

INPATIENT TO OUTPATIENT TRANSFER OF DIABETES CARE: PERCEPTIONS OF BARRIERS TO POSTDISCHARGE FOLLOWUP IN URBAN AFRICAN AMERICAN PATIENTS

Objectives: To determine potential obstacles to postdischarge followup of hospitalized diabetes patients and to inform planning to better ensure continuity of service when care is transferred from inpatient to outpatient settings.

Design: Surveys of hospital inpatients

Setting: Urban hospital

Patients: Inpatients with diabetes mellitus

Main Outcome Measures: Identification of barriers to postdischarge followup in relation to age, sex, race, marital status, employment status, educational level, health insurance status, date of admission, date of diagnosis, admission and discharge glucose values, and hyperglycemia medications at discharge.

Results: Of 303 respondents (average age 50 years, 46% women, 91% African American), 95% indicated that they planned to use follow-up services. Fifty percent of these patients anticipated encountering barriers to keeping outpatient appointments. The primary reasons were transportation problems (59%), inability to afford the visit (34%), and lack of health insurance (24%). Among persons expecting difficulty with follow-up care, significantly more were uninsured ($P=.025$), and a greater proportion had prior trouble accessing medical care ($P<.0001$). The odds of anticipating a barrier to postdischarge followup were higher for persons without health insurance (odds ratio [OR] 2.62, $P=.040$) and for persons with prior healthcare access problems (OR 5.94, $P<.0001$). Women also had a greater chance of reporting an obstacle (OR 2.30, $P=.024$).

Conclusion: New discharge planning programs that emphasize the need for long-term followup and that assist persons with access to postdischarge medical services should be developed, particularly for minority populations at particular risk for diabetes and its complications. (*Ethn Dis.* 2007;17:238–243)

Key Words: Diabetes Mellitus, Health Services Accessibility, Hospitalization

From Crawford Long Hospital (KW) and the Grady Health System (RC, DM, RR, VGD), Atlanta, Georgia; the Division of Endocrinology (CBC), Mayo Clinic, Scottsdale, Arizona.

Kate Wheeler, MD; Rochanda Crawford, BSN; Debra McAdams, BSN; Rosa Robinson; Virginia G. Dunbar, BS; Curtiss B. Cook, MD

INTRODUCTION

Hospitalization is a frequent occurrence among diabetes patients, 30% of whom require readmission, and it is a substantial component of the economic impact of the disease.^{1–5} The importance of effective inpatient care to improve hospital outcomes is increasingly apparent,^{6–10} but ambulatory settings are the most common sites of diabetes care.¹¹ Diabetes patients who receive intensive, integrated outpatient management of multiple metabolic risk factors achieve better outcomes.^{12–18} Thus, establishing contact with an outpatient care team after a hospital event can help diabetes patients maintain care.

Despite the large economic burden attributable to hospital admissions and the importance of outpatient management of diabetes, little is known about the transfer of care from inpatient to outpatient settings.¹⁹ We reported recently on patterns of postdischarge followup in a cohort of urban diabetes patients and identified patient characteristics associated with having ambulatory visits.¹⁹ Developing interventions that facilitate the transition from the hospital to the ambulatory care site requires better understanding of the potential barriers to posthospitalization care.

Successful transfer of patients from inpatient to outpatient settings for diabetes care is particularly relevant in minority patient populations such as African Americans, who have a high

Address correspondence and reprint requests to Curtiss B. Cook, MD; Division of Endocrinology; Mayo Clinic; 13400 East Shea Boulevard; Scottsdale, AZ 85259.

Diabetes patients who receive intensive, integrated outpatient management of multiple metabolic risk factors achieve better outcomes.^{12–18}

prevalence of diabetes, worse glycemic control, and more complications^{20–22} but who can clearly benefit from integrated outpatient care.²³ However, we know little about obstacles this population faces that might prevent posthospital care. Therefore, we surveyed hospitalized urban diabetes patients to identify the follow-up problems they believed they would experience and to determine the variables associated with barriers to postdischarge care.

