Health Care Reform

Practice Redesign to Improve Care for Falls and Urinary Incontinence

Primary Care Intervention for Older Patients

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Background: In primary care, medical care for age-associated conditions, such as falls and urinary incontinence (UI), is inadequate. In collaboration with the American College of Physicians, we augmented the Assessing Care of Vulnerable Elders practice redesign intervention to improve falls and UI care.

Methods: We performed a controlled trial in 5 nonrandomly selected primary care intervention (26 physicians across sites) and control (18 physicians) practices from diverse communities. Patients 75 years and older who screened positive for falls or fear of falling and UI were included in the study. We conducted a multicomponent intervention between October 30, 2006, and December 31, 2007, that included efficient collection of data, medical record prompts, patient education materials, and physician decision support. Main outcome measures were quality of care for falls and UI comparing intervention and control sites.

Results: Of 6051 patients screened, 2847 (47.1%) screened positive for falls or UI (46.1% in the intervention group and 48.8% in the control group). Across the 5 practices, 1211 patient medical records were evaluated after stratified random selection. Intervention patients received 60.0% of recommended care for falls vs 37.6% provided by control health care professionals (P < .001). Similarly, intervention health care professionals provided more recommended care for UI (47.2% vs 27.8%, P < .001). Intervention health care professionals more often performed a falls history, orthostatic blood pressure measurement, gait and balance examination, and UI history and tried UI behavioral treatments first. Knowledge about falls and UI increased more among intervention than control group health care professionals.

Conclusions: Practice redesign can improve the care that community-based primary care physicians provide for older patients with falls and UI. Outcomes of such care improvements require further evaluation.

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The older population in the United States is increasing, and older Americans have disproportionately high health care needs. Persons 65 years and older have more office visits and hospitalizations than younger adults1 and often have multiple chronic conditions, resulting in complex medical care needs.2 Furthermore, older patients experience a variety of syndromes of aging (eg, incontinence, falls) that have received less quality improvement attention than other common conditions (eg, heart failure). Primary care for these geriatric conditions is inadequate.3,4 A variety of interventions improve care for falls5-7 and urinary incontinence (UI).8,9 Various methods of implementation have attempted to enhance care for these conditions, including consultative10,11 and care management models.12-14 Although these interventions have, in general, demonstrated improvements in patient care and outcomes, they have been difficult to implement in the current practice environment and have not disseminated into small primary care practices, where most older patients receive their care.15 Small to medium practices usually do not have the resources to adopt new models of care.16 In these sites, practice redesign—reengineering the internal workflow and health care provision processes of the practice—may be more effective in improving care for older patients. Some of us17 previously demonstrated that practice redesign can improve

See Invited Commentary at end of article

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care for falls and UI for older patients in 2 large primary care practices, but the gains were relatively modest.

For this project we collaborated with the American College of Physicians’ (ACP) ACPNet (a Web-based quality improvement program) to incorporate quality improvement components and give participating sites increased latitude in implementing practice redesign. Five small to medium primary care practices, each with a control site, implemented the Assessing Care of Vulnerable Elders Practice Redesign for Improved Medical Care for Elders (ACOVEprime) intervention.

METHODS

We conducted a controlled trial to test the effect of the ACOVEprime intervention on the care provided by health care professionals to community-based patients 75 years and older who screened positive for falls, fear of falling, or UI. The study protocol was approved by the institutional review boards at RAND Health, the University of California, Los Angeles, and 3 clinical sites and the Western Institutional Review Board.

THE ACOVEprime INTERVENTION

The intervention was conceptualized as a practical restructuring of health care provision in the primary care office consistent with the Chronic Care Model, attempting to remedy many of the factors previously shown to relate to deficits in quality of care for older patients: inadequate case recognition, insufficient physician knowledge of condition-specific management techniques, patient lack of adherence, inadequate follow-up, and lack of time.

