Title
Physician Compensation from Salary and Quality of Diabetes Care

Journal
Journal of General Internal Medicine, 22(4)

ISSN
0884-8734

Authors
Kim, Catherine
Steers, W Neil
Herman, William H
et al.

Publication Date
2007-04-01

DOI
10.1007/s11606-007-0124-5

Peer reviewed

Physician Compensation from Salary and Quality of Diabetes Care

Catherine Kim, MD, MPH[1], W. Neil Steers, PhD[2], William H. Herman, MD, MPH[3], Carol M. Mangione, MD, MSPH[2], K. M. Venkat Narayan, MD, MPH[4], and Susan L. Ettner, PhD[2]

[1]Division of General Internal Medicine, Department of Internal Medicine and Department of Obstetrics & Gynecology, University of Michigan, Ann Arbor, MI, USA; [2]Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, University of California, Los Angeles, CA, USA; [3]Division of Metabolism, Endocrinology, and Diabetes, Departments of Internal Medicine and Epidemiology, University of Michigan, Ann Arbor, MI, USA; [4]Division of Diabetes Translation, Centers for Disease Control and Prevention, Atlanta, GA, USA.

OBJECTIVE: To examine the association between physician-reported percent of total compensation from salary and quality of diabetes care.

DESIGN: Cross-sectional analysis.

PARTICIPANTS: Physicians (n=1248) and their patients with diabetes mellitus (n=4200) enrolled in 10 managed care plans.

MEASUREMENTS: We examined the associations between physician-reported percent compensation from salary and processes of care including receipt of dilated eye exams and foot exams, advice to take aspirin, influenza immunizations, and assessments of glycemic control, proteinuria, and lipid profile, intermediate outcomes such as adequate control of hemoglobin A1c, lipid levels, and systolic blood pressure levels, and satisfaction with provider communication and perceived difficulty getting needed care. We used hierarchical logistic regression models to adjust for clustering at the health plan and physician levels, as well as for physician and patient covariates. We adjusted for plan as a fixed effect, meaning we estimated variation between physicians using the variance within a particular health plan only, to minimize confounding by other unmeasured health plan variables.

RESULTS: In unadjusted analyses, patients of physicians who reported higher percent compensation from salary (>90%) were more likely to receive 5 of 7 diabetes process measures and more intensive lipid management and to have an HbA1c<8.0% than patients of physicians who reported lower percent compensation from salary (<10%). However, these associations did not persist after adjustment.

CONCLUSIONS: Our findings suggest that salary, as opposed to fee-for-service compensation, is not independently associated with diabetes processes and intermediate outcomes.

Received June 26, 2006
Revised October 2, 2006
Accepted January 8, 2007
Published online February 1, 2007

KEY WORDS: compensation; diabetes; quality; managed care.
DOI: 10.1007/s11606-007-0124-5
 2007;22:448–452

INTRODUCTION

Structuring compensation to improve healthcare quality has attracted considerable attention.[1–6] However, few studies have examined the association between existing compensation strategies and quality of care. In one study by Keating and colleagues, physicians paid primarily by salary provided better quality than those paid fee-for-service.[7] The association was weak and the authors noted their findings needed to be replicated in other settings. Another study found no impact of a hemoglobin A1c (HbA1c) pay-for-performance strategy.[8]

A third study by Ettner and colleagues used the Translating Research Into Action (TRIAD) database, a study of diabetes care in managed care.[9] They noted that salary compensation, as reported by provider groups, was associated with quality measures, but the associations did not persist with adjustment for organizational model. Ettner and colleagues' report used provider group surveys of physician compensation, rather than physician surveys of compensation. The average incentives to physicians in a particular group may not be the same as the incentives faced by any individual physician. In addition, physicians respond to the incentives they perceive to be in effect, even if their perception is incorrect. Thus, physician perceptions of incentives may more accurately reflect compensation effects than actual compensation. Finally, the analyses in the Ettner report did not examine measures other than diabetes process measures.

