Nursing Homes in States with Infection Control Training or Infection Reporting Have Reduced Infection Control Deficiency Citations

It is estimated that 1.6–3.8 million infections occur among US nursing home (NH) residents each year, although healthcare-associated infections (HAIs) may be largely preventable. To reduce HAIs, the Centers for Medicare and Medicaid Services (CMS) monitors NH infection control (IC) practices as part of the annual inspection survey that determines certification eligibility. Noncompliant NHs are issued a citation (ie, F-tag or “deficiency”). State Departments of Health (DOHs) have also responded to these problems through a variety of activities, information, and policies, including IC training resources for NH providers, advisories, formal working groups, or collaboratives to advise NH providers regarding IC and mandatory or voluntary HAI reporting by NHs to the DOH. To our knowledge, the effects of these activities have not been evaluated. Hence, our objective was to determine associations between specific state DOH activities and NH IC citation rates.

Information regarding state activities to reduce infections in NHs was systematically collected from 50 states and the District of Columbia’s DOH Web sites between November 2012 and January 2013. Details regarding data collection were previously described. Data from the Certification and Survey Provider Enhanced Reporting (CASPER) system from 2013 (93.9%) or 2014 (6.1%) were used, as were data from the Area Health Resource File (AHRF). CASPER contains information collected during CMS annual NH inspections, including citations and facility characteristics. AHRF contains county-level socioeconomic, demographic, and health descriptions.

Multivariate logistic regression with regional and urbanicity fixed-effects and state clustering was used to test associations between IC-related citations and the presence of the following state DOH activities: (1) voluntary or mandatory reporting of NH infections; (2) an advisory board, working group, or collaborative focused on reducing infections in NHs; and (3) IC training available through the DOH Web site (excluding inspection-related information). The models included covariates to control for facility, resident population, and market characteristics similarly to those of other studies. Relationships between overall care quality citations and DOH activities were also evaluated to assess specificity. A significance level of 5% was set a priori. All analyses were conducted using Stata 13 statistical software.

Data were available from 14,276 NHs; 91.3% of facilities were in states that provided IC training, 70.4% were in states with an advisory group or collaborative, and 9.7% were in states with mandatory or voluntary HAI reporting. In this sample, 37.6% and 64.3% of facilities received an IC-related or a care quality citation, respectively. In the multivariate analyses, NHs in states that had mandatory or voluntary HAI reporting were less likely to receive IC-related citations (odds ratio [OR]: 0.61; 95% confidence interval [CI]: 0.49–0.75) or overall care quality citations (OR: 0.75; 95% CI: 0.55–0.95). NHs in states that provided IC training were less likely to receive IC-related citations (OR: 0.67; 95% CI: 0.48–0.86), and training was not related to overall care quality citations. The presence of a state advisory or collaborative was not associated with either IC-related or care quality deficiency citations (Table 1).

The association between provider access to IC training and fewer IC-related citations was specific and strong. Using qualitative methods, we previously found the need for increased training opportunities for NH staff members, particularly for those in charge of IC programs. It is logical that state DOH-provided IC training would improve IC and result in an inverse relationship with IC-related citations.

Inverse correlations between the presence of HAI reporting and both general care quality citations and IC-related citations may indicate that HAI reporting impacts quality generally. At the time of data collection, only 5 states had HAI reporting; 3 of these implemented reporting within the previous year. Other factors coinciding with NH HAI reporting in those states and that were not accounted for in our study may have affected care quality citations. Furthermore, the relationship

<table>
<thead>
<tr>
<th>Policy/Activity</th>
<th>Infection Control Citations</th>
<th>Care Quality Citations</th>
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<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Advisory group or collaborative</td>
<td>0.91</td>
<td>0.70, 1.12</td>
</tr>
<tr>
<td>Infection control training or materials</td>
<td>0.67</td>
<td>0.48, 0.86</td>
</tr>
<tr>
<td>Mandatory or voluntary HAI reporting</td>
<td>0.61</td>
<td>0.49, 0.75</td>
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NOTE. Estimates produced using logistic regression models with regional and urbanicity fixed-effects and state clustering, adjusting for facility, resident population, and market characteristics similar to those of other studies. HAI, healthcare associated infection; OR, odds ratio; CI, confidence interval.
was stronger with IC citations suggesting specificity. Future research should reassess these relationships.

It was surprising that no association between presence of advisory groups or collaboratives and citations was found. As these groups may be initiated by an entity other than the state DOH (eg, county-led), they may not have been identified on the state DOH Web site and therefore were not accounted for in the current analysis. Further research regarding regional initiatives to reduce infections in NHs would be helpful to interpret the impact of these initiatives as well as isolate effects of state policies.

We found an IC-related citations rate similar to that of Ye et al. (2015),9 which was higher than previously reported.7 A factor contributing to this difference is that 5 IC-related citations (441–445) were combined into one citation (441) in September 2009. Another factor may be that the rate that NHs received IC citations rose from 12.87% to 17.31% between 2000 and 2007.7 It is plausible that this trend continued to increase through data used in this study.

Given these findings, clinicians may wish to seek out NH-specific IC training as a means to improve practice and reduce IC citations. As IC training resources generated by state DOHs and HAI reporting are different across states, further research should determine which training methods are most effective and whether HAI reporting improves care. Policymakers and state DOHs should provide or increase IC training to NH providers.

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