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## Nurse Practitioner Co-Management for Patients in an Academic Geriatric Practice

David A. Ganz, M.D., Ph.D.<sup>1,2</sup>, Brandon K. Koretz, M.D.<sup>1</sup>, Julia K. Bail, R.N., M.S.N., G.N.P.-C.<sup>1</sup>, Heather E. McCreath, Ph.D.<sup>1</sup>, Neil S. Wenger, M.D., M.P.H.<sup>3</sup>, Carol P. Roth, R.N., M.P.H.<sup>4</sup>, and David B. Reuben, M.D.<sup>1</sup>

<sup>1</sup>Multicampus Program in Geriatric Medicine and Gerontology, David Geffen School of Medicine at UCLA

<sup>2</sup>Health Services Research & Development Center of Excellence and Geriatric Research, Education and Clinical Center, Veterans Affairs Greater Los Angeles Healthcare System

<sup>3</sup>Division of General Internal Medicine and Health Services Research, David Geffen School of Medicine at UCLA

<sup>4</sup>RAND Health, Santa Monica, CA

### Abstract

**Objective**—To determine whether nurse practitioner (NP) co-management can improve the quality of care provided for five chronic medical conditions in an academic geriatrics practice.

**Study design and methods**—From September 2006 to September 2007, 18 primary care geriatricians were divided into an intervention group that could refer patients to an NP for co-management of dementia, depression, falls, heart failure, and/or urinary incontinence, or a control group that indicated which patients would have been referred to the NP for these conditions. The NP used structured visit notes to guide delivery of care for the five conditions concordant with the Assessing Care of Vulnerable Elders-3 (ACOVE-3) quality indicators. We reviewed charts to determine adherence to recommended processes of care.

**Results**—Two hundred patients (108 intervention, 92 control) were eligible for at least one ACOVE-3 recommended process of care for the five conditions. Patients' mean age was 85 years (SD 7), 67% were women, and patients were eligible for a mean of 6.9 (SD 4.4) processes of care. Intervention patients were eligible for more processes of care than controls (7.8 vs. 5.9 processes per patient,  $p=0.002$ ). Quality of care was higher for patients in the intervention group compared to the control group (54% vs. 34% of care processes completed, respectively,  $p<0.001$ ). The adjusted absolute difference between intervention and control groups in processes of care completed was 20% (95% confidence interval, 13%–27%).

**Conclusion**—NP co-management of five chronic conditions was associated with higher technical quality of care, even in a practice of geriatricians.

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Address communications and requests for reprints to: David A. Ganz, M.D., Ph.D., 11301 Wilshire Blvd., Building 220, Room 313 (11G), Los Angeles, CA 90073, tel: (310) 268-4110, fax: (310) 268-4842, [d ganz@mednet.ucla.edu](mailto:d ganz@mednet.ucla.edu).

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## Keywords

quality improvement; geriatrics; nurse practitioner

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## INTRODUCTION

The U.S. needs a more robust primary care system, yet fewer medical students are pursuing careers in primary care.<sup>1, 2</sup> This quandary, coupled with the need for interprofessional collaboration to care effectively for older adults,<sup>3</sup> has renewed interest in care models that maintain the primary care physician (PCP) as the key decision maker with patients, but involve others in care implementation, including registered nurses with additional training (e.g., nurse practitioners [NPs]), social workers, and physician assistants.<sup>4, 5</sup> Data suggest that NPs focused on a particular condition can provide at least comparable quality of care for that condition and sometimes achieve better patient outcomes.<sup>6, 7</sup> However, information is sparse regarding the effectiveness of NP co-management of complex older patients in outpatient settings. An NP/social worker team collaborating with PCPs and a geriatrician-led interdisciplinary team improved the quality of medical care for low-income seniors,<sup>8</sup> and a trial of a registered nurse working with teams of PCPs to improve care for older adults with multimorbidity has shown early benefits on quality.<sup>9</sup> In addition, specialized nurses, NPs or psychologists have successfully co-managed patients with depression or dementia in primary care.<sup>10, 11</sup>

Available studies do not, however, address whether NP co-management can improve quality in a primary care practice staffed by geriatricians. By virtue of their training, interest, and patient population served, geriatricians are likely to be expert in managing geriatric conditions. Yet many of the barriers to providing recommended care that affect all PCPs (e.g., lack of time during the office visit, inability to overcome existing practice habits)<sup>12</sup> also confront geriatricians. This study's goal was to evaluate a quality improvement program that compared usual primary care by academic geriatricians with care co-managed by an NP for five chronic conditions: dementia, depression, falls, heart failure, and urinary incontinence.

## METHODS

The quality improvement project ran from July 1, 2006 to September 30, 2007. Subsequently UCLA IRB approval was obtained to examine de-identified data. Table 1 describes the project setting.

