Can America's Urban Safety Net Systems be a Solution to Unequal Treatment?

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ABSTRACT *Eliminating disparities in care for racial and ethnic minorities remains a challenge in achieving overall quality health care. One approach to resolving issues of inequity involves utilizing an urban safety-net system to address preventive and chronic care disparities. An analysis was undertaken at Denver Health (DH), an urban safety net which serves 150,000 patients annually, of which 78% are minorities and 50% uninsured. Medical charts for 4,795 randomly selected adult patients at ten DH-associated community health centers were reviewed between July 1999 and December 2001. Logistic regression was used to identify differences between racial/ethnic groups in cancer screening, blood pressure control, and diabetes management. No disparities in care were found, and in most instances, the quality of care met or exceeded available benchmarks, leading us to conclude that treatment in urban integrated safety net systems committed to caring for minority populations may represent one approach to reducing disparity.*

KEYWORDS *Disparities, Safety-net, Hypertension, Cancer screening, Diabetes*

INTRODUCTION

American health care has many issues that need to be resolved if we are to achieve good health for everyone. One of the greatest challenges in reaching this goal is solving the problem of the unequal access and quality of health care received by the ethnic minority population. The urgent nature of this challenge is underscored by the rapid demographic transformation of the US population. The US Census Bureau projects that, by 2050, the "minority" population will equal or exceed the white population. By 2050, the black population will represent 16%, and the Hispanic population will represent 23% of the United States' population.¹

The importance of addressing ethnicity-related disparities in health care was further underscored by the release of the Institute of Medicine (IOM) 2003 report entitled "Unequal Treatment: Confronting Racial and Ethnic Disparities in Health-care".² This report detailed the enormous gap in access and quality that exists between the minority populations and the white population in America. It is therefore necessary to understand the factors that contribute to these disparities and evaluate the settings that have succeeded in ameliorating this "unequal treatment."

For two reasons, the question of whether some health care settings have successfully addressed unequal treatment is particularly relevant with regard to America's urban safety net system. First, minority populations are more likely to be uninsured than the white population.^{3,4} In fact, 66% of the patients treated in urban

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safety net ambulatory care settings are members of ethnic minority communities.⁵ Second, these institutions are under enormous economic stress—to the point where some have failed.⁶ Despite the financial challenges faced by safety nets, there is strong evidence indicating that safety net providers can and do provide care that is comparable to, and in some cases better than, that available from private sources.^{7–10} If the care provided to the populations in safety net settings reduces health care disparities, closures in the safety net system will further exacerbate this severe problem. Ensuring their continued success represents a component of the overall solution to the problem of disparities in health care for ethnic minorities.

There have been numerous studies that have documented racial and ethnic disparities in access to care, health care utilization, and health outcomes.^{2,11–15} Many of these studies indicate that blacks and Hispanics have poorer health status than whites,^{2,11–15} are less likely to receive preventive care,^{2,13–15} and experience higher death rates due to late diagnosis for certain diseases.^{15–19} Cancer remains the second leading cause of death²⁰ in the United States, and for a number of malignancies, the minority population is disproportionately affected.^{18–20} For example, cervical cancer rates rank among the highest in Hispanic women—who also rank among the lowest for receiving cancer screening and treatment.^{18,19,21} In addition, one of the leading causes of death among black women is breast cancer.¹⁹ This may be due in part to the fact that black women tend to develop breast cancer 10 years earlier than do white women and to have it discovered at later stages of disease.¹⁷ Despite these facts, black women are typically less likely to obtain mammograms than white women.^{22–24}

The management of chronic disease is also becoming increasingly important in American health care, and for a number of these diseases, the minority population is disproportionately affected. The frequency of hypertension, for example, is significantly higher in the black and Hispanic population^{25,26} than among whites, and the incidence and burden of diabetes is much greater for minority populations than the white population.^{21,27–29} Diabetes-related mortality rates are higher for blacks and Hispanics than for whites, and diabetes-associated renal failure is 2.5 times higher in the black population than the Hispanic population.²⁸

It is worthy to note that urban safety net institutions in general have already addressed many of the issues which may contribute to these disparities. These include having a high number of minority providers;³⁰ a history of commitment to these communities, which may engender trust;³⁰ programs such as translation services and cultural competency training for providers;³¹ open-door policies; sliding fee scale payments;³² and geographic location in underserved neighborhoods, all of which may facilitate access. Therefore, it is reasonable to hypothesize that to the extent that these factors are operative in the overall health care system in creating disparity, there would be less evidence of disparity in access and quality in America's urban safety net system. This study attempts to determine whether the provision of care in one urban safety net health care system, Denver Health (DH), has ameliorated or eliminated disparities in care for racial and ethnic minorities.