MATERIALS AND METHODS

Data Collection

The study was conducted in a downtown Atlanta public hospital, which is part of a large two-county public healthcare system that includes outpatient specialty clinics (including a specialty diabetes clinic adjacent to the hospital), hospital-based and neighborhood primary care sites, and an emergency department/urgent care center. The mission of this healthcare system is to provide care to the under-served residents in the referral area.

Hospitalized diabetes patients who were referred to the endocrinology service or inpatient nurse educators for consultative care were surveyed. Recorded data included demographic

characteristics (age, sex, race, marital status, employment status, education level, and health insurance status), date of admission, approximate date of diagnosis, admission and discharge glucose values, and admission and discharge medications for hyperglycemia. Body mass index values were not available because height and weight had not been recorded for all inpatients. In addition, the classification of diabetes, which is often difficult to determine in this inpatient setting because of the frequency of diabetic ketoacidosis,²⁴⁻²⁶ was often not established; however, most patients likely had type 2 diabetes.^{23,27,28}

Patients were questioned about their postdischarge follow-up intentions and their perceived barriers to such visits. They were asked: "Where do you plan to go for your diabetes check-up after you get out of the hospital?" They were asked to select a response from choices that included primary care sites, the diabetes clinic, or a place outside the healthcare system; patients could select multiple answers, including "Do not plan to follow up." A follow-up question ("Which of these things will make it hard for you to come back for a follow-up visit or check-up after you get out of the hospital?") was then asked. Potential answers included "nothing—I should be able to come back for a follow-up visit," "no transportation to get to doctor," "no insurance," "cannot afford the visit," "afraid of losing job if take time off," "too busy to go," "nurses or doctors do not speak my language," "cannot remember appointment," and "some other reason." These choices were based on frequent explanations offered by patients in this clinical setting and on commonly reported barriers to health care.²⁹⁻³⁴

Prior difficulty in obtaining health care can influence patient perceptions about their ability to access future medical services,³¹ and a history of such difficulty is significantly associated with

the severity of glycemic control in this patient population.³⁵ Thus, we sought to evaluate whether past experience with accessing health services was associated with patient beliefs about being able to achieve follow-up after an acute hospital event. To evaluate the impact of previous accessibility difficulties, we asked patients if they had trouble obtaining medical care during the 12 months before their hospitalization.³⁵ Patients were categorized as either having had or not having had trouble obtaining medical care.

Statistical Analyses

Continuous variables were compared by using nonparametric tests. The chi square test was used to evaluate differences between proportions. Patients were stratified into those who did or did not anticipate a barrier to followup, and their characteristics were compared. A logistic regression model was constructed to determine which patient variables were associated with reporting a barrier to postdischarge care. The analysis was adjusted for patient age, sex, race, duration of diabetes, educational level, health insurance status, employment, marital status, and past experience with accessing medical care.

RESULTS

Characteristics of Patients

Surveys were completed on 303 inpatients with diabetes. The average age was 50 years; 91% were African American and 46% were female; 69% had preexisting diabetes (diabetes diagnosed prior to admission, mean duration 11.8 years), whereas 31% were admitted for new-onset diabetes. Mean admission and discharge glucose levels were 374 mg/dL and 197 mg/dL, respectively; hemoglobin A1C was available for 59% of patients and averaged 10.3%. The average length of stay was 5.9 days. Nineteen percent of patients

were married, and 60% reported having no health insurance. Educational levels were 12% elementary or less, 66% junior high through high school, and 22% some college or college graduates. Forty percent said they were unemployed, 27% were employed, 22% were disabled, and 11% were retired. Forty-two percent of the patients gave a history of trouble accessing medical care in the previous 12 months. The most common reason cited was financial ("cannot afford the visit"; 54%).

Barriers to Postdischarge Followup

Most patients (95%) indicated that they planned to have follow-up visits after discharge. Of patients planning to seek an ambulatory visit, 82% said they planned to return to the diabetes clinic. Although most patients indicated they planned to seek after-hospital care, 50% believed they would have problems doing so. Sixty-one percent cited only one barrier, but 30% cited two, 7% cited three, and 1% cited four obstacles. The most common reason (Figure 1) was "no transportation to get to doctor," followed by "cannot afford the visit," "no insurance," "cannot remember appointment," and "afraid of losing job if take time off." "Some other reason" was reported by the rest of the patients.