The ACOVE-2 intervention has 5 key components, which were customized to fit the practice’s patient flow and electronic and staff resources:

- Case finding—Before clinic visits, all patients 75 years and older were screened for falls or fear of falling and UI, and the results were available at the clinic visit.
- Efficient collection of condition-specific clinical data—A structured visit note and supporting educational materials were added to the patient’s medical record at the time of the office visit. Participating health care professionals and their staff decided what clinical data collection (eg, history taking) would be delegated to office staff and any alterations in patient flow to facilitate data collection. For example, staff placing the patient in a clinic room could follow automatic orders to complete simple condition-related procedures (eg, orthostatic blood pressure measurement).
- Medical record prompts—The structured visit note prompted health care professionals to address the identified condition and led them through data collection and diagnostic and therapeutic care processes, including patient education and referrals to community resources.
- Patient and family education materials—Patients were empowered by education materials for target conditions (eg, home safety checklist, pelvic floor exercises). Each practice developed local community resource lists for each condition (eg, community-based exercise programs).
- Health care professional decision support and physician and staff education—Health care professionals participated in a 2-hour educational program (led by D.B.R. or W.J.H.) that taught an approach to each target condition that could be completed during an office visit. A nurse (C.P.R.) conducted a separate training session to orient office staff to intervention implementation.

For ACOVEprime, the ACOVE-2 intervention was modified in several respects (Figure). First, the intervention incorporated an ACPNet quality improvement component in which participating health care professionals abstracted falls and UI care from their own medical records and received feedback reports from the ACP. Across-site collaboration was promoted by conference calls. Second, each practice had flexibility in implementing the intervention. As a result, there were fundamental differences in the ways practiced implemented intervention components. For example, condition screening was completed by nursing staff at 4 sites and by patient completion of a written previsit screener at the final site. One site planned to have patients return for a follow-up visit to manage the target condition. One site had a fully integrated electronic health record (EHR), 1 site had a medical record with electronic components, and 3 sites used paper records. A third innovation was a run-in phase that permitted practices to test their practice redesign model. Finally, the value of the project was enhanced by obtaining American Board of Internal Medicine Part 4 Maintenance of Certification credit for participation.

SITES AND PATIENT ENROLLMENT

The quality improvement project was advertised through ACPNet, and 108 practices demonstrated interest. Sixty potential practices did not meet the criteria of (1) at least 3 health care professionals caring for an adequate number of older patients and (2) having a clinic that could act as the control group (or being able to identify another local practice). Of the 48 remaining practices, 17 had physician disciplines or locations inconsistent with the project, 7 were academic Veterans Affairs practices, and 2 were introducing an EHR. Of the 22 eligible practices, 5 were selected with the intent of including community practices interested in practice redesign and representing variation in geographic location, environment, size, and patient characteristics. The sites were located in rural New York and small to medium cities in Pennsylvania, Wisconsin, Arizona, and Oregon.

At these sites, consecutive English-speaking patients 75 years and older presenting for routine primary care were screened for the target conditions at the intervention and control clinics of each site. Patients (or a proxy) were asked the following screening questions:

- Have you fallen 2 or more times in the past year? Have you fallen and hurt yourself since your last doctor visit?
- Are you afraid that you might fall because of balance or walking problems?
- Do you have a problem with urinary incontinence (can’t always hold your urine) that is bothersome enough that you would like to know more about how it could be treated?

A yes answer to any of these questions was considered a positive screen result. The intervention and evaluation were implemented as a quality improvement effort, meaning that all patients were screened at intervention and control venues, and at intervention clinics all patients were affected by the intervention. No individualized patient consent was requested. The sites maintained a list of patients who screened positive for falls, fear of falling, and/or UI during case finding to facilitate evaluation; this log was terminated 12 months after initiation of the intervention at the site (sites had staggered start times beginning October 30, 2006) or 3 months before the end of the intervention period (December 31, 2007), whichever came first.