METHODS

Study Design

The study population is comprised of patients from DH, an integrated urban safety net health care system. The system has multiple access points for care, including the

911 system, the hospital, 10 neighborhood health centers, 11 school-based clinics, the public health department, a nonmedical detoxification facility, correctional care, an HMO, and a nurse advice call center. This system serves 150,000 patients a year, with 21,000 inpatient admissions and 663,000 outpatient visits. Over 50% of DH patients are uninsured, 50% are Hispanic, and 18% are black. The health outcomes studied include cancer screening, hypertension control, and type 2 diabetes management as reflected by lipid management, urine protein or serum creatinine, glycosylated hemoglobin (HbA1c) measurement, and ophthalmologic and foot examination.

The data were obtained from retrospective medical chart reviews conducted from July 1999 to December 2001, upon charts associated with randomly selected medical record numbers and taken from a population of adult patients who regularly received care at the ten community health centers. Patients were selected who appeared to have DH as their regular health care provider. This was defined by a patient having had at least three encounters in the last 2 years, with at least a 3-month interval between the first and third encounter. The rationale for these selection criteria was based on the preference for studying patients that were “regular” users of the DH system, which is of particular importance for patients using an urban safety net. Data from sporadic users would not adequately assess quality of care, as the reasons for sporadic use by largely uninsured population may be because of the mobility of this population or because of their lack of satisfaction. During each month of the study period, medical record numbers were randomly selected based on this “regular user” criterion. Patient data for the study sample was included for those patients that were identified as female and meeting the cancer screening age criteria, for those who were identified as hypertensive, and for those who were identified as having type 2 diabetes.

For each medical chart review, the provider completed a questionnaire, documenting cancer screening, blood pressure control, and diabetic care. Questionnaires were scanned into a database that included the patient’s medical record number. Race/ethnicity, diagnoses, and payer type information were obtained by cross-referencing the patient medical record number with the DH utilization and demographic database. Race and ethnicity were considered self-reported, although there were not any controls in place to ensure this information was consistently collected during a visit using this preferred method. Payer type at the time of the relevant visit was not documented on the questionnaire; therefore, the most frequent payer type documented during the 24 months before the medical chart review was used to define a patient’s payer type for the purpose of this study.

Selected Process and Outcome Measures

The outcome measures included cancer screening for women (PAP test and mammography), blood pressure control for hypertensive patients, and management of adult type 2 diabetes (lipid profile and control, urine protein or serum creatinine, glycosylated hemoglobin [HbA1c], diabetic eye and foot examinations). These variables are further categorized as follows:

- The proportion of women 21–64 years that have documentation of at least one PAP smear in the last 3 years or three previous normal PAP smears with an age ≥ 65 years.
- The proportion of women aged 52–69 years who have received a mammogram within the preceding 2 years.

- The proportion of hypertensive patients that have their blood pressure under control. Blood pressure control was defined as less than 140/90 mm Hg overall and less than 135/85 mm Hg for those with diabetes, coronary heart disease, nephrotic syndrome, or creatinine >2.0 mg/dl.
- The proportion of diabetic patients receiving:
 - a lipid profile in the last 2 years, and if “yes” was the LDL level <130 mg/dl;
 - a urine protein or serum creatinine in the last 12 months;
 - more than one glycosylated hemoglobin measurement during the last 12 months;
 - an annual dilated eye examination;
 - an annual foot examination.