In this study, we examined the cross-sectional association between existing physician compensation strategies and quality of care among patients with diabetes. However, we used physician surveys to determine perception of compensation. We also examined outcomes beyond diabetes process measures, such as measures of intermediate outcomes. Although conceptual models typically predict that physicians compensated through fee-for-service will provide more and higher quality services,[2–6,10] empirical studies to date have focused primarily on utilization.[6,11–14] We speculated that physicians receiving a smaller part of their compensation from salary might feel pressured to provide

treatments and services that generated income. Such services include injections, bone densitometry testing, and electrocardiograms. These physicians would feel less pressured to provide diabetes quality measures entailing referrals, lab tests orders, foot examination, or aspirin advice. Similarly, we speculated that degree of salary compensation might influence intermediate outcomes by affecting the attention paid to medication adherence. Physicians with lower compensation from salary would have a greater financial incentive to take on more patients, but this would occur at the expense of seeing each patient less often, which in turn could lead to fewer opportunities to deliver quality measures. Therefore, we hypothesized that physicians who perceived a greater percent of their total compensation from salary would provide greater diabetes process and intermediate outcome measures than physicians who perceived a lesser percent of their total compensation from salary.

METHODS

Setting and Study Population

Data were collected as part of the Translating Research Into Action for Diabetes (TRIAD) study.[15] Six Translational Research Centers (TRCs) collaborated with 10 health plans including staff model health maintenance organizations, network/independent practice association HMOs, point of service plans, and preferred provider organizations. Eligible patients were ≥18 years of age, community-dwelling, not pregnant, had diabetes for ≥1 year, spoke English or Spanish, were continuously enrolled in their health plan for ≥18 months, used ≥1 service during that time, and could provide informed consent. Patients varied widely across health plans, in terms of age and race/ethnicity.[16]

Data Collection

This report includes 1,248 physicians (54% physician survey response rate) and their 4,200 patients who participated in the 2003 wave of data collection. Patient data were collected using mailed surveys or computer-assisted telephone interviews and medical record reviews. Multiple masked reviewers abstracted the medical records; the interrater reliability (kappa) for the process of care variables at each of the six TRCs ranged from 0.86–0.94.

Main Outcome Measures

The process measures indicated whether patients received dilated eye exams and foot exams, advice to take aspirin, influenza immunizations, and assessments of glycemic control, proteinuria, and lipid profile in the past year; intermediate outcomes such as adequate control of HbA1c, lipid levels, and systolic blood pressure levels; and satisfaction with provider communication and perceived difficulty getting needed care. Dilated eye exam, foot exams, and advice to take aspirin were either reported by the patient or noted in the medical record. Assessment of HbA1c, proteinuria, and lipids was determined through medical record review and receipt of an influenza immunization was determined through patient self-report. We also combined the performance of the measures into an unweighted summed composite score to determine whether there was an association between physician percent compensation from salary and number of care processes received.

Difficulties getting needed care were assessed by the questions, "In the last 12 months, how much of a problem, if any, was it to get the care you or your doctor believed necessary?" and "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?"[17,18] Respondents could answer a big problem, a small problem, or not a problem. The majority (80%) reported no problem with either category. How well doctors communicated was assessed with 4 questions about the effectiveness of communication by doctors and time spent by doctors. The possible responses to these questions were: never, sometimes, usually, and always; "never" and "sometimes" were combined into a single category to construct a 3-item response. Scores were summed, so response ranges were 4–12. The majority (56%) of patients had the highest possible score of 12.[17,18] Getting needed care and how well doctors communicated were then analyzed as dichotomous variables on which patients had either the highest possible score or a lower score.

Intermediate outcomes of diabetes care were the most recently recorded values in the prior year of HbA1c, low-density lipoprotein cholesterol (LDL-C), and systolic blood pressure (SBP). Values were analyzed as binary variables for patients at/below specified target levels (<8.0% for HbA1c; <140 mmHg for SBP; and <130 mg/dL for LDL-C).

We defined a third set of endpoints where physicians were credited with appropriately advancing treatment for each patient if either the intermediate outcome level was at/below target or the patient was currently on appropriately more pharmacotherapy (2 or more oral agents or insulin for diabetes; 1 or more lipid-lowering agents for hypercholesterolemia; and 2 or more antihypertensive agents for hypertension.) These measures were originally created to ascertain appropriate physician response (advancement of pharmacotherapy) to suboptimal intermediate outcomes, rather than intermediate outcomes only.[19]

Independent Variables

The primary independent variable was the physician-reported percent of total compensation from salary, modeled as a continuous variable. The clinician survey enquired, "As a primary care physician, what percent of your total compensation is based on salary as opposed to productivity or fee-for-service? Fill in the blank."