Comparisons by Presence of Postdischarge Follow-up Barrier

Significantly more patients ($P=.0048$) who expected to encounter problems were women, and a greater proportion ($P=.047$) had preexisting diabetes (Table 1). The percentage of uninsured patients was also higher ($P=.025$) among those who believed they would face obstacles. More persons who anticipated problems accomplishing posthospitalization visits also reported a history of difficulty in accessing medical care during the previous 12 months before admission ($P<.0001$). Patients with a post-

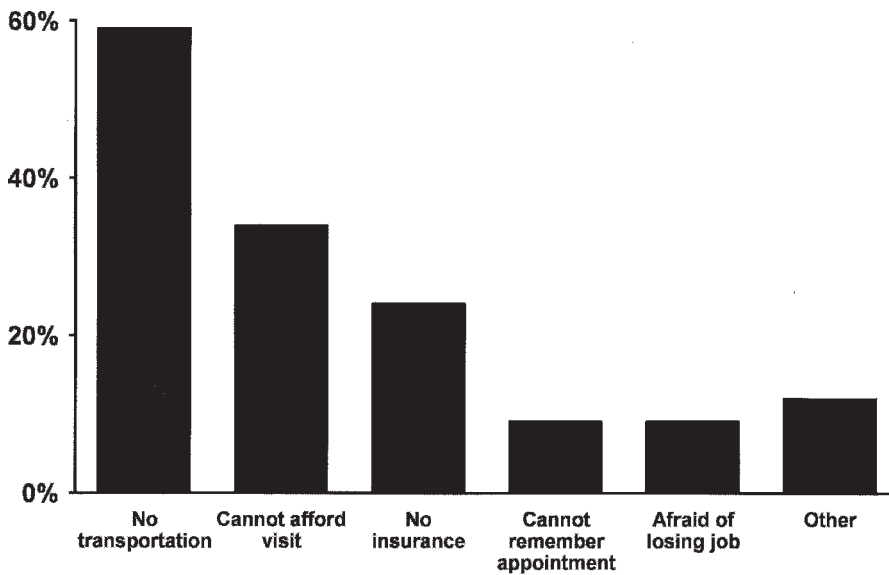


Fig 1. Patient-reported barriers to postdischarge hospital followup

discharge follow-up barrier were similar in age to persons who anticipated no difficulty, and a similar proportion was African American. No differences in admission/discharge glucose, hemoglobin A1C, marital status, or education level were detected between the two

groups. Although more people who anticipated a follow-up barrier were unemployed, the distribution of employment classes was comparable between persons in whom a perceived barrier was present and those in whom a barrier was absent (Table 1).

Table 1. Comparison of patients according to anticipation of a barrier to posthospital follow-up

Characteristic	Post-Discharge Follow-Up Barrier*		P value
	Absent	Present	
Age, y	49 (13)	50 (14)	.66
African American, %	93	90	.40
Female sex, %	38	54	.0048
Preexisting diabetes, %	63	74	.047
Admission glucose, mg/dL	371 (277)	377 (228)	.38
Discharge glucose, mg/dL	193 (77)	202 (78)	.34
HbA1C, %	9.8 (2.8)	10.8 (3.5)	.096
No health insurance, %	54	67	.025
Married, %	21	18	.56
Length of stay, d	6 (6.4)	5.8 (5.4)	.48
Education, %			
Elementary or less	10	14	.63
Some high school or high school graduate	66	66	
Some college or college graduate	24	20	
Employment, %			
Unemployed	36	46	.26
Employed	31	23	
Disabled	23	21	
Retired	10	11	
Prior trouble getting medical care, %	26	58	<.0001

* Values are mean (standard deviation) unless noted otherwise.

Variables Associated With Barriers to Postdischarge Follow-up

In the adjusted analysis (Table 2), the probability of anticipating a barrier was greater among women and among the uninsured. These odds markedly increased among persons with a history of trouble accessing medical care during the previous 12 months. Retired persons tended to have a greater likelihood of reporting an obstacle, whereas persons who had a college education tended to have a lower probability.

