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Referral Management and the Care of Patients With Diabetes: The Translating Research Into Action for Diabetes (TRIAD) Study

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Objective: To examine the effect of referral management on diabetes care.

Study Design: Cross-sectional analysis.

Patients and Methods: Translating Research Into Action for Diabetes (TRIAD) is a multicenter study of managed care enrollees with diabetes. Prospective referral management was defined as “gatekeeping” and mandatory preauthorization from a utilization management office, and retrospective referral management as referral profiling and appropriateness reviews. Outcomes included dilated eye exam; self-reported visit to specialists; and perception of difficulty in getting referrals. Hierarchical models adjusted for clustering and patient age, gender, race, ethnicity, type and duration of diabetes treatment, education, income, health status, and comorbidity.

Results: Referral management was commonly used by health plans (55%) and provider groups (52%). In adjusted analyses, we found no association between any referral management strategies and any of the outcome measures.

Conclusions: Referral management does not appear to have an impact on referrals or perception of referrals related to diabetes care.

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During the 1980s, referral management was introduced into managed care to reduce unnecessary services and contain healthcare costs.^{1,2} These strategies may be prospective (eg, “gatekeeping,” mandatory preauthorization from a utilization management office) or retrospective (eg, profiling of referral patterns, retrospective review of appropriateness). Referral management has been unpopular among patients and physicians.³⁻⁶ In some,⁷⁻⁹ but not all,^{10,11} settings, it may have led to decreased use of specialists.

The effect of referral management on diabetes care remains unclear. Persons with diabetes, like persons with other chronic diseases, use more healthcare services and have greater healthcare expenditures than patients without chronic diseases.^{12,13} As a result, patients with chronic diseases may be particularly sensitive to strategies designed to decrease use of unnecessary services.^{14,15} However, the effects of referral management strategies other than gatekeeping, includ-

ing practice profiling, have been relatively understudied. To our knowledge, only 1 study has examined referral management in cases of diabetes, and that study could not assess diabetes processes of care.¹⁶

The Translating Research Into Action for Diabetes (TRIAD) study is a multicenter, prospective cohort study designed to examine how managed care structure influences the processes and outcomes of diabetes care.¹⁷ Using TRIAD, we examined the association between individual and multiple referral management strategies and specialist use and patient dissatisfaction with diabetes care. We hypothesized that during the previous year, greater use of referral management strategies would be associated with 1) a lower probability of study participants receiving a dilated eye exam, 2) fewer self-reported visits to specialists, 3) increased perception of difficulty in getting specialist referrals, and 4) greater dissatisfaction with the quality of diabetes care. We examined these 4 outcomes because they represent 4 possible mechanisms of action of referral management strategies. We also hypothesized that

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the associations would be stronger with prospective referral management strategies than with retrospective referral management strategies.

METHODS

Study Setting

TRIAD has been previously described.¹⁷ The underlying hypothesis of TRIAD is that structural and organizational characteristics of health systems and provider groups affect processes of care, which, in turn, influence health and economic outcomes. Six Translational Research Centers collaborate with 10 health plans and 68 provider groups, which serve approximately 180 000 patients with diabetes; centers are available on the web: www.trialstudy.org. Managed care health plans are defined as entities that deliver, administer, or assume risk for health services in order to influence the quality, access, cost, and outcomes of healthcare for a defined population. Provider groups include groups of physicians with contractual arrangements with 1 or more health plans that provide managed care services.¹⁸ The groups often are engaged directly in diabetes care management and may determine compensation arrangements and financial incentives for physicians and specialty referral policies.

Study Population and Data

For the purposes of this analysis, we examined health plans ($n = 7$) and provider groups ($n = 51$) that answered questions regarding referral management strategies and their participants with medical record information (a total of 6941 participants). Participants from 1 site (located in New Jersey and Pennsylvania) were excluded from this analysis due to lack of information on referral management strategies used by provider groups. Study participants were 18 years of age or older, community dwelling, English or Spanish speaking, continuously enrolled in the health plan for at least 18 months, and not pregnant; and they had at least 1 claim for health services during the previous 18 months. Participants were sampled from provider groups that had at least 50 participants with diabetes enrolled in the study's health plans. Recruitment was completed in September 2001. Institutional Review Board approval was obtained from each participating institution.