Other independent variables included physician gender, race/ethnicity, specialty, and years of practice, and patient age, gender, education, income, body mass index (BMI), smoking, presence of other insurance, and type of diabetes treatment (diet-controlled, oral agents only, oral agents and insulin, or insulin alone) and Charlson comorbidity score.[20]

Statistical Analysis

Cross-sectional associations between percent compensation from salary and each of the dependent variables were tested in unadjusted and adjusted models. Distributions for variables

were examined and missing values for covariates (but not the dependent or primary independent variables) were singly imputed using the transcan function in S-PLUS Version 6.1 (Seattle, WA, USA), with each covariate predicted as a function of all other covariates in the model. When the primary independent variable, dependent variables, or income were missing, the individual was dropped from the models.

Adjusted models controlled for the covariates described above, which were dichotomous except for the unweighted summary score. To account for the clustering of patients within physicians and health plans, hierarchical mixed-effects linear and logistic models (SAS NLMIXED with full maximized likelihood estimation) were used, with health plan effects modeled as fixed effects. One implication is that all health plan characteristics that do not vary across patients within the same health plan (e.g., size, profit status, organizational type, etc.) are subsumed into these fixed effects and hence are implicitly controlled in the model. Analyses were performed using 9.1.3 of SAS statistical software (SAS Institute, Cary, NC, USA).

The results report the difference in predicted probabilities of each outcome associated with a change in the percent compensation from salary from 10% to 90% (i.e., the predicted probability if the sample had reported 90% compensation from salary, minus the predicted probability if the sample had reported 10% compensation from salary). Differences greater than zero indicate a higher probability of the outcome with a greater percent compensation from salary; 95% confidence intervals were calculated using simulation methods.[21]

We conducted the following sensitivity analyses. First, we examined whether estimates changed when including the patients with missing medical records by classifying patients with missing values for lipid, blood pressure, and HbA1c measurements as "out of control" or as "not managed." This did not lead to a change in patterns of effects (not shown). We included an indicator for the physicians who reported ignorance of their method of compensation and retained those physicians in the sample. This did not lead to a significant change in associations (not shown). We did not try modeling percent salary compensation as a discrete variable because in sensitivity analyses performed for a related paper,[9] the estimated effects of percent salary compensation were robust to the choice of modeling it as continuous versus discrete variable.

RESULTS

The physicians in the sample had mean age of 48 years (±10 years) and 19 years (±10 years) in practice. Twenty-eight percent were women. The majority (57%) were non-Hispanic white, with 29% identifying as Asian/Pacific-Islander, 7% Hispanic, 3% African-American, and 6% as another racial/ethnic group. Most were general internists (54%), with the remainder identifying as family practitioners (37%), endocrinologists (2%), or other subspecialty (7%). Thirty-eight percent received high (≥90%) of their compensation from salary and 36% received low (≤10%) of their compensation from salary. Only 10% received between 10% and 90% of their compensation from salary, and 16% of physicians reported not knowing their percent compensation from salary. There was substantial variation in percent salary compensation across the health plans, with percentages of physicians within health plans reporting high compensation from salary ranging between 16% and 88%, and percentages of physicians reporting low compensation from salary ranging between 0% and 57%.

Patients in the sample had a mean age of 62 years (±13 years), had had diabetes for mean of 14 years (±11 years), a mean BMI of 31 kg/m^2 (±7 kg/m^2), and a mean Charlson score of 2.3 (±1.5). Over half (55%) were women. Forty-four percent were non-Hispanic white, with 19% self-identifying as Asian/Pacific Islander and Hispanic, 17% as African-American, and 10% as another racial/ethnic group. Thirty-one percent were high school graduates, followed by 27% reporting some college education, 23% reporting less than a high school degree, and 20% reporting college degrees or higher. Thirty-one percent reported having an annual household income between $15,000 and $40,000 per year, followed by less than $15,000 per year (30%), $40,000 – $75,000 per year (24%), and greater than $75,000 per year (15%). Seventeen percent reported receiving

Table 1. Performance Rates of Diabetes Process Measures, Patient Satisfaction Measures, and Diabetes Intermediate Outcome Measures

