

## Are Diabetes Disease Management Programs Achieving Clinically Relevant Outcomes?

Mangione CM, Gerzoff RB, Williamson DF, et al. The association between quality of care and the intensity of diabetes disease management programs. *Ann Intern Med* 2006;145:107–16.

### Study Overview

**Objective.** To measure associations between the intensity of disease management programs and quality of care in patients with diabetes.

**Design.** Cross-sectional study.

**Setting and participants.** The study cohort was randomly selected from all community-dwelling patients with diabetes aged  $\geq 18$  years who had been continuously enrolled for  $\geq 18$  months in a health plan that participated in the Translating Research into Action for Diabetes (TRIAD) study. The TRIAD study involved 6 research centers partnered with 10 managed care plans in 7 states. Most patients were cared for by physician groups; other patients were cared for by individual physicians who contracted with health plans directly.

**Data sources.** Data sources included surveys of patients ( $n = 8861$ ), surveys of health plan directors and physician group leaders ( $n = 67$ ), and medical records. Provider surveys gathered information on their organizations' use of 3 disease management strategies, specifically, physician feedback, physician reminders, and structured care management (based on use of case management, disease management programs, diabetes guidelines, patient reminders, and diabetes education).

**Measures.** The relationship between intensity of disease management strategies and diabetes care processes, control of intermediate outcomes, and amount of medication used were measured. Intensity of each strategy (for each physician group) was rated based on a number of factors, including number of items fed back, type and content of reminders, proportion of patients receiving services, presence of certain programs, number of educators employed, etc. Study endpoints included 8 processes of care (ie, foot and dilated retinal examinations, urine albumin level, hemoglobin A<sub>1c</sub> level, serum lipid level, and recommendations for influenza vaccination, aspirin therapy, and smoking cessation) and 3 intermediate outcomes (systolic blood pressure, serum low-density lipoprotein [LDL] cholesterol, hemoglobin A<sub>1c</sub> level).

Investigators measured whether patients had achieved target levels of the 3 intermediate outcomes and, if not, whether they were receiving the appropriate amount of medication. Potential patient-level confounders that were assessed included age, sex, ethnicity, education, income, health status, duration of diabetes, diabetes treatment, and comorbidities.

**Main results.** More than 50% of patients had hemoglobin A<sub>1c</sub>, LDL cholesterol, and/or systolic blood pressure above target levels. Greater disease management intensity was significantly associated with higher quality for 17 of 24 adjusted associations for processes of care (3 disease management strategies  $\times$  8 processes of care). The magnitude of improvement varied between 5% and 15%, with 95% confidence intervals ranging from 0% to 23%. Specifically, greater intensity of structured care management, physician performance feedback, and physician reminders was associated with higher quality for 6 of 8, 6 of 8, and 5 of 8 processes of care, respectively. No strategy was significantly associated with giving advice to stop smoking. In terms of intermediate outcomes, greater intensity of physician reminders was associated with slightly lower serum LDL level, and greater intensity of structured management was associated with higher systolic blood pressure levels compared with lower-intensity groups. No other associations were found between disease management intensity and intermediate outcomes. When appropriate medication use was considered greater intensity of physician reminders was associated with slightly more patients achieving target LDL levels, but greater intensity of structured management was associated with slightly fewer patients achieving target hemoglobin A<sub>1c</sub> levels. All results were adjusted for potential confounders and clustering by physician groups.

**Conclusion.** Greater intensity of disease management programs was associated with higher quality of diabetes care, but intensity had no effect on intermediate outcomes or medication management.

### Commentary

It is widely recognized that there is a considerable gap

between the quality of care patients should receive and the care they do receive. Closing this gap has been notoriously difficult. In the United States, the majority of patients with diabetes have values for intermediate clinical outcomes that exceed target levels (when lower is better): 58% have hemoglobin A<sub>1c</sub> of 7% or greater, 66% have LDL levels of 100 mg/dL or greater, and 52% have systolic blood pressure of 130 mm Hg or greater [1]. Disease management strategies such as physician feedback, physician reminders, and structured care management have been used frequently to try to improve care. Although there is evidence that disease management for patients with diabetes improves processes of care and glycemic control, there is no evidence that these strategies improve blood pressure or lipid control [2,3].

Mangione and colleagues sought to determine whether the level of intensity of disease management programs was associated with quality of diabetes care in terms of process measures and intermediate outcomes. This study has several strengths, including a large sample size, data from multiple states, and the fact that this was an effectiveness study (as opposed to an efficacy study). Investigators had to use complex methods to rate program intensity given the broad range of disease management programs used. The study was limited by the cross-sectional design, which considered disease management programs in 2000–2001 and study endpoints from the preceding 12 months, and the lack of randomization.

The reason for the general lack of association between greater disease management intensity and favorable

intermediate outcomes is unclear. When investigators “gave credit” to physician groups for prescribing appropriate medication, the lack of association persisted. This suggests that medication regimens are not being changed as much or as often as necessary to achieve clinical goals. Future studies should more directly measure which interventions lead to appropriate intensification of medication regimens.

### Applications for Clinical Practice

High-intensity disease management programs are associated with higher rates of dilated retinal examinations, nephropathy screening, foot examination, hemoglobin A<sub>1c</sub> testing, lipid panel testing, and recommendations for influenza vaccination and aspirin therapy. Future disease management programs may need to focus on appropriate intensification of medication regimens in order to improve intermediate outcomes.

—Review by Lisa M. Kern, MD, MPH

### References

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3. Knight K, Badamgarav E, Henning JM, et al. A systematic review of diabetes disease management programs. *Am J Manag Care* 2005;11:242–50.

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