Participant data were obtained from a survey that was administered either by computer-assisted telephone interview or in writing, and from a review of medical records. Of contacted eligible individuals, 91% responded to the survey. If individuals who could not be contacted had the same rate of eligibility as those who were contacted, and if they were counted in the denomina-

tor, the survey response rate would be 69% (this is commonly called the Council of American Survey Research Organizations (CASRO) response rate¹⁹). Survey questions assessed sociodemographic characteristics, diabetes-related service use, and general health status and quality-of-life measures,^{20,21} among other variables. Health plan and provider group data were assessed by using standardized interviews of health plan and provider group medical directors and leadership personnel. Interviews determined the presence of referral management strategies and other structural variables.

Outcome Measures

Outcome measures were obtained from participant surveys. They were the receipt of a dilated eye exam, perception of difficulty in getting specialist referrals, any specialist visit, and participant dissatisfaction with the quality of diabetes care over the previous year. Each of the outcome measures was examined as a dichotomous measure. The last 2 outcome measures were adapted from questions from the Consumer Assessment of Health Plans Study 2.0 (CAHPS[®] 2.0) survey.²² We chose to score perception of difficulty in getting referrals independently from CAHPS[®] 2.0 because of response patterns in TRIAD. (See **Appendix** for a detailed explanation of scoring and the TRIAD patient survey questions.) In the participant survey, specialists were defined as doctors that patients may have seen for special health needs, like surgeons, cardiologists, allergists, dermatologists, and others who specialize in a single area of healthcare. Dentists were specifically excluded.

Referral Management

Health plan and provider group medical directors were asked whether referral management strategies were used by their organizations. Prospective referral management was defined as preapproval from primary care physicians for specialist referrals (gatekeeping) or mandatory preauthorization from a utilization management office for a referral to a specialist; these occurred before the referral had taken place. Retrospective referral management was defined as practice profiling of primary care physician referral patterns and retrospective review of referral appropriateness. We examined each of these strategies in unadjusted frequencies and then created 2 variables: the number of prospective strategies and the number of retrospective strategies, which both ranged from 0 (no strategies) to 2 strategies. Next, we examined the association between the number of prospective strategies and the outcome measures; then, the association between the number of retrospective strategies and the outcome measures.

In a separate analysis, we accounted for the total number of strategies by creating an “intensity of referral management” variable, the unweighted sum of all of the referral management strategies both as a continuous and a categorical variable. When we examined the strategies as a continuous variable, we examined the impact of the total number of strategies; when we examined the strategies as a categorical variable, we looked for the presence of a threshold number of strategies that would affect our outcome measures. A participant could be exposed to a maximum of 4 strategies used by the health plan and 4 strategies used by the provider group, and the models accounted for the simultaneous effect of referral management strategies at the health plan and the provider group levels.

Statistical Analysis

We used hierarchical logistic regression models (SAS GLIMMIX Macro with penalized quasi-likelihood estimation method [SAS, Cary, NC]) with random intercepts for health plan and provider group to account for the clustered study design (health plan, provider group, and participant levels) and dependency of participant characteristics within health plans and provider groups. To ensure that simultaneous modeling of referral management strategies at the health plan and provider group level did not diminish the effect of these strategies, we also created models that examined referral management at the level of the health plan without controlling for referral management strategies at the provider group level, but found no difference.

In adjusted models, we also included patient age, sex, race and ethnicity, education, income, diabetes duration and treatment, and self-reported health status. Because of concerns that we were overadjusting by including health status in the model, we also constructed an adjusted model that did not include self-reported health status. It produced little change in the results. In a sensitivity analysis, we used the Charlson index to adjust for medical comorbidity,²³ but found little change in the results. Using the method described by Smith and Bates,²⁴ we conducted a confidence limits analysis to determine a limit on the likely magnitude of any actual effect in outcomes between groups with and without referral management strategies. Such an analysis can be used instead of a post-hoc power calculation.