The results of the survey were compared to the *Healthy People 2010* goals and the *Behavioral Risk Factor Surveillance System (BRFSS)* prevalence data for 1999 and 2000. A limitation in this comparison, however, is that there were some differences in the classification of criteria between the DH questionnaire and the *Healthy People 2010* and *BRFSS* categories. For example, the study questionnaire focused on different age groups for PAP smears and mammograms than that targeted by *Healthy People 2010*. The medical chart review question on the survey targeted women age 21 and older for PAP smears instead of women 18 years and older, and a similar survey question targeted women aged 52–69 for mammograms instead of women aged 40 years and older. In addition, neither *Healthy People 2010* nor *BRFSS* have diabetic targets for lipids (LDL), urine protein or serum creatinine; therefore, comparisons to these goals were not possible.

Statistical Procedures

Logistic regression was used to test for significant differences between racial/ethnic groups for cancer screening, blood pressure control, and diabetes management. It is hypothesized that there is no significant difference between racial or ethnic groups in the probability related to the selected process and outcome measures, while controlling for age, gender, payer type, and number of visits per patient for the prior 2 years. A classification of “white” was utilized as the reference group for all analyses performed.

Odds ratios (OR) were used to serve as measures of association between outcome variables and independent variables. In cases where 1.0 is included in the (95%) confidence interval, there is no significant difference in outcomes between the reference group of “white” and the race of interest. Otherwise, the difference is significant. An OR of greater than one indicates a higher probability of receiving the test or exam, while an OR of less than one indicates a lower probability.

RESULTS

Table 1 describes the demographic and utilization characteristics of the study population. Medical chart reviews resulted in data collection on 4,795 adult patients from ten DH community health centers. The large proportion of female patients in this sample is related to the gender-specific cancer screening measures, PAP smear, and mammography. Almost 56% of the study patients are Hispanic, 20% are black, and 20% are white. The patients are evenly distributed in age.

Table 1 describes the study population overall; 50% of the patients are uninsured. The remaining patients are distributed between coverage from Medicaid, Medicare, private/commercial insurance, and other types of programs. The median

TABLE 1 Demographic and utilization characteristics of Denver Health Study patients (7/99–12/01)

Gender	N (%)	Age	N (%)	Race/ethnicity	N (%)	Payer type	N (%)	Mean (SD)	Median	Outpatient visits
Male	1,158 (24.2)	21–30	942 (19.6)	Black	984 (20.5)	Medicaid	821 (17.1)	12.0 (8.8)		
Female	3,637 (75.8)	31–40	868 (18.1)	Hispanic	2,677 (55.8)	Medicare	891 (18.6)			
Missing	0 (0.0)	41–50	966 (20.2)	White	978 (20.4)	Private/commercial	416 (8.7)			
Total	4,795 (100.0)	51–60	853 (17.8)	Other	89 (1.9)	Uninsured ^a	2,453 (51.2)			
		61–70	716 (14.9)	Unknown	63 (1.3)	Other	214 (4.5)			
		71–75	203 (4.2)	Missing	4 (0.1)					
		>76	247 (5.2)	Total	4,795 (100.0)	Total	4,795 (100.0)			
		Total	4,795 (100.0)							

^aThe uninsured include self-pay, those subsidized by an external community health services program and those enrolled in the Colorado Indigent Care Program, which is not an insurance program but a state program that provides partial reimbursement to providers who offer medical care to eligible underinsured and uninsured residents.

number of outpatient visits over a 24-month period was 10, indicating that these patients do use the system regularly. There is a larger percentage of black (50.4%) and Hispanic (57.2%) uninsured than white (38.1%) uninsured ($p < 0.01$), which is representative of the DH adult patient population.

Table 2 describes the results of the retrospective chart review by race/ethnicity and compares these results to state and national averages and targets. For six of the nine outcomes considered, Hispanic patients had, on average, the highest rates of receiving an exam and/or having levels under control. Hispanic women were shown to have the highest rates of cancer screening of all ethnic groups for both PAP smears and mammograms, with 88% for PAP smears among Hispanic women compared to 75% for white women, and with 76% for mammography among Hispanic women compared to 73% for white women. More than 50% of these patients had their blood pressure under control, including Hispanics and black patients.

For the diabetic management study population, 76% were found to have had an LDL determination within the last 2 years. Moreover, 49% of the patients with an LDL determination had achieved a level of less than 130 mg/dl, including more than 40% of blacks and Hispanics. Renal function had been assessed in 94% of the study patients, and this rate was realized for both black and Hispanic patients. A HbA1c measurement had been obtained in the last 12 months for 77% of the study patients, and for over 70% for black and Hispanic patients. Referrals for ophthalmologic examination were given to 75% of patients, with 53% of the patients receiving this examination. Foot examinations had been given within the last 12 months to 82% of patients.