Diabetes Process Measures	Overall Performance % or Mean (SD)	Range Over Health Plans
Glycemic control assessed (*N*=2,575)	86%	71%–95%
Lipid profile assessed (*N*=2,192)	73%	48%–88%
Microalbuminuria assessed (*N*=2,505)	84%	66%–95%
Dilated eye exam (*N*=3,285)	78%	66%–89%
Foot exam (*N*=3,554)	85%	75%–93%
Aspirin advised (*N*=1,924)	64%	47%–76%
Influenza advised (*N*=2,965)	71%	59%–79%
Unweighted sum (*N*=2,967)	5.5 (1.4)	4.8–6.2
Patient satisfaction measures		
Getting needed care (in highest category) (*N*=2,990)	82%	71%–89%
Satisfaction with provider communication (in highest category) (*N*=2,249)	59%	50%–89%
Intermediate outcome measures		
Hemoglobin A1c (HbA1c) out of control (>8.0) (*N*=969)	38%	23%–47%
Low-density lipoprotein cholesterol (LDL-C) out of control (>130 mg/dl) (*N*=492)	23%	14%–40%
Systolic blood pressure (SBP) out of control (>140 mmHg) (*N*=1,047)	39%	30%–50%
HbA1c controlled or treated with >2 oral medications or insulin (*N*=2,419)	91%	83%–97%
LDL-C controlled or treated with >1 lipid lowering agent (*N*=1,480)	88%	74%–97%
SBP controlled or treated with >2 antihypertensive agents (*N*=1,901)	83%	75%–89%

other non-Medicare insurance aside from that of the health plan. The majority (58%) were treated with oral medications only, followed by insulin only (19%), insulin and oral medications (16%), and diet only (7%). Only 16% currently smoked.

Performance of process of care measures was relatively high (Table 1). On average, each patient had at least 5 processes performed, with assessment of glycemic control (86%) occurring most often and recommendations to take aspirin least often (64%) reported. Intermediate outcomes were not optimal, whether defined as the value being under control or whether treatment was also assessed (Table 1). The majority of patients reported high satisfaction with physician communication and relatively infrequent difficulty in getting needed care. The sample size of clinicians and their patients differed for each endpoint (Table 1), due to the different survey response rates to different questions, the fact that not all measures were consistently recorded in the medical record, and the fact that some endpoints were obtained from either survey or the medical record whereas others were obtained only from one source.

Unadjusted Analyses

In unadjusted analyses, high compensation from salary was associated with measurement of proteinuria and performance of dilated eye exam, foot exam, influenza vaccination, and advice to give aspirin (Table 2). The effect sizes were not large, however. For example, the largest effect was seen with advice to take aspirin: there was only a 7 percentage point difference in the probability of aspirin advice between physicians who received high salary compensation versus physicians who received low salary compensation. High salary compensation was associated with a lower probability of getting needed care and HbA1c control or treatment, but was associated with a higher probability of control or treatment of LDL-C. Again, the magnitudes were modest: for example, there was only a 5 percentage point difference in the probability of having a hemoglobin A1c that was uncontrolled between physicians who received a low versus high percent salary compensation.

Adjusted Analyses

Physician compensation had no statistically significant association with any dependent variable after adjustment for health plan, physician, and patient characteristics (Table 2). The primary reason for lack of association was adjustment for clustering within health plan; we reran these models without health plan adjustment, and this resulted in similar estimates to unadjusted analyses (results not shown).

DISCUSSION

Literature describing the empirical effects of financial arrangements on quality of care has been limited. Our findings lend further support to previous conclusions[7,8] that there are inconsistent associations between physician report of compensation and quality of care measures. We examined a large, geographically diverse sample that reported more frequent performance of process of care measures than has been reported in other studies, and we were able to perform case-mix adjustment using detailed patient covariates.

We found that significant associations existed between percent compensation from salary and quality measures before adjustment and after adjustment for patient and physician covariates. While the magnitude of the changes was comparable to those seen in quality improvement programs,[22] the differences were small, and after further adjustment for health plan, there was no significant association. This suggests either that there was no independent association, or that we overadjusted by eliminating between-plan variation in compensation. We found that there was at least some within-plan variation of percent compensation for salary, but this may not have been sufficient to counter inflation of standard errors. The change in several point estimates suggests that the lack of significance for at least some measures was due to more than inflation of standard errors, but this is speculative.

Our findings are similar to a study by Ettner and colleagues that found associations between salary compensation which

Table 2. Regression-adjusted Differences in Process, Satisfaction, and Intermediate Outcomes when Changing Physician Compensation from Salary from 10% to 90%*