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RESULTS

Characteristics of participants in this substudy of the TRIAD population are listed in **Table 1**. The mean age of the participants was 61 years, and 54% were

Table 1. Subject Characteristics and Outcome Measures (n = 6941)

Characteristic	Percentage or Mean (SD)
Age, years	61 (13)
Female	54%
Race or ethnicity	
White non-Hispanic	45%
Latin	17%
Black non-Hispanic	16%
Asian or Pacific Islander	13%
Other	9%
Education	
8th grade or less	11%
Some high school	14%
High school/graduate equivalent degree	28%
Some college	29%
4-year college graduate	9%
>4-year college degree	9%
Annual household income, \$	
<15 000	34%
15 000-39 000	31%
40 000-74 999	22%
>75 000	14%
Diabetes treatment	
Diet and exercise only	8%
Oral medication only	60%
Insulin only	19%
Insulin and oral medication	12%
Duration of diabetes, years	12 (11)
Interview conducted in Spanish	3%
Health status	
Excellent	4%
Very good	18%
Good	38%
Fair	31%
Poor	9%
Charlson comorbidity index	2.3 (1.6)
Health plan location	
California	30%
Hawaii	16%
Indiana	17%
Michigan	17%
Texas	20%
Outcome measure	
Dilated eye exam within previous 12 months	78%
Perception of any difficulty with referrals*	6%
Saw a specialist within previous 12 months*	57%
Fair or low satisfaction with health care	10%

*Adapted from the CAHPS® 2.0 survey.²²

Table 2. Percentage of Patients Affected by Specific Referral Management Strategies

Provider	Referral Management Strategy Health Plans (n)	Groups (n)	Overall Percentage of Patients Affected by Strategy		
			Health Plan	Provider Group	
Prospective					
	Mandatory preauthorization from an office for referrals	0	22	0	19
	Gatekeeping	5	20	55	44
Retrospective					
	Practice profiling of primary care physician referral patterns	2	19	17	18
	Retrospective review of referral appropriateness	2	21	17	35

women. The population was diverse. The majority of participants were treated with oral antidiabetic medications, insulin monotherapy, or insulin in combination with oral antidiabetic therapy; fewer than 10% controlled their diabetes with diet and exercise alone. More than three fourths of participants (78%) had a dilated eye exam in the past year, and more than half (57%) saw a specialist in the past 12 months. Of the patients who needed to see a specialist, only 6% reported a perception of any problem getting a referral to a specialist; and in these cases, the problem was perceived as small rather than big. Dissatisfaction with diabetes care was low, with fewer than 2% of participants rating care as “poor.”

The prevalence of specific referral management strategies is shown **Table 2**. At the level of the health plan, the largest number of participants were exposed to gatekeeping, followed by practice profiling and retrospective review of referrals. At the level of the provider group, the largest number of participants

also were exposed to gatekeeping, followed by retrospective review of referrals, preauthorization from a utilization management office, and practice profiling. Approximately 55% of participants were affected by at least 1 health plan strategy, and 52% of participants were affected by at least 1 provider group strategy.

Table 3 shows the association between referral management strategies and outcome measures. It compares outcome rates between groups and plans with referral management strategies and between groups and plans without such strategies after adjustment for patient covariates. The probability of an outcome is expressed along with differences in probabilities (“risk differences”). For example, patients in health plans with 1 prospective referral management strategy had a 63% probability of seeing a specialist over a year; patients in health plans with no prospective referral management strategies had a 61% probability of seeing a specialist over a year. A risk difference of “2” between a health

Table 3. Effects of Referral Management Strategies on Outcome Measures*

Strategy	Outcome Difference, % (95% Confidence Interval)		
	Saw a Specialist	Perceived Difficulty in Getting Referrals	Received Dilated Eye Exam
Prospective			
1 plan strategy – no plan strategies	63 – 61 = 2 (–10, 14)	13 – 13 = 0 (–48, 48)	78 – 82 = –4 (–55, 47)
2 group strategies – no group strategies	61 – 61 = 0 (–7, 7)	9 – 13 = –4 (–11, 3)	86 – 79 = 7 (–2, 15)
Retrospective			
2 plan strategies – no plan strategies	77 – 59 = 17 (–54, 88)	16 – 12 = 4 (–62, 70)	75 – 81 = –6 (–64, 52)
2 group strategies – no group strategies	65 – 60 = 5 (0, 11)	15 – 12 = 3 (–4, 10)	78 – 80 = –2 (–9, 6)

*Numbers indicate outcome rates for plans or groups with 0, 1, or 2 referral strategies. Differences (95% confidence intervals) indicate differences between plans or groups with 0, 1, or 2 referral strategies. To be statistically significant, the confidence interval must exclude 0. Results were adjusted for clustering of patients and covariates. (Covariates include participant age, sex, race, ethnicity, education, income, type and duration of diabetes treatment, and health status.)

plan with 1 prospective strategy and a health plan with no prospective strategy means that the patient's probability of the outcome (eg, seeing a specialist over a 1-year period) is 2 percentage points higher in health plans with no prospective strategies.