Table 3 describes the likelihood of patients within a particular race/ethnic category of having had a particular outcome related to cancer screening, hypertension control, or diabetes management.

The results indicate that there is no trend for whites to receive higher quality of care compared to any other racial/ethnic category.

There were no statistically significant differences among the racial/ethnic groups for the likelihood of receiving a mammography, achieving blood pressure control, obtaining lipid profiles or achieving lipid control, or obtaining a HbA1c. Differences among ethnic groups were found in the likelihood of receiving a PAP smear, having a determination of urine protein and serum creatinine, having an ophthalmology exam ordered and obtained, and having a foot exam performed. It is of interest to note that for two of these variables, the highest levels of care were achieved among ethnic minority patients. In the case of the PAP smear, all races were more likely to have received an exam than were whites ($p < 0.07$). Blacks ($p < 0.05$) and Hispanics ($p < 0.05$) were more likely than whites to have had a determination of urinary protein or serum creatinine in the previous 12 months. Hispanic diabetic patients were as likely as white patients to have an ophthalmologic exam ordered. Black and other ethnic groups were less likely to receive this care. Similarly, Hispanic and black diabetic patients were as likely as whites to receive a foot exam, but other ethnic minority patients were less likely.

The model also includes the covariates of gender, age, number of visits, and payer type. These variables did not have an effect on the probability of receiving a test or exam among the racial/ethnic groups. However, the privately insured were somewhat more likely to have a PAP smear ($p = 0.03$) or lipid profile ($p = 0.04$) than uninsured patients, and Medicare patients were more likely to have HbA1c measurements ($p = 0.02$) than uninsured patients. Given that ethnic minority patients are more likely to be uninsured than white patients ($p < 0.01$), this makes the lack of disparity observed in these interventions even more dramatic.

TABLE 2 Health care outcomes by race/ethnicity

Parameter	DENVER HEALTH									
	Black		Hispanic		White		Other/unknown		Total	BRFSS (CO) ^b
	% (n)	Nat'l avg ^c	% (n)	Nat'l avg ^c	% (n)	Nat'l avg ^c	% (n)	Nat'l avg ^c	% (n)	% (n)
Preventive care: cancer screening										
If female, was there at least one PAP smear done in the last three years? (n=3,100)	79.4 (478)	83	87.8 (1,692)	74	74.5 (363)	79	83.3 (70)	84.0 (2,603)	79	82.7 (3,069)
If female (52–69 years), was there at least one mammogram in the last 2 years? (n=1,182)	72.1 (191)	66	76.1 (439)	61	73.0 (195)	67	69.8 (30)	74.2 (855)	67	93.1 (975)
Chronic care: hypertension (n=1,759)										
If hypertensive, is blood pressure under control?	52.4 (258)	–	51.1 (399)	–	53.2 (224)	–	40.0 (26)	51.6 (907)	27 ²⁶	– ^e
Chronic care: Diabetic Treatment (n=860)										
Lipid profile in the last 2 years?	73.0 (130)	–	76.5 (371)	–	75.9 (101)	–	73.3 (22)	75.5 (624)	–	– ^e

If yes to LDL, was it <130 mg/dl?	44.4 (56)	–	49.8 (171)	–	48.9 (45)	–	50.0 (9)	48.5 (281)	–	– ^e
Urine Protein or Serum Creatinine?	95.5 (169)	–	94.9 (467)	–	90.4 (122)	–	83.9 (26)	93.9 (784)	–	– ^e
HbA1c obtained in last 12 months?	71.0 (127)	–	79.8 (382)	–	76.5 (104)	–	63.3 (19)	76.7 (632)	–	50.0
Is there an ophthalmology encounter in the last 12 months in the chart?	41.3 (71)	–	57.0 (272)	–	59.5 (78)	–	34.5 (10)	53.2 (431)	–	– ^e
Has an eye exam been ordered in the last 12 months?	65.9 (114)	–	79.1 (372)	–	75.6 (99)	–	54.8 (17)	74.8 (602)	–	75.0
Have the patient's feet been examined in the last 12 months?	78.5 (139)	–	85.0 (401)	–	82.9 (107)	–	66.7 (20)	82.5 (667)	–	75.0

The *n* for each question indicates the sample size of the patients that were either hypertensive, female in the appropriate age group, or diabetic. A person could be counted in more than one question. For instance, a 55-year-old woman could also be a diabetic.