Comparisons of Women vs Men

The observation that women had a greater likelihood of reporting a barrier to postdischarge care led us to compare their characteristics with those of men (Table 3). Women respondents were slightly but significantly older. A greater proportion of women had preexisting diabetes and lower average blood glucose on admission. Fewer women than men were uninsured or married and they tended to be hospitalized longer. There was a trend ($P=.077$) for a difference in the distribution of employment categories, with fewer women reporting employment and more indicating disabilities. Significantly more women ($P=.0091$) reported prior difficulty obtaining medical care. Other characteristics (discharge glucose, hemoglobin A1C, race, education) were similar between the sexes (not shown). Lack of transportation was the most frequently cited barrier for both sexes but was reported more often by women (65%) than men (53%). The frequencies of other reported obstacles were similar between women and men (not shown).

DISCUSSION

Inpatient care provides an opportunity to establish or ensure maintenance of follow-up diabetes care, which is crucial to continue recommended preventive services, accomplish treatment

Table 2. Variables associated with anticipating a barrier to a postdischarge follow-up visit*

	Odds Ratio	95% Confidence Interval	P value
Women vs men	2.30	1.12–4.73	.024
Uninsured vs insured	2.62	1.04–6.57	.040
Prior healthcare access trouble vs no trouble	5.94	2.88–12.23	<.0001
Retired vs employed	4.55	.83–25.01	.081
College vs high school	.47	.19–1.15	.098

* Analysis adjusted for other variables in table, plus race, new onset vs established diabetes, and marital status.

goals, and realize the benefits of management. The transition from the hospital to ambulatory care has been studied on only a limited basis,^{36,37} and factors that might prevent postdischarge care have not been detailed. Postdischarge followup is particularly relevant in minority populations of diabetes patients, who face a greater burden of disease and greater socioeconomic barriers that may impede accessibility to health care.^{20–22,32–34,38}

This study examined barriers to accomplishing after-hospital care in a predominantly minority urban diabetes patient population. Nearly all the surveyed patients indicated that they wanted followup within our healthcare system. Nevertheless, half the respondents anticipated some barrier to postdischarge care, and transportation was the most commonly cited obstacle. The metropolitan area served by the healthcare system is equipped with light rail, bus, and extensive freeway systems. In

addition, ancillary shuttle service is provided to patients through public funding or by our healthcare system. Despite these resources, the possibility of a lack of transportation led patients to question their ability to obtain after-hospital care.

Transportation is well recognized as influencing the beliefs of patients about their ability to access health care.^{30,31} In a previous study conducted in our healthcare system, transportation was reported as a barrier to regular care by nearly 36% of patients discharged from the urgent care center.²⁹ In a report by others, changes in Medicaid reimbursement resulted in fewer visits to a hospital-based primary care site.³⁹ This decline in outpatient contact was partially compensated for by increased visits to community-based primary care settings.

The public hospital system where this study was conducted also has outreach clinics providing primary care that may be geographically closer to

Despite these [transportation] resources, the possibility of a lack of transportation led patients to question their ability to obtain after-hospital care.

where these patients live. Informing inpatients about these alternative clinic sites, as well as other programs in the area that may offer discounted care, could alter their perception of transportation as a barrier to postdischarge followup. Providing counseling to patients at the time of discharge about the available transportation options to available clinics in the area, with information about actual bus routes, might be one way of overcoming the perceived transportation barrier.

Although not a commonly cited barrier, some patients indicated that they may not keep a postdischarge follow-up appointment because of inability to remember. Our previous analysis¹⁹ indicated that a direct referral to the outpatient diabetes clinic increased the chance that the patient would keep the appointment. When considering ways to improve postdischarge followup for diabetes, consideration could be given to developing an appointment reminder system (eg, phone calls to patients).

