discharged with follow-up appointments within 7 days (43.0% vs 32.2%; *P* < .001) and those readmitted to other hospitals (19.0% vs 12.0%; *P* = .001). More hospitals were estimating risk of readmission in a formal way (34.6% vs 22.5%; *P* < .001), using electronic forms for medication reconciliation (81.0% vs 72.8%; *P* < .001), and using “teach-back” techniques, in which health care providers ask patients to state in their own words clinical instructions given or decisions about treatment made (80.8% vs 68.9%; *P* < .001). Last, more hospitals were providing action plans to discharged patients with heart failure (60.0% vs 52.2%; *P* = .005) and calling patients after discharge to follow up on postdischarge needs or provide additional education (71.4% vs 62.9%; *P* < .001).

For many of the strategies, however, we found no significant change in the proportion of hospitals implementing them (Table 2). At the follow-up survey, less than 40% of hospitals had in place a process for alerting outpatient physicians about discharges within 48 hours or for following up on test results that are returned after the patient was discharged; less than one-quarter of hospitals always sent the discharge summary to the primary care physician, and less than two-thirds always conducted nurse-to-nurse report before discharge to nursing homes. Results did not differ substantially for hospital subgroups based on numbers of beds, teaching status, ownership type, census region, or multihospital affiliation.

**Discussion** | Despite financial incentives for hospitals to reduce readmission rates, many hospitals are not implementing recommended strategies that have been shown to be associated with lower hospital risk-standardized readmission rates.3-6 Our work provides national data among a group of hospitals most likely to engage in improvement activities and may partially explain the slow rate of improvement in readmission rates nationally. More consistently implemented strategies to promote safe transitions from hospital to home are likely critical for reducing readmission rates in the years ahead.

Elizabeth H. Bradley, PhD  
Heather Sipsma, PhD  
Leora I. Horwitz, MD, MHS  
Leslie Curry, MPH, PhD  
Harlan M. Krumholz, MD, SM

**Author Affiliations:** Department of Health Policy and Management, Yale School of Public Health, New Haven, Connecticut (Bradley, Curry, Krumholz); Robert Wood Johnson Clinical Scholars Program, Department of Medicine, Yale University School of Medicine, New Haven, Connecticut (Bradley, Curry, Krumholz); Department of Women, Children and Family Health Science, University of Illinois at Chicago College of Nursing, Chicago, Illinois (Sipsma); Center for Outcomes Research and Evaluation, Yale-New Haven Hospital, New Haven, Connecticut (Horwitz, Krumholz); Section of General Internal Medicine, Department of Medicine, Yale University School of Medicine, New Haven, Connecticut (Horwitz); Section of Cardiovascular Medicine, Department of Medicine, Yale University School of Medicine, New Haven, Connecticut (Krumholz).

**Corresponding Author:** Elizabeth H. Bradley, PhD, Department of Health Policy and Management, Yale School of Public Health, 60 College St, PO Box 208034, New Haven, CT 06520-8034 (Elizabeth.Bradley@yale.edu).

**Published Online:** October 21, 2013. doi:10.1001/jamainternmed.2013.11574.

**Author Contributions:** Drs Bradley and Sipsma had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

**Study concept and design:** Bradley, Horwitz, Curry, Krumholz.

**Acquisition of data:** Bradley.

**Analysis and interpretation of data:** Bradley, Sipsma, Horwitz, Curry, Krumholz.

**Drafting of the manuscript:** Bradley, Sipsma.

**Critical revision of the manuscript for important intellectual content:** Bradley, Sipsma, Horwitz, Curry, Krumholz.

**Statistical analysis:** Sipsma.

**Obtained funding:** Bradley, Krumholz.

**Administrative, technical, or material support:** Sipsma.

**Study supervision:** Bradley.

**Conflict of Interest Disclosures:** Dr Krumholz has received a research grant from Medtronic through Yale University and chairs a cardiac scientific advisory board for United Health Care. Dr Walsh has served as a consultant to United Health Care and Eli Lilly. No other disclosures are reported.

