Heterogeneity in Management of Diabetes Mellitus Among Latino Ethnic Subgroups in the United States

Arch G. Mainous III, PhD, Vanessa A. Diaz, MD, MS, Sonia Saxena, MD, and Mark E. Geesey, MS

Background: Recent debate suggests that general racial/ethnic categories may obscure potentially important subgroup differences within minority groups. The purpose of this study was to examine the quality of diabetes care among ethnic subgroups of the Latino population in the United States while accounting for aspects of acculturation and access to care.

Methods: We evaluated adults (≥18 years old) with previously diagnosed diabetes in the 2003 National Health Interview Survey (n = 2136; United States population estimate = 13,471,587). The Latino subgroups (n = 373; United States population estimate = 1,556,259) were Mexicans, Puerto Ricans, and Other Latinos. Through a series of logistic regressions we examined ethnic group and quality of care for diabetes while controlling for demographics, access to care, and acculturation.

Results: Among Latinos, 43% conducted their interview in Spanish and 59% were immigrants to the United States. Ethnic group differences were apparent in the analyses. In a logistic regression analysis including all Latinos, with Puerto Ricans as the reference group, Mexicans (odds ratio, 0.24; 95% CI, 0.07–0.85) and Other Latinos (odds ratio, 0.15; 95% CI, 0.04–0.58) were significantly less likely to have only one doctor for their diabetes care. Mexicans were less likely than Puerto Ricans (odds ratio 0.39; 95% CI, 0.18–0.84) to know about glycated hemoglobin. Similarly, among Latino immigrants, Mexicans (odds ratio, 0.13; 95% CI, 0.02–0.81) and Other Latinos (odds ratio, 0.09; 95% CI, 0.01–0.63) were significantly less likely than Puerto Ricans to have only one doctor for their diabetes care and management. Measures of acculturation and immigration were not independent predictors of diabetes quality of care.

Conclusions: Differences in diabetes management exist between Latino ethnic subgroups; treating Latinos in the United States as one homogenous category may be a barrier to the appropriate provision of care. (J Am Board Fam Med 2007;20:598–605.)

Diabetes is a common disease that has substantial morbidity and mortality and has reached epidemic proportions in the United States. Appropriate ongoing diabetes management and treatment has been shown to successfully decrease the deleterious outcomes of the disease. Reducing health disparities in diabetes care is an important issue facing the United States.

US Census estimates from 2005 report that Latinos constitute 14% of the nation’s population. Among these, 64% have Mexican backgrounds whereas 10% are Puerto Rican. Latinos have a higher prevalence of diabetes, more complications, and worse outcomes than non-Latino whites. Quality of care for diabetes among Latinos continues to lag behind that for non-Latino whites. Recent projections continue to predict an increasing prevalence of diabetes, particularly for Latinos. The US Census indicates that 14.5% of adult US residents are foreign born. These immigrants, particularly minorities, may require targeted interventions and modifications to the standard health care delivery system than might others in their ethnic group who are born in the United States. Recent debate has highlighted that homog-
ous groupings using general racial/ethnic
categories may obscure potentially important subgroup
differences within minority groups. Some data
has indicated the importance of considering both
immigration and country of origin when discussing
the Latino population. Classifying diverse
groups (eg, Puerto Rican, Mexican) into one mono-
lithic group with shared language (Spanish) may
obscure important cultural and socioeconomic dif-
f erences that impact health beliefs, behaviors, and
access to care.

Differences in diabetes prevalence and care
among ethnic subgroups are associated with the
degree of acculturation. For example, Latinos
who are less acculturated to the majority US cul-
ture tend to have a higher prevalence of diabetes
and more complications. Latinos with low lev-
els of acculturation were more likely to be without
a routine place for health care, have no health
insurance, and have low levels of education.

It is unclear whether ethnic subgroup differ-
ences are simply representations of differences in
acculturation or access to care or whether ethnic
subgroup membership has important implications
for diabetes management. The purpose of this
project was to examine diabetes management
among ethnic subgroups of the Latino population
in the United States while accounting for aspects of
acculturation and access to care.

Methods

Design

We conducted an analysis of the 2003 National
Health Interview Survey (NHIS). The NHIS is
one of the principal sources of information about
the health of the civilian, noninstitutionalized pop-
ulation of the United States and is one of the major
data collection programs of the National Center
for Health Statistics. Although the NHIS has been
conducted continuously since 1957, the content of
the survey has been updated every 10 to 15 years.
The NHIS is a cross-sectional household interview
survey that uses a complex survey design that allows
for estimates of the civilian, noninstitutionalized
population of the US.

