Outcomes of Embedded Care Management in a Family Medicine Residency Patient-Centered Medical Home

Robert J. Newman, MD; Richard Bikowski, MD; Kristy Nakayama, RN; Tina Cunningham, PhD; Pam Acker, MHA; Dana Bradshaw, MD, MPH

BACKGROUND AND OBJECTIVES: Much attention is devoted nationally to preventing hospital readmissions and emergency department (ED) use, given the high cost of this care. There is a growing body of evidence from the Patient Centered Primary Care Collaborative that a patient-centered medical home (PCMH) model successfully lowers these costs. Our study evaluates a specific intervention in a family medicine residency PCMH to decrease readmissions and ED utilization using an embedded care manager.

METHODS: The Department of Family and Community Medicine at Eastern Virginia Medical School in Norfolk, VA, hired an RN care manager in May of 2013 with a well-defined job description focused on decreasing hospital readmissions and ED usage. Our primary outcomes for the study were number of monthly hospital admissions and readmissions over 23 months and monthly ED visits over 20 months.

RESULTS: Readmission rates averaged 22.2% per month in the first year of the intervention and 18.3% in the second year, a statistically significant 3.9% decrease. ED visits averaged 176 per month in the first year and 146 per month in the second year, a statistically significant 17% reduction.

CONCLUSIONS: Our study adds to the evidence that a PCMH model of care with an embedded RN care manager can favorably lower readmission rates and ED utilization in a family medicine residency practice. Developing a viable business model to support this important work remains a challenge.

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Much attention is devoted to the prevention of hospital readmissions to decrease costs of care and improve patient outcomes. National data currently reflect an all cause Medicare readmission within 30 days rate of 17.5% in 2013. Preventing admissions is a key intervention in cost containment, given that hospital care costs an average of over $4,000/day and $16,000/admission.

There is a growing body of literature on single and multiple method interventions that are intended to decrease hospital readmissions, with mixed results. Less is known about residency practices and their readmission rates. The I3 Collaborative, a regional group of 26 primary care residencies, is currently involved in sharing best practices to decrease hospital readmissions and ED utilization.

Similarly, decreasing ED visits that nationally cost over $1,200/visit should have dramatic effects on decreasing costs of care. Again, studies to decrease ED utilization have shown mixed results.

In May 2013, our NCQA Level 3 certified PCMH family medicine residency practice of 9,500 patients at the Department of Family and Community Medicine at Eastern Virginia Medical School in Norfolk, VA, hired a full-time RN care manager to evaluate whether this intervention led to significant reductions in readmissions and ED visits. Our study is unique in at least two respects. First, we are a family medicine residency practice. Second, we embedded our care manager within our practice to work closely with the physicians and the medical director.

Methods

The job description for our embedded RN care manager is described in detail in Table 1. An early focus for the care manager was to develop a list of VIP patients who were high utilizers of care, defined as either having two or more admissions per year or 10 ED visits per year, and then developing and implementing...
To examine the change of the outcome variables over time, linear regressions models were fitted with time being treated as an independent variable. Additionally, data between two different time points, the first year and the second year, were compared using independent two-group t test. Statistical analysis was performed in the statistical software package SAS 9.3, using $\alpha=0.05$ (SAS Institute, Cary, NC).

There were a total of eight patients that were dismissed from care during the course of the study. These eight patients were removed from the final data analysis for both readmissions and ED visits.

IRB approval from the EVMS IRB was obtained in July of 2015 as an exempt quality improvement study.

**Results**

Data on our admissions indicate we had an average of 43 admissions per month to our inpatient service. Analysis reveals no statistical difference in the monthly admission numbers with the intervention of hiring our care manager. For comparison, we also obtained data from our major hospital chain, where most of our admissions occur, that showed no significant differences in the admission rates over the nearly 2 years of the study.

Figure 1 shows our monthly readmission percentages after implementing the hiring of our nurse care manager. There were a total of 1,091 admissions over the course of the study, with 109 readmissions in the first year and 93 readmissions in the second year. Our 30-day readmission rate averaged 22.2% in the first year of the intervention from May 2013 through April 2014. In the second year of the intervention from May 2014 through March 2015, there was a decline of our readmission rate to an average of 18.3%, a 3.9% decline. This result was statistically significant ($t=2.46$, $P$ value=.0233).

Figure 2 shows our monthly ED visit data for 20 months, starting from July 2013 through February 2015. Splitting this 20-month period in half, there were an average of 176 ED visits per month in the first