### Intervention

The project consisted of run-in (July 1, 2006 to August 30, 2006) and intervention (September 1, 2006 to September 30, 2007) periods. For these periods, an experienced gerontology certified NP (JKB), -- hired specifically for the co-management role -- was supported by a grant from the John A. Hartford Foundation. The NP was co-located with the geriatricians at the large outpatient clinic (see Table 1 for details on practice locations).

During the run-in period, the NP customized condition-specific structured visit notes based on previous versions (see [http://www.geronet.ucla.edu/index.php?option=com\\_content&view=category&layout=blog&id=111&Itemid=189](http://www.geronet.ucla.edu/index.php?option=com_content&view=category&layout=blog&id=111&Itemid=189)), to address the Assessing Care of Vulnerable Elders -3 (ACOVE-3) quality indicators for the five chronic conditions<sup>13-17</sup> and American College of Cardiology/American Heart Association heart failure guidelines.<sup>18</sup> These note templates were designed to support Medicare documentation requirements, and could be used for both initial and follow-up visits. The

run-in period also allowed time for the NP to develop her practice style, familiarize herself with clinic operations, and build trust among the referring physicians while seeing patients together with her supervisor (BKK). The practice also developed condition-specific patient education handouts (based on published materials<sup>19</sup> and other materials, see [http://www.geronet.ucla.edu/index.php?option=com\\_content&view=article&id=116&Itemid=172](http://www.geronet.ucla.edu/index.php?option=com_content&view=article&id=116&Itemid=172)) and referrals to local community resources, most of which were available to both intervention and control physicians.

Prior to the intervention period, physicians were first paired by patient volume, and then one physician from each pair was selected by coin toss to be able to refer to the NP. Intervention physicians could only refer their primary care patients, not other physicians' patients whom they might have seen while covering. Control physicians could not refer patients to the NP but were requested to indicate which patients they would have referred.

During the intervention period, the night before a physician's scheduled clinic, practice staff clipped an additional sheet to each patient's chart. For control physicians, the sheet asked for which (if any) of the five conditions the physician would have referred the patient for NP co-management, and the priority level for each "referred" condition (more than one condition could have the same priority level). For intervention physicians, the sheet asked for which condition(s), if any, the physician would like the patient to see the NP, and the priority level for each referred condition. The clinic scheduler received completed forms and, in the case of intervention patients, arranged an appointment with the NP.

The NP could order tests and treatments without approval from the patient's geriatrician, but could obtain guidance if needed. The NP delegated certain tasks to clinic nurses, including orthostatic vital signs, urinalyses, bladder scans and visual acuity measurement. Patient follow-up visits were scheduled by the NP as needed. After each visit, the NP e-mailed or faxed geriatricians a written assessment and plan; she handled more urgent issues via phone or pager.

The project was introduced at a faculty meeting in September 2006, with follow-up by BKK (the clinical champion) to reinforce the importance of referrals. In February 2007, one pair of high-volume physicians switched roles, with the intervention physician switching to the control group and vice versa, because the physician originally assigned to the intervention group was not referring patients to the NP. This switch was made to increase the number of NP referrals.

For participating intervention and control physicians who were internists, the practice successfully applied to the American Board of Internal Medicine to receive credit for the Practice Improvement Module of the Maintenance of Certification program, on the basis of this project. After the project period, all geriatricians could make referrals to the NP.

## Data

After project completion, two abstractors, who had worked as physicians outside the U.S., were trained by a nurse researcher with extensive experience in chart abstraction (CPR). Abstractors reviewed both the paper and electronic medical record using structured forms. All intervention and a sample of control group records were reviewed (see Technical eAppendix, Section A for details on control group selection).

The chart abstraction focused on determining eligibility for, and completion of, care processes specified by relevant ACOVE-3 quality indicators for vulnerable elders, the population served by the practice (see Technical eAppendix, Section B for indicator list). The quality indicators specify a time window during which relevant care should be

completed; if this window extended beyond the end of the project period for a particular indicator, the patient was considered ineligible for that indicator. Abstractors' decision about completion of recommended processes of care was based on the entire chart, regardless of who completed the care process or for which conditions the patient was referred to the NP. Thus, the care reviewed for patients in the intervention group was a combination of both physician and NP care, and included project conditions that physicians had chosen not to refer to the NP. Abstractors were not blind to intervention versus control group status (because structured visit notes appeared only in intervention patients' records) but were blind to which conditions patients were referred for.

Fifteen charts were reabstracted (8 for test-retest reliability and 7 for inter-rater reliability), demonstrating a pooled kappa<sup>20</sup> of 0.64 for agreement on eligibility for care processes, and (where agreement existed on eligibility) 0.31 for completion of care processes. Data from the paper abstraction forms were entered electronically (with > 99% accuracy). Abstractors also reviewed encounter data in the electronic health record to determine the number of geriatrician and NP office visits in the intervention and control groups.