A second reported barrier to postdischarge followup was financial constraints. In a previous study, we found that a requirement to pay for any of the delivered service was significantly associated with markedly lower odds of returning for followup within the healthcare system.¹⁹ In another study, a required copayment was also identified as a restriction to keeping post-hospitalization appointment.³⁶ This concern about ability to pay is a poten-

Table 3. Differences in characteristics of female and male diabetes patients*

Characteristic	Women	Men	P value
Age, y	51 (14)	48 (12)	.036
Preexisting diabetes, %	78	61	.0029
Admission glucose, mg/dL	333 (217)	408 (277)	.016
No health insurance, %	51	68	.002
Married, %	14	24	.032
Length of stay, d	6.8 (7)	5.1 (4.7)	.088
Employment, %			
Unemployed	41	40	.077
Employed	20	32	
Disabled	26	18	
Retired	12	9	
Prior trouble getting medical care, %	50	35	.0091

* Values are mean (standard deviation) unless noted otherwise.

tial economic barrier to accessing subsequently needed health services.

Uninsured persons had significantly greater odds of anticipating barriers to posthospitalization care. The relationship between access to medical care and insurance status has been well described.^{32,33} The current study did not link reported insurance status with followup, but lack of insurance coverage may impede the transfer from inpatient to outpatient diabetes care and requires further investigation.

Other studies have shown that a previous negative experience with the healthcare system can influence patients' perceptions about future access to medical services.³¹ In our analysis, patients with a history of difficulty accessing health care had a nearly six-fold greater probability of anticipating a barrier to postdischarge followup. This perceived impediment could be difficult to overcome. If patients anticipate, on the basis of previous experiences, that they will not be able to access services, then they may abandon the effort to seek necessary postdischarge followup. The need for followup, especially after an acute hospital stay, should be emphasized, and the concerns of patients about prior experiences should be explored. A referral to social services may help determine and correct any modifiable barriers to after-hospital care.

More women than men said they faced obstacles to postdischarge followup, and a greater proportion reported a history of difficulty obtaining medical care. Fewer women were uninsured, which suggests that other factors affected their beliefs about such access. The reason for this disparity cannot be determined from this study, but our data indicate some of these potential considerations. Women respondents were slightly older, and a larger percentage of them had established diabetes prior to admission (and possibly more complications). In addition, women had longer hospital stays,

and more women reported being disabled. Thus, women may have had more co-morbid conditions that influenced their beliefs about being physically able to obtain follow-up care. These women also may have had less family support (fewer were married) or more limited financial resources to offset medical care costs (fewer were employed). Further investigation is needed on these sex differences in this inpatient population's perceptions about medical care access and whether they persist in the outpatient setting.

Our findings are restricted in that we have only determined patients' perceptions of their ability to accomplish postdischarge followup. The survey was not meant to be an exhaustive list of obstacles but rather to be representative of common explanations provided by patients in this setting or reported in the medical literature.²⁹⁻³⁴

We do not know whether patients who expressed concerns about their ability to seek postdischarge care actually had less followup compared with persons who reported no such barrier. This area should be investigated in the future to further enhance our insight on the factors that influence the inpatient-to-outpatient transfer of diabetes care in this patient population. Another limitation is that patient data on socioeconomic factors, such as health insurance or a history of problems in accessing medical care, are self-reported. In addition, selection bias was introduced by the study design, in that the patients who were evaluated were referred for diabetes care and education and therefore may not represent the entire population of diabetes inpatients at this facility. Finally, the types of barriers encountered by patients in this setting may differ from those observed in other clinical environments.

The surveys we conducted provide previously undocumented data on personal factors that our patients perceived would impair their ability to accomplish postdischarge diabetes care. Variables

such as limited transportation, lack of health insurance, and a history of difficulty in obtaining medical care were key factors that determined patients' perceptions about their ability to return for postdischarge followup. To ensure delivery of necessary outpatient care to this patient population, which is highly vulnerable to diabetes and its complications, healthcare providers may need to develop discharge planning programs that emphasize the need for long-term follow-up care and that assist persons in attaining it.

ACKNOWLEDGMENTS

Information in this article was published as an abstract of the 63rd Annual Scientific Session of the American Diabetes Association (ADA); June 13-17, 2003; New Orleans, Louisiana.