DATA COLLECTION

All patients who screened positive for falls, fear of falling, or UI at intervention and control clinics were eligible for evaluation. Patients were assigned to the intervention or control group based
Patients selected for evaluation were reported by study identification to the sites, which linked them to patient records. These records were copied for approximately a 2-year period, including the intervention period and the prior 10 months. Medical records were deidentified and abstracted; abstraction was performed on site at 1 of the smaller sites. Abstractation was performed by nurses with experience in quality assessment aided by written guidelines. The abstractor considered all sources within a patient’s record when assessing whether patients were eligible for and had received the indicated care processes.

Health care professionals in the intervention and control groups completed a demographic survey and, before and after the intervention period, a knowledge test and an evaluation of the relevance of and their confidence and frustration in managing the target conditions. Relevance, confidence, and frustration were measured using a 1- to 5-point (high) scale (with frustration reversed), and a single mean score was compared between the intervention and control group health care professionals. Knowledge scores were computed as the percentage correct of 14 items concerning management of falls and UI in the older patient.

### STATISTICAL ANALYSIS

The primary outcome of the ACOVEprime intervention was aggregate quality of care for falls and UI over the approximately...
1-year intervention period, comparing intervention practices with control practices. This was measured using 11 quality indicators for falls and 10 quality indicators for UI from the ACOVE-3 set1,2,3 computed as the mean number of recommended care processes received divided by the number of eligible quality indicators. Quality indicators measured whether patients who had fallen received a fall history; examination, including orthostatic blood pressure measurement, vision evaluation, cognitive screen, and gait, balance, and strength evaluation; and home hazard evaluation. Patients who reported fear of falling without a fall since their last visit required a gait, balance, and strength evaluation. Additional quality indicators were triggered based on the clinical findings. Patients with bothersome UI were evaluated for whether they received a UI history, urinalysis, and appropriate examination; appropriate action for an elevated postvoid residual; treatment options discussed; behavioral treatment if appropriate; classification of the incontinence cause if medical or surgical treatment was undertaken; and reassessment.

Patients were eligible for quality indicator care processes if they had a positive screen result or if they presented to their health care professional with a fall, gait problem, or new or worsening UI during the study period. Any patient with a positive screening result was excluded from application of quality indicators if he or she had already received maximal treatment, defined as having received a workup and/or completed maximal therapies for falls or UI, or if the medical record documented that he or she, despite screening positive for fear of falling or UI, had denied the symptom to the health care professional. Patients presenting with UI who had a urinary tract infection and whose symptoms resolved after treatment of the infection were excluded from application of the UI quality indicators. Selected quality indicators were not applied to individuals with advanced dementia or a life expectancy of 6 months or less.20 For each quality indicator triggered by a patient, a pass or fail score was assigned based on whether the recommended care was provided. Credit was conferred for a health care professional offering a treatment even if refused by the patient (eg, the health care professional suggested physical therapy, but the patient refused).

For unadjusted comparisons of overall and condition-specific quality scores between the intervention and control groups, we used a general linear model with a Tukey-Kramer correction for multiple comparisons. We used χ² tests to compare intervention and control scores on individual quality indicators. To adjust for clustering of patients within data for health care professionals and factors that might confound the relationship between intervention or control group status and quality of care, we used a mixed-effects linear regression model that included a random intercept for each physician and fixed effects for site, patient age, patient sex, and screening interval within the intervention period.

Because 1 site planned to have patients with positive screening results return for dedicated falls or incontinence visits, we performed a sensitivity analysis by eliminating timing requirements for recommended care provision. We rescored the quality indicators, allowing care to be provided any time during the study period (eg, instead of having to perform a gait, balance, and strength examination for a patient who fell within 3 months; an examination performed any time before the end of the study satisfied the quality indicator), and then compared the intervention and control groups. Analyses were performed with SAS (SAS Institute Inc, Cary, North Carolina) and STATA (StataCorp LP, College Station, Texas) statistical software.

RESULTS

Of 6051 patients 75 years and older who had an office visit during the study period and were screened for falls and UI across the 5 sites, 2847 (47.1%) screened positive: 1502 (24.8%) for only falls or fear of falling, 535 (8.8%) for only bothersome UI, and 810 (13.4%) for both. Of 3846 intervention clinic patients, 46.1% screened positive, with 23.6% positive for falls or fear of falling, 9.5% positive for UI, and 13.1% positive for both. Of 2205 control clinic patients, 48.8% screened positive, with 27.0% positive for falls or fear of falling, 7.8% positive for UI, and 14.0% positive for both. The percentage of patients with positive screening results varied substantially across the 5 sites (Table 1).