**Funding/Support:** Dr Horwitz is supported by the National Institute on Aging, Bethesda, MD (K08 AG038336) and by the American Federation for Aging Research, New York, NY through the Paul B. Beeson Career Development Award Program. Dr Horwitz is a Pepper Scholar with support from the Claude D. Pepper Older Americans Independence Center at Yale University School of Medicine (No. P30AG21342 NIH/NIA). Funding was provided by The Commonwealth Fund and the Center for Cardiovascular Outcomes Research at Yale University, supported by the National Heart Lung, and Blood Institute (No. U01HL05270-03).

**Role of the Sponsor:** The funding sources had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

**Disclaimer:** The content is solely the responsibility of the authors and does not necessarily represent the official views of The Commonwealth Fund, the National Institute on Aging, the National Institutes of Health, or the American Federation for Aging Research.

**Previous Presentation:** This study was presented at the 2013 Academy Health Annual Research Meeting; June 24, 2013; Baltimore, MD.


**Trends in Emergency Department Visits for Ambulatory Care Sensitive Conditions by Elderly Nursing Home Residents, 2001 to 2010**

Despite having 24-hour access to health care professionals, nursing home residents have disproportionately high rates of emergency department (ED) visits, a large portion of which are potentially preventable.1,2 These acute care visits, often classified as potentially preventable using ambulatory care sensitive conditions (ACSCs), can be harmful to residents’ functional outcomes relative to treatment in their familiar setting.3 Given the increase in reporting and
enforcement of the Centers for Medicare & Medicaid Services’ regulations about nursing home quality, we hypothesized that the rate of ED visits for ACSCs by elderly nursing home patients had declined during the last decade.

**Methods** | This study was exempt from review by the University of California, San Francisco Committee on Human Research. We conducted a retrospective analysis of ED visits by elderly nursing home residents using data from the 2001 to 2010 National Hospital Ambulatory Medical Care Survey. We excluded patients who were younger than 65 years (85.3%), had died in the ED (0.5%), or did not reside in a nursing home (88.8%) (see the eMethods in the Supplement).

We used the Agency for Healthcare Research and Quality’s Prevention Quality Indicators to identify visits for ACSCs based on *International Classification of Diseases, Ninth Revision* diagnosis codes. To calculate rates of ED use per nursing home resident, we used resident-year denominators from the Centers for Medicare & Medicaid Services’ Online Survey Certification and Reporting data.

Significance of the trends in rates of ED visits for ACSCs and other diagnoses by nursing home patients was assessed using Poisson regression. We further analyzed the distribution of visits for ACSCs by diagnosis and assessed the significance of changes in that distribution using χ² test across 5 two-year blocks to preserve significant sample sizes.

All analyses were performed using commercially available software. SAS, version 9.2 (SAS Institute Inc) and SUDAAN, version 10.0 (RTI International) were used.

**Results** | Between 2001 and 2010, the number of ED visits by elderly nursing home patients increased 12.8%, from 1.9 to 2.1 million. Nineteen percent were for ACSCs. The rate of ED visits for ACSCs increased from 263 to 320 visits per 1000 residents (21.8%), but the change was not statistically significant (P = .17).

Pneumonia was the most common ACSC in the sample, accounting for 27.9% of all ED visits for ACSCs (Table). Urinary tract infections rose from 23.4% of all visits for ACSCs in 2001-2002 to 32.2% in 2009-2010, although the change in the distribution of diagnoses was not significant (P = .17).