### Data analysis

Patient demographics were limited to information in the chart, which included age and gender. Patients were assigned to the intervention or control group based on the group status of their primary geriatrician. For the two physicians who switched intervention/control group status during the project, analysis was based on actual referrals (intervention or control) at the time of referral rather than intention to treat. Adherence to each recommended care process was scored dichotomously (process completed/not completed). The percent adherence was computed for the intervention and control group, both in aggregate and stratified by condition. The primary analysis included all of the patient's conditions. In a sensitivity analysis, we included only those conditions designated as "top priority" for referral to the NP on the referral sheets. Details on statistical analyses may be found in the Technical eAppendix, Section C.

## RESULTS

Charts from 275 patients (139 intervention, 136 control) were reviewed. For two patients, no record was found of any geriatric outpatient care; these patients were excluded. Of the remaining 273 patients, 200 (73%, 108 intervention, 92 control) were eligible for at least one ACOVE-3 process of care; these patients were eligible for a total of 1384 care processes (mean 6.9 processes per patient, SD 4.4). Patients' mean age was 85 years (SD 7); 67% were women. Age and gender did not differ by intervention versus control group assignment ( $p=0.35$  and  $p=0.51$ , respectively). Intervention patients were eligible for more processes of care than controls (7.8 vs. 5.9 processes per patient,  $p=0.002$ ).

Quality of care was higher for the intervention group compared to controls (54% vs. 34% of care processes completed,  $p<0.001$ ). The adjusted difference in quality of care between intervention and control groups remained significant ( $p<0.001$ ) and the bootstrapped quality of care difference between groups was 20% favoring the intervention group (95% confidence interval, 13%–27%). Quality of care was higher in the intervention group for all five conditions, and significant statistically for dementia, falls, and incontinence (Table 2). When we restricted quality of care data to those conditions designated by physicians as top priority for referral to the NP (found in 148 patients – 74% of the sample eligible for at least one care process), quality of care was 60% in the intervention group and 38% in controls ( $p<0.001$ ). The intervention group had higher quality of care across all five conditions, and significant statistically for dementia, falls, and heart failure (Table 2).

Encounter data were available for 273 patients (99%, 138 intervention and 135 control). During the project period, intervention patients made a mean of 2.5 (SD 3.2) visits to the NP. There was no difference in the number of other visits to the practice by group (7.2 intervention, 6.7 control,  $p=0.32$ ). Among those patients (73%, 108 intervention and 92 control) who were eligible for at least one ACOVE-3 process of care, intervention patients made a mean of 2.6 (SD 3.3) visits to the NP. In this sub-sample, other visits to the practice did not differ (6.9 intervention, 6.7 control,  $p=0.70$ ).

## DISCUSSION

When compared to usual care by academic geriatricians, NP co-management of five chronic conditions with geriatricians correlated with an absolute 20% increase in adherence to recommended care. Care for all five conditions was better, and significant statistically for dementia, falls, and incontinence. Thus, NP co-management appears to augment the quality of geriatric care even with geriatricians. Co-management improved quality with a mean of 2.6 NP office visits during a 13-month period.

These findings extend prior research. Among low-income seniors, one study found better quality of care for depression, urinary incontinence, and falls (among other conditions) using an NP and social worker who provided home-based care management, together with a geriatrics interdisciplinary team.<sup>8</sup> Our project differed in that we provided a less intense intervention (the NP saw patients in the office and followed up with them by phone rather than making home visits), and our intervention did not target low-income patients. A test of primary care co-management using specially trained registered nurses, which showed early benefits on quality, will report more definitive results in the future.

Strikingly, control patients in this project received similar quality of care for chronic conditions to patients in previous studies cared for by primarily non-geriatricians, as measured by ACOVE indicators.<sup>21, 22</sup> Differences from previous studies in the methods used to identify conditions and abstract medical records, as well as the evolution of quality indicators over time, are potential explanations. Alternatively, the results may reflect physicians facing similar barriers to providing high technical quality of care for older adults, regardless of specialty.

This analysis has limitations. First, intervention group patients were eligible for more quality indicators than controls, suggesting non-equivalence of the two groups. Since sicker patients may receive better quality of care,<sup>23, 24</sup> and being eligible for more quality indicators may indicate a higher level of disease burden, results may be biased in favor of the intervention group. However, this potential bias is unlikely to account for the entire intervention effect. Second, one pair of physicians switched intervention/control group status during the project. We believe that the physician unwilling to refer patients to the NP felt total responsibility for patients and was unwilling to delegate care for this reason. Since the switch occurred to increase referrals to the NP, data are analyzed accounting for the switch rather than as "intention-to-treat." Third, about 25% of patients were not eligible for ACOVE-3 quality indicators. This finding reflects the restricted scope of the ACOVE-3 quality indicators and potentially sparse clinical documentation that limited verification of patients' eligibility for quality indicators.