^bSource: Colorado Behavioral Risk Factor Surveillance System (BRFSS), Colorado Department of Public Health and Environment, Health Statistics Section. 1999–2001.

^cSource: U.S. Department of Health and Human Services. Cancer. In: *Healthy People 2010*. 2nd ed. Washington, DC: U.S. Government Printing Office; 2000.

^dWomen 40 years and older

^eData not tracked

TABLE 3 Logistic regression results

Measure	Race/ Ethnicity	DHMC (random sample of 10 clinics)	
		OR (95% CI)	p-value
Preventive care			
If female, was there at least one PAP smear done in the last 3 years?	Black	1.33 (0.96–1.80)	0.06175*
	Hispanic	2.01 (1.54–2.62)	0.0000**
	Other	1.85 (0.95–3.58)	0.06946*
	White	1	
If female (52–69 years), was there at least one mammogram in the last 2 years?	Black	1.05 (0.71–1.56)	0.79179
	Hispanics	1.27 (0.90–1.78)	0.16892
	Other	1.08 (0.51–2.30)	0.84420
	White	1	
Chronic care			
If hypertensive, is blood pressure under control?	Black	0.98 (0.75–1.28)	0.90521
	Hispanic	1.00 (0.79–1.30)	0.98462
	Other	0.61 (0.35–1.06)	0.07731*
	White	1	
Lipid profile taken in the last 2 years (Y/N)	Black	0.96(0.57–1.63)	0.87912
	Hispanic	1.13(0.71–1.79)	0.60706
	Other	0.86(0.35–2.18)	0.77624
	White	1	
If Yes to 7, was the LDL level<130 mg/dl (<100 for 2001)? (Y/N)	Black	0.77(0.44–1.34)	0.34807
	Hispanic	1.02(0.63–1.65)	0.92686
	Other	1.07(0.38–3.03)	0.89539
	White	1	
Urine protein or serum creatinine obtained in the last 12 months (Y/N)	Black	2.58(1.01–6.63)	0.04865**
	Hispanic	2.12(1.03–4.38)	0.04216**
	Other	0.47(0.15–1.54)	0.21306
	White	1	
Has more than 1 HbA1c obtained in the last 12 months, at least three months apart (Y/N)	Black	0.81(0.48–1.37)	0.43215
	Hispanic	1.38(0.86–2.20)	0.18617
	Other	0.56(0.23–1.33)	0.18617
	White	1	
Is there an ophthalmology encounter in the last 12 months in the chart?	Black	0.50 (0.31–0.81)	0.00490**
	Hispanic	1.01 (0.67–1.52)	0.98095
	Other	0.38 (0.16–0.92)	0.03162**
	White	1	
Has an eye exam been ordered in the last 12 months?	Black	0.63 (0.38–1.07)	0.08453*
	Hispanic	0.1.28 (0.80–2.05)	0.29698
	Other	0.43 (0.19–0.99)	0.04639**
	White	1	
Have the patient’s feet been examined in the last 12 months?	Black	0.76 (0.42–1.39)	0.37423
	Hispanic	1.27 (0.74–2.17)	0.38998
	Other	0.47 (0.19–1.16)	0.09921*
	White	1	

* $p < 0.10$ ** $p < 0.05$

DISCUSSION

Disparities in health care access and quality between ethnic minority groups and the white population have been well documented. However, we are unaware of any significant body of data that has previously identified any systems of care in America where these disparities have been minimized or eliminated. This emphasizes the importance of the results found in this study and indicates a potential approach to reduce disparity. Other studies that have not found significant differences between racial/ethnic groups in health care^{33–36} have either relied on patient survey data,^{35,36} one health care procedure,³⁵ one payer type,³³ or a very small patient sample. It was hypothesized that America's urban safety net system might have achieved amelioration disparity for at least some outcomes given that these institutions have previously addressed a number of the issues which are believed to contribute to such disparity. The data presented in this study support this hypothesis.