**Discussion** | Despite increasing legislation to monitor and enforce nursing home standards and quality of care, no decrease has occurred in the rate of ED visits for ACSCs during the last decade. The absolute rate of ED visits for ACSCs among elderly nursing home residents (273 visits per 1000 in 2007) was substantially higher than past estimates of ED visit rates for ACSCs in the general adult population (31.9 visits per 1000 in 2007). Similarly, their overall ED visit rate (310 visits per 1000 in 2007) was almost 3 times higher than past estimates of ED use by all Americans older than 65 years (476.8 visits per 1000 in 2007).4

High ED visit rates among elderly nursing home residents are in some ways expected, for ACSCs and overall, given the prevalence of serious illness and disability in this population.3 Furthermore, the uncoordinated payment systems of Medicare and Medicaid, for which most elderly patients are eligible, contribute to use of health services, including ED visits.6

Visit numbers and corresponding visit rates from 2001 to 2004 were adjusted by 0.92 to account for non–nursing home, institutionalized patients (see the eMethods in the Supplement).

---

**Table. Emergency Department Visits for Ambulatory Care Sensitive Conditions (ACSCs) by Diagnosis Among Elderly Nursing Home Residents**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Visits for ACSCs, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>184 546 (27.9)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>154 941 (23.4)</td>
</tr>
<tr>
<td>Other ACSCs</td>
<td>322 924 (48.7)</td>
</tr>
</tbody>
</table>

*Analysis of the change in the distribution of diagnoses using χ² test demonstrated that the shift in visits across diagnostic groups during the study period was not significant (P = .17).

Visit estimates from 2001 to 2004 were adjusted by 0.92 (see the eMethods in the Supplement).

© 2014 American Medical Association. All rights reserved.
Risk and Risk Reduction of Major Coronary Events Associated With Contemporary Breast Radiotherapy

Long-term breast cancer survival rates have improved markedly over recent decades, so minimization of long-term treatment-related complications is increasingly important. Several reports have suggested links between breast cancer radiotherapy and long-term cardiovascular mortality. A recent analysis by Darby et al6 of patients treated with breast radiotherapy between 1958 and 2001 revealed a statistically significant linear dependence of the risk of major coronary events on mean cardiac dose. We use these historical data to estimate risks of major coronary events induced by modern breast radiotherapy. Our motivation is to quantify contemporary risks and also to guide efforts to minimize radiotherapy-induced cardiovascular risks.

Methods | The risk estimates derived here were based on contemporary patient-specific radiation doses averaged over the cardiac volume (hereafter, mean cardiac dose). These were derived from breast radiotherapy treatment plans for 48 patients with stage 0 through IIA breast cancer who were treated after 2005 at New York University Department of Radiation Oncology. Two treatment plans, for supine and for prone treatment positions, were generated for each patient. This was a prospective trial and received institutional review board approval. Informed consent was obtained from all participants.

Excess absolute risks (R) of radiotherapy-induced major coronary events (defined, as in Darby et al, as myocardial infarction, coronary revascularization, or death from ischemic heart disease) were calculated for each patient, on the basis of patient-specific mean cardiac doses and using the dose-response relationship reported by Darby et al for these endpoints:

\[
R = 0.074 \times D \times B.
\]

Here, D is the mean cardiac dose (in gray) and B is the baseline risk for a major coronary event, as defined in the previous paragraph. Because the radiation-associated risk depends on the baseline risk, we report risk estimates for typical low-risk, medium-risk, and high-risk patients, with baseline risks (B) estimated (Table) on the basis of the standard Reynolds algorithm.4 Cardiac risks were calculated over 20 years after radiotherapy, the approximate mean life expectancy after early-stage breast cancer.

Results | For standard supine-positioned radiotherapy, the patient-averaged mean cardiac dose was 1.37 (95% CI, 1.12-1.61) Gy (to convert to rad, multiply by 100), less than one-third of the average mean cardiac dose reported2 for breast radiotherapy from 1958 to 2001. As expected,3 mean cardiac doses were significantly lower for right-sided than for left-sided breast radiotherapy (2-tailed P = .001 for supine positioning and <.001 for prone positioning). For left-sided (but not right-sided) radiotherapy, treating in a prone position resulted in a halving of the mean cardiac dose.