Process Measures	Unadjusted Difference	Adjusted Difference†
Glycemic control assessed (patient *N*=2,441, clinician *N*=807)	1% (−1%, 4%)	0% (−3%, 3%)
Lipid profile assessed (patient *N*=2,441, clinician *N*=807)	2% (−2%, 6%)	1% (−3%, 5%)
Proteinuria assessed (patient *N*=2,441, clinician *N*=807)	**5% (2%, 8%)**	0% (−3%, 4%)
Dilated eye exam (patient *N*=3,427, clinician *N*=985)	**4% (2%, 7%)**	3% (0%, 6%)
Foot exam (patient *N*=3,427, clinician *N*=985)	**4% (2%, 7%)**	3% (0%, 6%)
Aspirin advised (patient *N*=2,441, clinician *N*=807)	**7% (3%, 11%)**	2% (−2%, 6%)
Influenza advised (patient *N*=3,407, clinician *N*=983)	**5% (2%, 8%)**	3% (0%, 6%)
Unweighted composite measure‡ (patient *N*=2,431, clinician *N*=806)	0.03 (−0.09, 0.16)	0.02 (−0.10, 0.14)
Patient satisfaction measures		
Getting needed care (patient *N*=3,004, clinician *N*=913)	**−4% (−6%, −1%)**	−2% (−5%, 1%)
Satisfied with physician communication (patient *N*=3,129, clinician *N*=913)	−1% (−4%, 2%)	−1% (−5%, 3%)
Intermediate outcome measures		
Hemoglobin A1c >8.0 (patient *N*=2,125, clinician *N*=737)	**5% (1%, 9%)**	1% (−3%, 5%)
Low-density lipoprotein cholesterol (LDL-C) >130 mg/dl (patient *N*=1,790, clinician *N*=670)	−2% (−6%, 2%)	−1% (−6%, 4%)
Systolic blood pressure (SBP) >140 mmHg (patient *N*=2,217, clinician *N*=764)	2% (−2%, 6%)	0% (−5%, 5%)
HbA1c controlled or treated with >2 oral agents or insulin (patient *N*=2,199, clinician *N*=759)	**−4% (−6%, −2%)**	0 (−3%, 3%)
LDL-C controlled or treated with >1 lipid lowering agent (patient *N*=1,401, clinician *N*=577)	**4% (1%, 7%)**	4% (0%, 9%)
SBP controlled or treated with >2 agents (patient *N*=1,875, clinician *N*=683)	0% (−3%, 3%)	−1% (−5%, 3%)

*Values >0 indicate that greater compensation from salary is associated with performance of the measure. Statistically significant associations are in bold.
†Adjusted for health plan, physician, and patient characteristics.
‡Estimates represent the difference between the mean unweighted composite score for patients seen by physicians with high percent salary — the mean unweighted composite score for patients seen by physicians with lower percent salary. Confidence intervals including 0 indicate nonsignificance.

did not persist after adjustment for organizational model.[9] Our report differs from that report in several ways. First, we used physician reports of compensation, rather than provider group surveys as was used in that report. Second, we examined a narrower set of variables to describe compensation, due in part to the findings from that report, which found minimal effects of the strength of incentives and utilization-based compensation. Third, we checked for downstream effects of better performance of process measures when we examined satisfaction and intermediate outcome measures. However, these differences in the analysis did not lead to different conclusions, as our reports are similar in the small associations between compensation and quality of care. Ettner and colleagues' report showed no association between compensation and quality after adjusting for provider group organizational model, and our report showed no association between compensation and quality after adjusting for fixed health plan effects, which eliminate confounding due to unmeasured health plan characteristics.[9] Other TRIAD studies have found that a group organizational model was associated with better diabetes quality than the independent practice association model.[23] It is possible that the more highly integrated models were more conducive to clinical care strategies such as disease management programs that have also been found to be associated with better diabetes quality of care in TRIAD,[22] and such models may tend to reimburse primarily by salary.

This study is cross-sectional and observational and therefore the associations observed cannot necessarily be interpreted as causal, as patients were not randomized to different practices. Our findings may not be generalizable to other settings or diseases. Finally, it is possible that fee-for-service physicians would perform better than salaried physicians on performance measures perceived to be more generously reimbursed than those studied here. We conclude that broad financial arrangement strategies currently used to compensate physicians are unlikely in themselves to be major determinants of diabetes quality of care.

