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Increased city-level influenza mortality and state-level influenza severity is associated with greater functional decline among nursing home residents

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Context

In the USA, 90% of the estimated 24 000 influenzarelated deaths each year occur in older adults,¹ and rates (per 100 000 person-years) of hospitalisation for influenza and its complications increase steadily with age, from 111 among those 50–64 years to 1669 among those 85 years or older.² Age, comorbidity and high risk of exposure make nursing-home residents particularly vulnerable to influenza. Yet, other than increased hospitalisation and mortality, little is known about the clinical outcomes of influenza in this vulnerable population.

Methods

This retrospective observational study evaluated the relationship between regional influenza prevalence and severity and clinical outcomes among the long-stay nursing home residents of 2351 nursing homes in 122 US cities over six influenza seasons (1999–2005). City-level data on weekly influenza death rates and state-level data on influenza activity were obtained from the Centers for Disease Control and Prevention, data on resident vaccination rates were obtained from the Online Survey and Certification Automated Record (OSCAR) aggregated at the city level. Risk-adjusted clinical outcomes, including decline in activities of daily living, weight loss, pressure ulcers and infections, were obtained from the Minimum Data Set, and aggregated quarterly and by facility. Facility fixed-effects multivariate regression models which accounted for correlations in outcomes within facilities over time and for secular trends were used to evaluate the relationship between influenza mortality and activity and resident outcomes.

Findings

Regional influenza activity and mortality rates were strongly associated with functional decline, weight loss, worsening pressure ulcers and infections among long-stay nursing-home residents, but not with control outcomes not hypothesised to be related to influenza (restraint use, antipsychotic use and persistent pain). Influenza activity was a better predictor of adverse clinical outcomes than death rates, although both were independently associated

with most outcomes. Adjusting for city-level resident vaccination rates had a minimal effect on these relationships.

Commentary

Gonzalo and colleagues use region-level and facility-level data to identify strong association between influenza exposure, as estimated by city-level and state-level influenza mortality and activity, and important clinical outcomes among long-stay nursing-home residents. Although their measures of influenza exposure are indirect, their results provide support for the substantial impact of influenza on residents' morbidity and quality of life. Many of the clinical outcomes studied also serve as publicly reported quality measures, suggesting that severe influenza seasons may have an adverse impact on ratings of facilities in affected regions. Although these adverse clinical outcomes need to be confirmed with prospective, non-aggregated data, the strength of the evidence necessitates continued efforts to prevent influenza and its complications among nursing home residents. Vaccination of residents and staff is the mainstay of influenza prevention in nursing homes. Although this study did not show any ameliorating effect of vaccination on functional decline and other clinical outcomes, they had limited data on vaccination rates among residents and none among staff. Previous studies have demonstrated the effectiveness of vaccination in nursing home residents. Despite limited efficacy (30–40%) in preventing influenza infection, resident vaccination can decrease the likelihood of a facility outbreak. In the event of an outbreak, vaccination can decrease hospitalisations by up to 60% and mortality by up to 80%.³ High-dose vaccines and intradermal administration, currently being studied, have the potential to improve vaccine efficacy among vulnerable older adults.⁴ Vaccination of nursing-home staff has been shown to decrease all-cause mortality and influenza-like illness among residents.⁵ In addition to mortality and healthcare utilisation, future studies of vaccine effectiveness in nursing-home residents and other groups of vulnerable older adults should consider examining patient-oriented clinical outcomes such as functional decline.

References

1. Thompson MG, Shay DK, Zhou H, et al. Estimates of deaths associated with seasonal influenza—United States, 1976–2007. *MMWR*. 2010; 59:1057–1062. [PubMed: 20798667]
2. Thompson WW, Shay DK, Weintraub E, et al. Influenza-associated hospitalizations in the United States. *JAMA*. 2004; 292:1333–1340. [PubMed: 15367555]
3. Bradley SF. Prevention of influenza in long-term-care facilities. *Infect Control Hosp Epidemiol*. 1999; 20:629–637. [PubMed: 10501266]
4. Parodi V, de Florentiis D, Martini M, et al. Inactivated influenza vaccines: recent progress and implications for the elderly. *Drugs Aging*. 2011; 28:93–106. [PubMed: 21275435]
5. Thomas RE, Jefferson T, Lasserson TJ. Influenza vaccination for healthcare workers who work with the elderly: systematic review. *Vaccine*. 2010; 29:344–356. [PubMed: 20937313]

Implications for practice and research

- Prevention of exposure to influenza among long-stay nursing home residents has the potential to prevent significant morbidity, including functional decline.
- Nursing home quality measures may need to be adjusted seasonally or for regional influenza severity.
- Future research is needed to confirm these associations on an individual level and to determine if preventive measures, such as resident and staff vaccination and hand hygiene, can prevent functional decline and other adverse outcomes.