Among the patients with positive screening results, a stratified random sample of 1420 patients was selected; an additional 20 patients were selected at each of the 4 sites that had an adequate sample for supplementation if selected patients were determined ineligible or records could not be found. Among these patients, 115 medical records could not be obtained or were incomplete, yielding 1385 possible medical records for abstraction. Of these patients, 23 were found to be younger than 75 years and 15 were erroneously included because of a screening error or had resolution of symptoms after urinary tract infection treatment. Of the remaining 1347 patients, 136 were excluded from evaluation because the patient had received maximal treatment for the condition, the health care professional noted that the patient was not a candidate for treatment, the patient was treated for the condition by a specialist whose records were not available, the patient denied fear of falling or bothersome UI, or, in the case of falls, the patient used a wheelchair. The final analytic sample in-

Table 1. Patients Who Screened Positive for Falls and Urinary Incontinence Across Sites and by Intervention and Control Groups

<table>
<thead>
<tr>
<th>Site</th>
<th>Total No. of Patients Screened</th>
<th>No. (%) of Patients Who Screened Positive</th>
<th>Total No. (%) of Patients Who Screened Positive for Falls or UI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Falls Only</td>
<td>UI Only</td>
<td>Falls and UI</td>
</tr>
<tr>
<td>A</td>
<td>2382</td>
<td>642 (27.0)</td>
<td>259 (10.9)</td>
</tr>
<tr>
<td>B</td>
<td>1162</td>
<td>210 (18.1)</td>
<td>68 (5.9)</td>
</tr>
<tr>
<td>C</td>
<td>977</td>
<td>215 (22.0)</td>
<td>60 (6.1)</td>
</tr>
<tr>
<td>D</td>
<td>798</td>
<td>238 (29.8)</td>
<td>77 (9.7)</td>
</tr>
<tr>
<td>E</td>
<td>732</td>
<td>197 (26.9)</td>
<td>71 (9.7)</td>
</tr>
<tr>
<td>Total</td>
<td>6051</td>
<td>1502 (24.8)</td>
<td>535 (8.8)</td>
</tr>
</tbody>
</table>

Abbreviation: UI, urinary incontinence.
cludes 1211 patients (80.7% of the selected sample): 1037 patients with falls and 349 patients with UI. Patients’ mean age was 83 years, and 71.7% were women. A total of 10.3% of the sample had medical record documentation of advanced dementia and 2.6% had poor prognosis. A total of 2.9% of patients died during the intervention period. The analytic sample contained 586 patients in the intervention group and 625 patients in the control group. Intervention patients and control patients were not significantly different with respect to age, sex, advanced dementia, and poor prognosis.

Forty-four primary health care professionals (42 physicians, a nurse practitioner, and a physician assistant) participated in the trial, 26 in the intervention group and 18 in the control group. Three-quarters of health care professionals were men; all practiced internal medicine or family medicine. One physician had completed a geriatrics fellowship and 5 more had additional certification in geriatrics. The health care professionals estimated that patients 75 years and older were represented, on average, more than one-third of their practices. No differences were found between the intervention and control group members in demographic or practice characteristics, baseline knowledge score, or relevance, confidence, or frustration in treating target conditions (Table 2).