Neither prospective nor retrospective referral management strategies were significantly associated with performance of a dilated eye exam over the past year, a visit to a specialist, or perceived difficulty in getting referrals (Table 3). Because of the high percentage of satisfied participants and the lack of variation in response, unadjusted models with patient dissatisfaction as a dependent variable did not converge, or could not yield estimates of effect. There were no differences between models unadjusted and adjusted for patient covariates. (See Table 4 for risk differences unadjusted for patient covariates.) When we looked at the number of strategies or the intensity of referral management, neither the linear nor the categorical variable was associated with any outcome measures (results not shown).

We realized our small sample size gave us limited ability to detect a difference in outcomes between organizations with and without referral management strategies. Therefore, we calculated the likelihood that the difference between plans with and without referral management strategies and between groups with and without referral management strategies was greater than 10 percentage points for each outcome measure.²⁴ Our goal was to see whether we could have missed large differences between organizations with and without referral management strategies. Given the standard deviations and risk differences, the likelihood that groups with no prospective referral strategies would perform dilated eye examinations 10 percentage points more often than plans with such strategies was 11.5%, for rates of specialist referral was 0.2%, and for problems with difficulty of referral to specialists was 0.3%. In other words, the probability that outcomes differed by more than 10 percentage points between groups with and

Table 4. Effects of Referral Management Strategies on Outcome Measures, Unadjusted for Patient Covariates*

Strategy	Outcome Difference, % (95% Confidence Interval)		
	Saw a Specialist	Perceived Difficulty in Getting Referrals	Received Dilated Eye Exam
Prospective			
1 plan strategy – no plan strategies	5 (–71, 81)	0 (–33, 32)	–5 (–45, 35)
2 group strategies – no group strategies	5 (–12, 1)	–4 (–10, 3)	6 (–1, 14)
Retrospective			
2 plan strategies – no plan strategies	19 (–33, 70)	4 (–56, 64)	–5 (–48, 39)
2 group strategies – no group strategies	5 (0, 11)	1 (–5, 7)	–1 (–7, 6)

*Percentages indicate differences (95% confidence intervals) in outcome rates between plans with referral strategies and plans without referral strategies, and between groups with referral strategies and groups without referral strategies, adjusted for clustering only.

without referral management strategies was fairly low. Similar results were seen when plans with no retrospective referral strategies were compared 1) with plans that had retrospective referral strategies and 2) with plans that had both retrospective and prospective referral strategies. The exception was the association between rates of specialty referral and health plans strategies, where the possibility that the difference between health plans with and without referral strategies exceeded 10 percentage points was more than 12%.

DISCUSSION

We found no relationship between prospective and retrospective referral management strategies and performance of dilated eye exam, self-reported specialist use, or perception of difficulty in seeing a specialist in patients with diabetes across different models of managed care. These results extend more recent reports that show little, if any, effect of gatekeeping on specialist use.^{16,25} These results are reassuring in that others have speculated that referral management strategies may negatively affect access to needed services for persons with chronic illness.^{26,27}

Our results may reflect a trend toward more relaxed practices of gatekeeping, preauthorization, profiling, and retrospective review of referrals. Institution of referral management strategies at the provider group level usually occurs in response to health plan strate-

gies, but actual denial of claims at the provider group level is uncommon.²⁸ The lack of association between referral management strategies and perception of difficulty in getting a referral also could reflect the diffusion of referral management strategies into managed care and their acceptance by patients. Finally, our results could reflect the presence of other diabetes management strategies such as disease management programs that did not necessarily hinge on the involvement of a specialist, and that would reduce both the perception of need and actual need for a specialty referral.