Fourth, enhanced documentation by the NP in the intervention group may have facilitated abstractors noting completion of certain processes of care; however, prior work – not specifically including NPs – suggests that documentation is not the sole basis of poor quality of care.<sup>25</sup> Fifth, reliability of chart abstraction was only fair for completion/non-completion of recommended care processes. However, the resulting random

misclassification would make estimates of between-group differences conservative. Finally, this project may be a best-case scenario since several of the study investigators, including the NP, were also clinicians in the improvement project and were motivated for the project to be properly implemented.

This study has significant strengths, however. First, external validity was improved by the quality improvement design, since all patients were eligible for participation as long as they had one of the five chronic conditions. Second, the intervention is relatively simple, and can be replicated with an experienced, motivated NP using materials in the public domain.

In conclusion, a quality improvement project using an NP to manage five chronic conditions was associated with markedly higher technical quality of care for these conditions, suggesting that deploying NPs as chronic care clinicians may successfully complement physician practice and enhance care.

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### Take-away points

A nurse practitioner markedly improved the quality of care for dementia, depression, falls, heart failure, and urinary incontinence in an academic geriatrics practice.

- Adding a nurse practitioner focused on managing these five chronic conditions improved adherence to recommended geriatric care by 20% in a setting where all physician providers were geriatricians.
- Improved quality of care came at the expense of 2.6 additional visits to the nurse practitioner per patient during a 13-month period.



**Table 1**

Description of project setting.

Practice locations	1 large outpatient clinic (shared with general internal medicine faculty); 1 small office located in the community and operated by the University
Practice resources	Social worker available for phone-based patient consultations; handouts for patient education and community resources available in hanging file folders in each examination room
Practice documentation system	Handwritten progress notes; dictated history and physicals/consultations available in an electronic health record that also provided lab and imaging reports
Number of geriatricians	18
Geriatrician training	16 internal medicine, 2 family medicine; all physicians board certified in geriatric medicine.
Academic track of physicians	10 clinician-educators; 8 clinician-scientists
Academic rank of physicians	2 advanced fellows, 10 assistant professors, 2 associate professors, 4 full professors
Annual number of outpatient visits (estimated)	16,000
Time allotted for outpatient visits	New patients: 60 minutes; Follow-up visits: 20 minutes.
Patient insurance status	Virtually all fee-for-service Medicare

**Table 2**

Quality of care by condition.

ALL DATA									
Condition	INTERVENTION				CONTROL				P value (I vs. C)*
	Patient N	Eligible care process N	Recommended care completed (%)	Patient N	Eligible care process N	Recommended care completed (%)	Patient N	Eligible care process N	
Dementia	51	301	51	60	286	30			<0.001
Depression	12	77	51	4	25	28			0.07
Falls	36	221	44	22	108	17			0.002
Heart failure	36	114	82	32	86	71			0.06
Incontinence	26	128	58	8	38	26			0.01
<b>TOTAL</b>	<b>108</b>	<b>841</b>	<b>54</b>	<b>92</b>	<b>543</b>	<b>34</b>			<b>&lt;0.001</b>

  

CONDITIONS DESIGNATED "TOP PRIORITY" BY REFERRING MD									
Condition	INTERVENTION				CONTROL				P value (I vs. C)*
	Patient N	Eligible care process N	Recommended care completed (%)	Patient N	Eligible care process N	Recommended care completed (%)	Patient N	Eligible care process N	
Dementia	27	184	56	42	208	35			0.002
Depression	7	49	49	2	12	25			0.15
Falls	15	101	61	9	41	10			0.001
Heart failure	13	43	91	17	56	71			0.03
Incontinence	21	102	60	2	10	40			0.35
<b>TOTAL</b>	<b>81</b>	<b>479</b>	<b>60</b>	<b>67</b>	<b>327</b>	<b>38</b>			<b>&lt;0.001</b>

\* P value compares percent of recommended care processes completed in the intervention (I) versus control (C) group using multilevel logistic regression models adjusted for clustering as described in the Methods section.

Table showing quality of care by condition in the intervention group and control group of the nurse practitioner intervention. The columns entitled "Eligible care process N" represents the total number of care processes for each condition for which patients in the columns entitled "Patient N" were eligible. The top half of the table represents data on all care processes; the bottom half of the table represents data only for care process among conditions designated "top priority" for referral (note that patients could have multiple conditions -- or no conditions -- designated as top priority by the referring physician).