**INTERVENTION EFFECT ON QUALITY OF CARE**

Overall quality of care for falls and UI was better for patients in the intervention group compared with the control group. In the intervention group, 586 patients triggered 2974 quality indicators and received recommended care for 56.8% (95% confidence interval [CI], 54.0%-59.8%) compared with 35.7% of recommended care (33.0%-38.5%) provided to the 625 patients in the control group, who triggered 2750 quality indicators (P < .001 for the difference between groups). Intervention group patients received better care than control group patients for falls (60.0% vs 37.6%, P < .001) and UI (47.2% vs 27.8%, P < .001). The sensitivity analysis (extending the period during which recommended care could be completed) resulted in only minor changes in overall (intervention 64.3% vs control 44.5%), falls (intervention 67.8% vs control 46.9%), and UI (intervention 56.0% vs control 39.2%) quality scores and no change in the intervention effect. As indicated in Table 3, intervention health care professionals provided statistically significantly better care than control health care professionals for falls care at 4 sites and for incontinence care at 2 sites.

**SPECIFIC CARE RECEIVED BY INTERVENTION AND CONTROL GROUP PATIENTS**

Performance on specific care processes for the 2 conditions is presented in Table 4. Patients in the intervention group received more recommended history taking, physical examination components for falls and gait disorders, and home hazard evaluations. Intervention group health care professionals more often prescribed an exercise program for patients found to have a deficit on examination for falls and discussed treatment options and timely behavioral treatment for patients with UI.

| Table 2. Health Care Professional Characteristics by Intervention and Control Groups |
|---------------------------------|-----------------|
| Characteristic                  | Intervention (n=26) | Control (n=18) |
| Site                            |                 |                |
| A                              | 7 (26.9)        | 2 (11.1)       |
| B                              | 4 (15.4)        | 4 (22.2)       |
| C                              | 3 (11.5)        | 3 (16.7)       |
| D                              | 9 (34.6)        | 6 (33.3)       |
| E                              | 3 (11.5)        | 3 (16.7)       |
| Male sex                       | 18 (68.2)       | 15 (83.3)      |
| Age, median (SD), y            | 50 (7)          | 49 (9)         |
| Years since professional school graduation, mean (SD) | 21 (7) | 21 (9) |
| Training                       |                 |                |
| Internal medicine               | 21 (81)         | 13 (72)        |
| Family medicine                 | 3 (11)          | 5 (28)         |
| Nurse practitioner              | 2 (8)           | 0              |
| or physician assistant          |                 |                |
| Board certified                 | 25 (96.2)       | 17 (94.4)      |
| Geriatric additional qualifications | 5 (19.2)       | 1 (5.6)        |
| Percentage of patients          | 36              | 37             |
| ≥75 years old, mean            |                 |                |
| Knowledge score, baseline, mean (SD) | 65.0 (14.7) | 67.5 (13.7) |
| Relevance of falls and UI to their patients, mean (SD) | 4.0 (0.6) | 4.2 (0.6) |
| Confidence in treating falls and UI, mean (SD) | 3.1 (0.7) | 3.2 (0.6) |
| Frustration in treating falls and UI, mean (SD) | 3.2 (0.8) | 3.5 (0.9) |

Abbreviation: UI, urinary incontinence.

a Data are presented as number (percentage) of health care professionals unless otherwise indicated. There was no difference (P > .05) between the intervention and control groups in characteristics listed in this table.

b Knowledge score is the percentage correct of 14 questions about falls and UI.

c Relevance, confidence, and frustration treating falls and UI were measured at baseline on a 1- (low) to 5-point (high) scale.

**HEALTH CARE PROFESSIONAL SURVEY SCORES**

During the study period, intervention group health care professionals increased knowledge about falls and UI more than control group health care professionals (mean 0- to 100-point knowledge score change, +14.8 vs +3.2; P = .007 by paired t test). Comparing preintervention vs postintervention surveys, intervention group health care professionals increased their scores on the confidence, relevance, and frustration scale more than control group health care professionals (mean change, +0.30 on the 5-point scale vs +0.02; P = .04).