REFERENCES

1. Jiang HJ, Stryer D, Friedman B, Andrews R. Multiple hospitalizations for patients with diabetes. *Diabetes Care*. 2003;26:1421-1426.
2. Ray NF, Thamer M, Taylor T, Fehrenbach SN, Ratner R. Hospitalization and expenditures for the treatment of general medical conditions among the US diabetic population in 1991. *J Clin Endocrinol Metab*. 1996;81:3671-3679.
3. Aubert RE, Geiss LS, Ballard DJ, Coughner B, Herman WH. Diabetes-related hospitalization and hospital utilization. In: National Diabetes Data Group. *Diabetes in America*. 2nd ed. Bethesda, Md: National Institute of Diabetes and Digestive and Kidney Diseases; 1995:553-569.
4. Hogan P, Dall T, Nikolov P, for the American Diabetes Association. Economic costs of diabetes in the US in 2002. *Diabetes Care*. 2003;26:917-932.
5. Selby JV, Ray GT, Zhang D, Colby CJ. Excess costs of medical care for patients with diabetes in a managed care population. *Diabetes Care*. 1997;20:1396-1402.
6. Edelstein EL, Cesta TG. Nursing case management: an innovative model of care for hospitalized patients with diabetes. *Diabetes Educ*. 1993;19:517-521.
7. Roman SH, Chassin MR. Windows of opportunity to improve diabetes care when patients with diabetes are hospitalized for other conditions. *Diabetes Care*. 2001;24:1371-1376.
8. Malmberg K, for the DIGAMI (Diabetes Mellitus Insulin Glucose Infusion in Acute