Our analysis has several limitations. We examined a select group of health plans and provider groups with an interest in the quality of diabetes care, and these results do not necessarily extend to other managed care plans. The lack of more significant differences in diabetes processes of care by presence or number of referral management strategies may have been due to inadequate power. We did not examine how diabetes care management strategies modified the relationship between referral management strategies and our outcomes of choice, as we had limited power and this question was beyond the scope of our paper. However, further investigation on how other health systems' interventions interact with referral management strategies could provide insight into the reasons why referral management appears to have little association with specific outcomes.

This analysis is cross-sectional, and we did not examine how long referral management strategies had been in place. It is possible that immediately after implementation, such strategies reduced service use or were perceived more negatively, but the effect waned over time. Although accepted by diabetes quality organizations,²⁹ these measures have limitations in that they may not capture management strategies³⁰ and may not necessarily be appropriate for all persons with diabetes; for example, performance of annual dilated eye exams in participants with excellent glycosolated hemoglobin measures may not represent optimal resource use.³¹ We did not analyze actual utilization and cost associated with referral management strategies, and it is possible that these strategies would have some effect on these end points. Finally, it is possible that these mechanisms, gatekeeping in particular, may serve other functions such as to integrate care,³² but we did not assess this function.

CONCLUSION

Referral management strategies have little effect on rates of dilated eye exams, perception of difficulty in

getting referral to specialists, or specialist referral in a population with chronic disease.

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Appendix. Getting Needed Care

The CAHPS® 2.0 Adult Core Questionnaire created a composite variable called "Getting Care." This variable consists of the following questions:

Question 6: With the choices your health plan gives you, how much of a problem, if any, was it to get a personal doctor or nurse you are happy with?
(a big problem/a small problem/not a problem)

Question 10: In the last 12 months, how much of a problem, if any, was it to get a referral to a specialist that you needed to see?
(a big problem/a small problem/not a problem)

Question 22: In the last 12 months, how much of a problem, if any, was it to get the care you or your doctor believed necessary?
(a big problem/a small problem/not a problem)

Question 23: In the last 12 months, how much of a problem, if any, were delays in healthcare while you waited for approval from your health plan?
(a big problem/a small problem/not a problem)

In the Translating Research Into Action for Diabetes (TRIAD) study, we examined question 10 separately as an end point in and of itself. We did this for 2 reasons. First, we were primarily interested in end points that would reflect the impact of referral management on the quality of diabetes care. Questions 6, 22, and 23 did not seem to be end points that would be affected by referral management strategies. Second, only 28% of patients answered all 4 of the questions. This was primarily because question 10 was skipped (as in CAHPS® 2.0) if the patient or physician did not think that a specialist was warranted. Finally, attempts to examine the composite of questions 22 and 23 revealed plan-level reliability of 0.88 but minimal variation in response. Only 18% of patients perceived any problem with getting care they thought necessary (question 22), and only 12% of patient perceived any problem with delays in healthcare while they waited for approval (question 23). Not surprisingly, a composite of these 2 questions showed that 77% reported no problems either with getting

healthcare (question 22) or with delays in healthcare (question 23), and the 13% who reported any problem reported only a small problem with only one of these measures.

TRIAD patient survey questions that were used as end points were worded as follows:

Receipt of dilated eye exam in the past year:

When was the last time you had an eye exam in which your pupils were dilated (drops in your eyes that make you temporarily sensitive to bright light)?

(during the past 12 months/*more than a year but less than 2 years/more than 2 years/never/not sure*)

Responses in italics were coded as "no dilated eye exam in the past 12 months"

The next few questions are about doctors that you may have seen for special health needs, like surgeons, heart doctors, allergy doctors, skin doctors, and others who specialize in 1 area of healthcare. In answering these questions, do not include visits to your dentist.

In the last 12 months, did you or a doctor think you needed to see a specialist?

(yes/no)

If no, skip next question and go to "specialist visit."

Perception of difficulty in getting a referral to a specialist:

In the last 12 months, how much of a problem, if any, was it to get a referral to a specialist that you needed to see?

(a big problem/a small problem/not a problem at all)

Specialist visit:

In the last 12 months, did you see a specialist?

(yes/no)

Patient satisfaction:

Over the past 12 months, how would you rate the quality of care you received for your diabetes?

(excellent/very good/good/fair/poor)