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<tr>
<th>Table 1: RN Care Manager Job Description</th>
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<td>1. Maintain a daily ongoing registry of patients admitted to the hospital, and track readmissions monthly using an Access data file.</td>
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<td>2. Monitor the ADT (admissions including ED visits, discharges, and transfers) list we receive electronically daily from our major hospital system, and track all patient ED visits daily and monthly in an Access data file.</td>
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<td>3. Track hospital discharges, time to completion of discharge summaries on our hospital EHR, and make sure patients had follow-up visits in the office within 7 days or at least 14 days with a hospital team member or the patient’s primary care physician. Make sure patients who utilize the ED frequently had follow-up office visits within 7 days. Additionally, she created a brochure on appropriate use of the ED for patients who came in for ED follow-up visits. An attempt is made to follow-up all patients who visited the ED, at least by phone, to assess their progress within 7 days.</td>
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<td>4. Make sure the discharge summaries are posted in our outpatient electronic medical record before the hospital follow-up visit for easy availability to the provider seeing them.</td>
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<td>5. Make hospital discharge follow-up phone calls within 48 hours to allow for billing of transitions of care CPT codes 99495 (moderate complexity) or 99496 (high complexity). The phone call covers a review of the patient’s status, medication reconciliation, review of follow-up appointments and insuring transportation, checking on the status of home health arrangements and specialty consultations, and then documenting this information in a specially designed electronic template note.</td>
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<td>6. Call and immediately reschedule patients who missed their hospital follow-up appointments.</td>
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<td>7. Develop a list of VIP patients who are high utilizers of care. Patients are defined as VIP if they have two admissions/year or 10 ED visits per year. The care manager developed a comprehensive care plan for each VIP, including developing care agreements when needed, arranging home health, physical therapy, and specialty consultations, especially psychiatry, substance abuse, and pain management consultations as needed.</td>
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<td>8. Provide intensive care management in direct weekly consultation with the medical director to the list of VIP patients. This strategy often involved weekly phone calls to the patient and weekly to monthly office visits.</td>
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<td>9. Be responsible for billing codes 99495 or 99496 at the 30 day after discharge time frame for Medicare patients and other insurers paying this code.</td>
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<td>10. Perform five Medicare Wellness visits per week. This last duty was added to help offset the cost of the care manager and to help improve the quality of care provided for our Medicare patients.</td>
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Figure 1: 30-Day Readmission Rates by Month

Figure 2: Number of ED Visits by Month
10 months of the intervention and an average of 146 monthly visits in the second 10 months of the intervention. The intervention shows a 30 visit per month reduction in ED use between these two 10-month periods, a statistically significant 17% reduction. ($t=5.25, P<.001$). We obtained data from our major hospital system for numbers of ED visits to their facility that showed no significant change in numbers over this time period.

Secondary outcomes of completion of discharge summaries within 48 hours show that an average of 87% were completed within 48 hours. The secondary outcome of hospital discharge follow-up phone calls within 48 hours showed compliance in 91% of discharges. Lastly, our compliance with the secondary outcome of hospital follow-up visits within 14 days was 91%.

**Discussion**

A potentially controversial area of our model involves the use of patient care agreements for our VIP high utilizers that outline specific expectations for patients to participate in their own care. We found that despite our best efforts to provide care, there was a small number of patients who refused to comply with their agreements. As a last resort, and after managing all possible barriers and after two warnings, a total of eight patients were dismissed from care during the intervention.

Residents played key roles in the intervention. Since they care for all of our inpatients, they were responsible for completing discharge summaries within 48 hours and providing timely information for the provider seeing the patient in follow-up, often another member
of the resident inpatient team. They interfaced regularly with the care manager by texting regarding hospital discharges, even on weekends, to arrange hospital follow-up visits and to alert her to the need for making the 48-hour discharge phone call. Lastly, residents often “adopted a VIP patient” and were able to contribute to intensive care management themselves with frequent office visits and phone calls. We think resident training in care management is critical, since there will be an increased focus on limiting costs of patients with high utilization in future health care models.

The data supporting a PCMH’s ability to control cost through decreasing readmissions and ED utilization continue to grow, as noted in the 2015 annual report of the Patient Centered Primary Care Collaborative. We have provided a business model for this work-based on our experience (Table 2). The annual cost of the intervention was the salary and benefits of $70,000 for the RN care manager. The annual revenue came from Medicare’s Annual Wellness visits performed by the care manager of $34,647 combined with the additional revenue from using Medicare’s Transitions of Care Codes of $39,634, for a total annual revenue of $74,281. Thus the revenue from the intervention more than covered the cost of the care manager in the first year. New potential revenue sources from care management and the huge cost savings to the health care system of over $616,000 are detailed in Table 3.

In conclusion, we have demonstrated that embedded care management in our family medicine residency practice led to a 3.9% decrease in readmission rates and a 17% reduction in ED visits during our intervention. We have outlined a model for this for other primary care practices. Payment strategies need to be developed that fairly reimburse and support this model for more practices. This will be a key component of health cost containment strategies in the future.

ACKNOWLEDGMENTS: Some elements of this work have been presented at the 2014 University of North Carolina I3 Population Collaborative Meeting, Cabarrus, NC. Our participation in the I3 Pcp Collaborative was critical to the development of this intervention and subsequent manuscript, and we greatly appreciate our fellow collaborators from 26 primary care residencies.

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Table 3: New Potential Revenue Sources From Care Management

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<th>Population Management</th>
<th>Volume</th>
<th>Fee Per Member Per Month</th>
<th>Annual Revenue</th>
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<tr>
<td>Medicare Advantage Plans</td>
<td>110</td>
<td>$15</td>
<td>$19,800</td>
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<tr>
<td>Medicare Care Management CPT Code 99490</td>
<td>110</td>
<td>$42</td>
<td>$55,440</td>
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<tr>
<td>Annual Total</td>
<td>220</td>
<td>$75,240</td>
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Shared Savings to Insurers from Care Management

Decreased ED Utilization

Demonstrated ED reduction in utilization of 17%, which equates to 300 less ED visits in year two versus year one. Average ED visit costs insurers $1,200.00.

Savings in year two compared to year one = 300 fewer ED visits times $1,200 per ED visit:

Saving to the insurers for decreased ED utilization is: $360,000.00

Decreased Number of Re-admissions

Demonstrated decrease of re-admissions of 3.9%, which equates to 16 less re-admits in year two versus year one. Average hospital stay costs insurers $16,000.

Savings in year two compared to year one = 16 fewer re-admissions times $16,000 per re-admission:

Savings to the insurers for decreased re-admissions is: $256,000

Annual total saving to insurers by decreasing ED visits and hospital re-admissions (savings in year two versus year one): $616,000.

References