The quality of care for two preventive measures and for two chronic diseases was examined. Mammography and PAP smears were selected as preventative measures, as ethnic minority women are diagnosed at a later stage of disease than white women, suggesting fewer screening studies.^{17–19,24,37} The control of hypertension and the management of diabetes were selected as chronic conditions, as these two chronic diseases disproportionately affect minority populations and have a higher incidence of known disease-related sequelae among ethnic minority patients.^{38–41}

In fact, ethnic minority females were found to be more likely to have PAP smears than white women in this urban safety net, and there was also no difference discerned in the use of mammograms between the racial/ethnic groups. Moreover, the frequency of PAP smears exceeded the national average of 79% in both blacks and Hispanics, approaching the 90% target defined by *Healthy People 2010*. Similarly, the frequency of mammography in blacks and Hispanics exceeded the national average of 67%.

In addition, not only was there no significant difference shown between racial/ethnic groups in achieving blood pressure control, more than 50% of blacks, Hispanics, and whites actually had their blood pressure adequately controlled. This compares to a national average of 36%.²⁶ The study also revealed better management for a number of measures of diabetic management, including lipid control, appropriately assessing glucose control with HbA1c, and appropriately assessing renal function. However, for unclear reasons, two variables related to assessing ophthalmologic complications of diabetes revealed no difference found between Hispanic diabetic patients and whites, but there was a lower frequency of achieving this intervention for black and other ethnic minorities.

Also in the case of diabetic patients, DH met or exceeded the quality of care achieved by the commercial managed care population in assessing renal function and performing ophthalmology and foot examinations, and closely approached the Veteran's Administration's level of performance in their population for these diabetic interventions.⁴² It is worth noting that in this particular study, the sample populations for the VA and commercial managed care were not as ethnically diverse as the population in the DH study, and the effect of race/ethnicity on these interventions was not reported. However, these quality improvement interventions were not achieved for all patients for DH, the VA, or commercial managed care.

This study was not designed to assess how DH has approached a system of care that is characterized by "unequal treatment." However, there are some characteristics of the DH, and of many safety-nets that may contribute to ameliorating disparities.

DH employs 16 community outreach workers who focus on 32 medically underserved neighborhoods. Their goal is to educate and inform the residents of these neighborhoods of the services available. DH has numerous points of access for patients, including clinics in underserved neighborhoods. In these clinics, patients are assigned a primary care provider, creating an emphasis on primary care rather than on episodic use of emergency rooms. Thirty-five percent of the primary care providers are members of ethnic minority groups, and 75% are bilingual. In addition, interpreter services are readily available. As DH is an integrated system, patients have access to specialty as well as primary care providers. DH operates a decentralized outpatient pharmacy service through which pharmaceuticals are provided on a sliding fee scale, with the co-payment being \$0 for the poorest patients. In fact, all services are provided on a sliding fee scale. DH also utilizes a single electronic medical record that links outpatient, inpatient, laboratory, and radiology data using a unique patient identifier.

Other systems of care may also contribute to ameliorating disparities, particularly integrated health systems and other public health systems. Integrated systems such as Kaiser Permanente claim that integrated services and data contribute to managing patient care and improving quality of care.⁴³ Two studies focused on Pap smears for immigrant patients using telephone surveys concluded that awareness of a safety net systems and culturally competent-based care also is needed to improve quality of care among minority groups.^{44,45}

CONCLUSION

This is one of the first studies to have attempted to address the role of a system of care on reducing ethnic disparities in health care. The IOM report on “Unequal Treatment” underscored the need for such studies.² It is both surprising and important that this study showed that care in an urban safety net institution can, in fact, ameliorate “unequal treatment”. Safety net providers are often unfairly maligned, and many have developed ways of reducing disparities in treatment that can be shared with other health care systems. There are a number of potential reasons for this achievement, including the fact that safety net institutions offer programs that may help mitigate differences in care between racial and ethnic groups, such as community outreach, minority providers, translation services, and sliding fee scale payment. This study should stimulate further studies of other health care systems, especially of other urban safety net institutions. If these findings are generalizable, support and expansion of the urban safety net system in America offers one of the first meaningful potential approaches to eliminating “unequal treatment”.

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