- Myocardial Infarction) Study Group. Prospective randomized study of intensive insulin treatment on long term survival after acute myocardial infarction in patients with diabetes mellitus. *Br Med J*. 1997;314:1512-1515.
9. Furnary AP, Zerr KJ, Grunkemeier GL, Starr A. Continuous intravenous insulin infusion reduces the incidence of deep sternal wound infection in diabetic patients after cardiac surgical procedures. *Ann Thorac Surg*. 1999;67:352-360.
 10. van den Berghe G, Wouters P, Weekers F, et al. Intensive insulin therapy in the critically ill patients. *N Engl J Med*. 2001;345:1359-1367.
 11. Janes GR. Ambulatory medical care for diabetes. In: National Diabetes Data Group. *Diabetes in America*. 2nd ed. Bethesda, Md: National Institute of Diabetes and Digestive Kidney Diseases, 1995;541-552.
 12. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med*. 1993;329:977-986.
 13. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33) [published erratum appears in *Lancet*. 1999;354:602]. *Lancet*. 1998;352:837-853.
 14. UK Prospective Diabetes Study (UKPDS) Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34) [published erratum appears in *Lancet*. 1998;352:1557]. *Lancet*. 1998;352:854-865.
 15. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38 [published erratum appears in *BMJ*. 1999;318:29]. *BMJ*. 1998;317:703-713.
 16. Haffner SM, Alexander CM, Cook TJ, et al. Reduced coronary events in simvastatin-treated patients with coronary heart disease and diabetes or impaired fasting glucose levels: subgroup analyses in the Scandinavian simvastatin survival study. *Arch Intern Med*. 1999;159:2661-2667.
 17. Gaede P, Vedel P, Parving HH, Pedersen O. Intensified multifactorial intervention in patients with type 2 diabetes mellitus and microalbuminuria: the Steno type 2 randomized study. *Lancet*. 1999;353:617-622.
 18. Gaede P, Vedel P, Larsen N, Jensen GV, Parving HH, Pedersen O. Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes. *N Engl J Med*. 2003;348:383-393.
 19. Wheeler K, Crawford R, McAdams D, et al. Inpatient to outpatient transfer of care in urban patients with diabetes: patterns and determinants of immediate postdischarge follow-up. *Arch Intern Med*. 2004;164:447-453.
 20. Mokdad AH, Bowman BA, Ford ES, Vinicor F, Marks JS, Koplan JP. The continuing epidemics of obesity and diabetes in the United States. *JAMA*. 2001;286:1195-1200.
 21. Harris MI, Eastman RC, Cowie CC, Flegal KM, Eberhardt MS. Racial and ethnic differences in glycemic control of adults with type 2 diabetes. *Diabetes Care*. 1999;22:403-408.
 22. Carter JS, Pugh JA, Monterrosa A. Non-insulin-dependent diabetes mellitus in minorities in the United States. *Ann Intern Med*. 1996;125:221-232.
 23. Cook CB, Ziemer DC, El-Kebbi IM, et al. Diabetes in urban African Americans. XVI. Overcoming clinical inertia improves glycemic control in patients with type 2 diabetes. *Diabetes Care*. 1999;22:1494-1500.
 24. Umpierrez GE, Casals MM, Gebhart SP, Mixon PS, Clark WS, Phillips LS. Diabetic ketoacidosis in obese African Americans. *Diabetes*. 1995;44:790-795.
 25. Umpierrez GE, Kelly JP, Navarrete JE, Casals MM, Kitabchi AE. Hyperglycemic crises in urban Blacks. *Arch Intern Med*. 1997;157:669-675.
 26. Umpierrez GE, Clark WS, Steen MT. Sulfonylurea treatment prevents recurrence of hyperglycemia in obese African American patients with a history of hyperglycemic crises. *Diabetes Care*. 1997;20:479-483.
 27. Cook CB, Lyles RH, El-Kebbi I, et al. The potentially poor response to outpatient diabetes care in urban African Americans. *Diabetes Care*. 2001;24:209-215.
 28. Ziemer DC, Goldschmid MG, Musey VC, et al. Diabetes in urban African Americans. III. Management of type II diabetes in a municipal hospital setting. *Am J Med*. 1996;101:25-33.
 29. Rask KJ, Williams MV, Parker RM, McNagly SE. Obstacles predicting lack of a regular provider and delays in seeking care for patients at an urban public school. *JAMA*. 1994;271:1931-1933.
 30. Field KS, Briggs DJ. Socio-economic and locational determinants of accessibility and utilization of primary health care. *Health Soc Care Community*. 2001;9:294-308.
 31. Ahmed SM, Lemkau JP, Nealeigh N, Mann B. Barriers to healthcare access in a non-elderly urban poor American population. *Health Soc Care Community*. 2001;9:445-453.
 32. Institute of Medicine. *Care Without Coverage: Too Little, Too Late*. Washington, DC: The Institute; 2002.
 33. Institute of Medicine. *Coverage Matters: Insurance and Health Care*. Washington, DC: The Institute; 2001.
 34. Smedley BD, Stith AY, Nelson AR, eds. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press; 2003.
 35. Rhee MK, Cook CB, Dunbar VG, et al. Limited healthcare access impairs glycemic control in urban African Americans with type 2 diabetes. *J Health Care Poor Underserved*. 2005;16:734-746.
 36. Kiefe CI, Harrison PL. Post-hospitalization followup appointment-keeping among the medically indigent. *J Community Health*. 1993;18:271-282.
 37. Kiefe CI, Heudebert G, Box JB, Farmer RM, Michael M, Clancy CM. Compliance with post-hospitalization follow-up visits: rationing by inconvenience? *Ethn Dis*. 1999;9:387-395.
 38. Beckles GL, Engelgau MM, Narayan KM, Herman WH, Aubert RE, Williamson DF. Population-based assessment of the level of care among adults with diabetes in the U.S. *Diabetes Care*. 1998;21:1432-1438.
 39. Tierney WM, Harris LE, Gaskins DL, et al. Restricting Medicaid payments for transportation: effects on inner-city patients' health care. *Am J Med Sci*. 2000;319:326-333.

AUTHOR CONTRIBUTIONS

Design concept of study: Wheeler, Crawford, McAdams, Dunbar, Cook
Acquisition of data: Wheeler, Crawford, McAdams, Robinson, Dunbar
Data analysis and interpretation: Wheeler, Dunbar, Cook
Manuscript draft: Wheeler, Cook
Statistical expertise: Cook
Administrative, technical, or material assistance: Wheeler, Robinson, Dunbar
Supervision: Cook