there is a significant change in the resident's status, and at discharge. The RAI is also used for Medicare Prospective Payment System (PPS) assessments to determine payment for Medicare Part A beneficiaries covered under the skilled nursing facilities (SNF) benefit. Assessments are conducted for SNF PPS residents at 5 days, 14 days, 30 days, 60 days, and 90 days postadmission, and when a change in therapy occurs. When the timing of OBRA-87 and SNF PPS assessments coincide, 1 assessment can be used to satisfy both requirements.[16,17]

Influenza and pneumococcal vaccination status is assessed on the RAI by medical record review when possible. If status cannot be determined from the medical record, the resident or the resident's legal guardian is questioned.[16,17]

Influenza Vaccination Assessment

The study population for each influenza season included all adults aged ≥18 years in CMS-certified nursing homes and long-term care facilities who had at least 1 resident assessment of any type (OBRA-87 or SNF PPS) during each influenza season (defined as the period from October 1 through March 31 of the next year) during 2005-2006 through 2014-2015. Whereas residents must have had at least 1 assessment during October through March to be included in the study population for a given influenza season, all assessments from October 1 through June 30 were used to determine vaccination status. The mean number of assessments per resident in the study population for each influenza season ranged from 4.3 to 5.0. The number of residents included in the study population ranged from 2,446,647 in 2005-2006 to 2,640,219 in 2014-2015. Size of the study population for each influenza season, by demographic characteristics and by state, are given in Supplementary Tables 1 and 2.

Influenza vaccination status for the 2005-2006 through the 2009-2010 influenza seasons was determined from the following questions in the MDS 2.0: (1) "Did the resident receive the influenza vaccine in this facility for this year's influenza season (October 1 through March 31)?" and (2) "If influenza vaccine not received, state reason." Influenza vaccination status for the 2010-2011 through 2014-2015 influenza seasons was determined from the following questions in the MDS 3.0: (1) "Did the resident receive the influenza vaccine in this facility for this year's influenza season?" and (2) "If influenza vaccine not received, state reason." Residents with a "yes" response to the first question or a "no" response to the first question and response to the second question of "Received outside of this facility" were considered to be vaccinated. Residents considered vaccinated on any assessment conducted within an influenza season were counted as vaccinated for that season. Sensitivity analyses were conducted to examine the effect of excluding residents with discrepant assessments (ie, indicated as vaccinated on one assessment and indicated as unvaccinated in a subsequent assessment during the same season) and counting residents with discrepant assessments as unvaccinated.

Residents with missing vaccination information on all assessments conducted within an influenza season were excluded from the study population for that season. Residents were also excluded from the study population if all assessments for a particular season indicated that the resident was unvaccinated and the reason given for nonvaccination was "not present in the facility during influenza season." In total, 2% to 7% of nursing home residents with assessments from October 1 through March 31 were excluded from the study population for each influenza season.

Pneumococcal Vaccination Assessment

The study population for pneumococcal vaccination assessment in each year included all adults ≥18 years in CMS-certified nursing homes and long-term care facilities who had at least 1 resident assessment of any type from January 1 through December 31 of each calendar year. The mean number of assessments per resident in the study population for each year ranged from 4.7 to 5.4. The number of residents included in the study population ranged from 3,288,514 in 2006 to 3,786,938 in 2014. Size of the study population for each year, by demographic characteristics and by state, are given in Supplementary Tables 3 and 4.

Pneumococcal vaccination status from assessments conducted prior to October 1, 2010, was determined based on the following question in the MDS 2.0: "Is the resident's PPV status up to date?" Pneumococcal vaccination status from assessments conducted from October 1, 2010, through December 31, 2013, was determined based on the following question in the MDS 3.0: "Is the resident's pneumococcal vaccination up to date?" The definition of "up to date" is not given directly on either version of the RAI; however, the RAI 2.0 and RAI 3.0 user's manuals specify that vaccination is indicated for residents of nursing homes and other long-term care facilities, and revaccination is indicated for those with certain immunocompromising conditions and those who received their first dose of pneumococcal vaccination before age 65 years.[16,17] Residents with a "yes" response on any assessment conducted in the calendar year of interest or in any earlier year were considered to be vaccinated, regardless of an any subsequent "no" responses. Sensitivity analyses were conducted to examine the effect of excluding residents with discrepant assessments (ie, indicated as vaccinated on one assessment and indicated as unvaccinated in a subsequent assessment) and counting residents with discrepant assessments as unvaccinated.

Residents were excluded from the study population for a calendar year if pneumococcal vaccination information was missing from all assessments conducted during that year and all previous years. Three percent to 5% of residents were excluded from the study population each year because of missing information.

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