**INTERVENTION EFFECT ADJUSTING FOR COVARIATES**

In the multivariate model predicting overall falls and UI quality of care at the patient level, after adjusting for patient age, condition triggered, and intervention timing, intervention patients received 24.7 percentage points higher quality of care (95% CI, 16.1-33.3) compared with control patients. Site B provided better care, and women received slightly lower quality care (−4.6 points; 95% CI, −8.7 to −0.5; P = .03).
This practice redesign intervention improved medical care for falls and UI from 35.7% of recommended care in the control group to 56.8% in the intervention group. The control group care was similar to the 30% range seen in other cohorts, whereas the intervention group’s quality scores were similar to quality levels found for common, nongeriatric medical conditions, such as diabetes mellitus and heart failure, among vulnerable elderly patients and other adults. The relative effect size of 60% is remarkable given the nature of this practice change intervention, which involved hiring no new staff and in 4 of 5 sites did not include EHR implementation. Accordingly, this intervention can be implemented across medium and small medical practices that do not have a research infrastructure, has the potential to be applied broadly to change the way falls and UI are treated in large groups of older patients, and also may be applicable to other geriatric conditions.

This 5-site intervention achieved substantially better care for falls and UI than did a prior quality improvement study using the ACOVE-2 intervention conducted in 2 California medical groups where intervention patients received 44% of recommended care for falls and 37% for UI. The augmented practice redesign intervention incorporated elements shown to enhance quality improvement: physician self-evaluation with feedback provided by the ACP, a physician incentive of potential Maintenance of Certification credit, and collaborative support across sites. Quality improvement with support from a professional society has broad potential to reach physicians in a variety of practice settings.
The intervention appeared to be effective, albeit not always statistically significantly so, across all 5 sites, with I site receiving comparatively higher quality scores in its intervention and control clinics. This site used a fully integrated EHR. Whether this difference in scores reflects differences in care processes or relates to mode of documentation requires exploration.

This controlled trial has several limitations. Although it included heterogeneous and geographically disparate medical groups, these groups were volunteers from ACPNet that were interested in improving geriatric care. Furthermore, the intervention and control sites were not selected randomly. Thus, the results cannot be generalized to all medical groups. Second, although we had a complete collection of primary care medical records, which included some specialty records as well, it is possible that some of the patients received recommended care at other venues that we could not measure. Furthermore, care measurement was limited to what was recorded in the medical records. The full effect of practice redesign (case finding plus intervention components) was not studied because the condition identification component was provided for the control and intervention group patients; providing screening results to control group health care professionals likely minimized differences in quality of care between the 2 groups. Importantly, this study did not measure clinical outcomes of care.

In conclusion, this study demonstrates further development of a practice redesign intervention to improve care for falls and UI that may be implemented in most primary care practices. Components are publicly available (http://www.acponline.org/running_practice/quality_improvement/projects/acove_prime/). Future implementation efforts should measure clinical outcomes, which were unavailable in this study.

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REFERENCES


INVITED COMMENTARY

Improving Primary Care for Older Patients

Challenge for the Aging Century

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We have entered the aging century. The global population older than 65 years will double by 2040, with the most rapid increase among people older than 80 years.1 The aging of populations will challenge health care systems around the world: not only will greater numbers of people have chronic diseases, such as heart failure or cancer, but also many will develop disabling geriatric conditions, such as dementia, difficulty walking, falling, or incontinence. Geriatric conditions are underdiagnosed, and their treatment requires expertise beyond a prescription or surgery. These complex conditions diminish the length and quality of life and the ability of individuals to engage in society.2

Unfortunately, the US health care system often fails to provide recommended care, especially for geriatric conditions. Roughly half of recommended care is provided for general medical conditions among younger and older adults, and less than one-third of recommended care has been provided for geriatric conditions.34 Although systematic efforts have increased the amount of recommended care provided to older adults, these improvements have been small.3

How can we, as physicians, improve care beyond doing our usual best for our next patient? We believe that robust efforts to improve care can be built on the principle that “quality problems exist not because of a failure of goodwill, knowledge, effort, or resources devoted to health care, but because of fundamental shortcomings in the ways care is organized”56(123) — shortcomings that can be overcome only through redesign of our health care provision systems. For us physicians, it is tempting to say that a redesign of the system devoted to health care, but because of fundamental shortcomings in the ways care is organized"56(123) — shortcomings that can be overcome only through redesign of our health care provision systems. For us physicians, it is tempting to say that a redesign of the system

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