Acknowledgments: *Translating Research Into Action for Diabetes (TRIAD) was supported by the Centers for Disease Control and Prevention (CDC) U58/CCU523525-03. This study was jointly funded by Program Announcement number 04005 from the CDC (Division of Diabetes Translation) and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC and the NIDDK. Catherine Kim was supported by an American Diabetes Association Junior Faculty Award. Drs. Steers and Mangione were partially supported by the UCLA Center for Health Improvement in Minority Elders/ Resource Centers for Minority Aging Research, NIH/NIA, under Grant AG-02-004. Significant contributions to this study were made by members of the Translating Research Into Action for Diabetes (TRIAD) Study Group. The authors acknowledge the participation of our health plan partners. This work was presented in abstract form at the 2006 SGIM meeting in Los Angeles.*

Potencial Financial Conflict of Interest: *None disclosed.*

Corresponding Author: *Catherine Kim, MD, MPH; (e-mail: cathkim@umich.edu).*

REFERENCES

1. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, D.C.: Institute of Medicine; 2001.
2. **Hillman A.** Health maintenance organizations, financial incentives, physician's judgments. Ann Intern Med. 1990;112:891–3.
3. **Tufano J, Conrad D, Liang S.** Addressing physician compensation and practice productivity. J Ambul Care Manage. 1999;22(3):47–57.
4. **Glass K, Pieper L, Berlin M.** Incentive-based physician compensation models. J Ambul Care Manage. 1999;22(3):36–46.
5. **Goldfarb S.** The utility of decision support, clinical guidelines, and financial incentives as tools to achieve improved clinical performance. Jt Comm J Qual Improv. 1999;25(3):137–44.
6. **Conrad D, Maynard C, Cheadle A, et al.** Primary care physician compensation method in medical groups. Does it influence the use and cost of health services for enrollees in managed care organizations? JAMA. 1998;279(11):853–8.
7. **Keating N, Landrum M, Landon B, et al.** The influence of physicians' practice management strategies and financial arrangements on quality of care among patients with diabetes. Med Care. 2004;42:829–39.
8. **Rosenthal M, Frank R, Li Z, Epstein A.** Early experience with pay-for-performance: from concept to practice. JAMA. 2005;294(14):1788–93.
9. **Ettner S, Thompson T, Stevens M, et al.** Are physician reimbursement strategies associated with processes of care and patient satisfaction for patients with diabetes in managed care? Health Serv Res. 2006;41(4 pt 1):1221–41.
10. **Dudley R, Miller R, Korenbrot T, Luft H.** The impact of financial incentives on quality of health care. Milbank Q. 1998;76(4):649–86.
11. **Armour B, Pitts M, Maclean R, et al.** The effect of explicit financial incentives on physician behavior. Arch Intern Med. 2001;161:1261–6.
12. **Bateman D, Campbell M, Donaldson L, Roberts S, Smith J.** A prescribing incentive scheme for non-fundholding general practices: an observational study. BMJ. 1996;313:533–8.
13. **Hillman A, Pauly M, Kerstein J.** How do financial incentives affect physicians' clinical decisions and the financial performance of health maintenance organizations? N Engl J Med. 1989;321:86–92.
14. **Rosenthal MB, Fernandopulle R, Song H, Landon B.** Paying for quality: providers' incentives for quality improvement. Health Aff. 2004;23(2):127–41.
15. TRIAD Study Group. The Translating Research Into Action for Diabetes (TRIAD) study: a multicenter study of diabetes in managed care. Diabetes Care. 2002;25(2):386–9.
16. **Brown A, Gregg E, Stevens M, et al.** Race, ethnicity, socioeconomic position, and quality of care for adults with diabetes enrolled in managed care: the Translating Research Into Action for Diabetes (TRIAD) study. Diabetes Care. 2005;28(12):2864–70.
17. **Ackermann R, Thompson T, Selby J, et al.** Is the number of documented diabetes process-of-care indicators associated with cardiometabolic risk factor levels, patient satisfaction, or self-rated quality of diabetes care? The Translating Research Into Action for Diabetes (TRIAD) study. Diabetes Care. 2006;29(9):2108–13.
18. CAHPS 2.0 Survey and Reporting Kit [computer program]. Version. Rockville, MD: AHCPR; 1998.
19. **Kerr E, Smith D, Hogan M, et al.** Building a better quality measure: are some patients with 'poor quality' actually getting good care? Med Care. 2003;41(10):1173–82.
20. **Charlson M, Pompei P, Ales K, MacKenzie C.** A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis. 1987;40(5):373–83.
21. **King G, Tomz M, Wittenberg J.** Making the most of statistical analysis: improving interpretation and presentation. Am J Political Science. 2000;44(2):341–55.
22. **Mangione C, Gerzoff R, Williamson D, et al.** Influence of diabetes disease management on quality of care: the TRIAD study. Ann Intern Med. 2006;145(2):107–16.
23. **Kim C, Williamson D, Mangione C, et al.** Managed care organization and the quality of diabetes care: the Translating Research Into Action for Diabetes (TRIAD) study. Diabetes Care. 2004;27(7):1529–34.