The 2003 NHIS is the most recently available
data for the NHIS that included the questions
needed to differentiate ethnic subgroups and evaluate
acculturation factors and diabetes management. The data were weighted to make population
estimates of people in the United States. The
NHIS has been used to examine health care issues
regarding both Hispanic subgroups as well as people
who are foreign born and living in the United States.

Subjects

The subjects analyzed in this project were adults
(≥18 years old) with previously diagnosed diabetes
(n = 2136). This unweighted sample size repre-
sents a population of 13,471,587.

Variables

Race/Ethnicity

The NHIS provides data via several questions to
classify the population into race/ethnicity catego-
ries. First, people were asked to identify their race.
Only people identifying a primary race group were
used in the analysis. Second, in a separate question,
people were asked if they considered themselves to
be of Hispanic ethnicity. The term Hispanic or
Latino describes a population with a common cul-
tural heritage and most often a common language,
but it does not refer to a race or a common ances-
try. Because there may be some cultural, reli-
gious, and genetic differences, some measures of
Latino ethnicity have used self-reports to indicate
the person’s geographic region of origin. People
who identified themselves as having Latino ethnic-
ity were asked to identify the group that repre-

sented their Latino origin or ancestry. The racial/
ethnic categories with sufficient numbers to be
used in this study were (1) non-Latino white, (2)
non-Latino black, (3) Mexican, (4) Puerto Rican,
and (5) other Latino.

Acculturation Factors

Acculturation is an indication of the cultural
change of people in a minority to the majority
culture. Acculturation measures vary widely in what
is conceptualized to indicate the construct. Several
indicators that have been previously used as proxies
were available from the NHIS. Spanish lan-
guage use has been used as a proxy. Being born
outside the United States and, among immigrants,
years in the United States and US citizenship were
assessed.

Diabetes Management

Measures of ongoing diabetes management include
self-care as well as care provided by health care
professionals. The measures include (1) the patient has a continuity provider for diabetes; (2) the patient has seen a dietitian for diabetes in the past 12 months; (3) self-monitoring of blood glucose; (4) self-monitoring of foot ulcers; (5) knowledge of glycosylated hemoglobin (HbA1c); (6) check for foot ulcers by a health professional during the past 12 months; (7) examination for retinopathy by a health professional during the past 12 months; (8) cholesterol check by a health professional during the past 12 months; and (9) blood pressure check by a health professional during the past 12 months.

Demographic and Access to Care Characteristics

We assessed the following access to care as well as demographic characteristics of the respondents: (1) sex; (2) age; (3) body mass index computed as weight (kg)/height² (m); (4) annual household income; (5) education; (6) health insurance; (7) usual source of care; (8) occasions during the past 12 months when accessing needed medical care was delayed; (9) getting care was delayed because they could not afford health services (among individuals who reported delay in getting needed care); (10) the number of physician visits during the last 12 months; and (11) the number of overnight hospital stays during the past 12 months.

Analysis

Because this survey is based on a complex sampling design that makes it representative of the noninstitutionalized US population, we are able to make nationally representative estimates. We used SUDAAN software (RTI International, Research Triangle Park, NC) to account for the weighting and complex sampling design.

We computed χ² analyses for bivariate relationships between race/ethnicity and demographic, access to care, acculturation factors, and diabetes management variables. We computed χ² values for the entire set of racial/ethnic groups and for the subset of Latinos alone. Non-Latino whites and non-Latino blacks were examined in the bivariate analysis to provide a context for the Latino subgroups.

We conducted multivariate analyses to evaluate the relationships between Latino ethnic subgroups and the effect of acculturation factors on diabetes management while adjusting for patient characteristics, access to care, and socioeconomic status. These analyses were restricted to Latinos in an effort to examine the importance of ethnic subgroup status to other patient characteristics. Specifically, we focused on 3 variables that indicate continuity of care and the patient’s knowledge of their disease and receipt of recommended tests received outside of primary care. We calculated the relative likelihood of having only one doctor for diabetes care, knowledge of HbA1c, and having an examination for retinopathy within the previous year. Included in our forced inclusion logistic regressions as independent variables were the following characteristics: Latino subgroup, sex, age, family annual income (<$20,000 vs ≥$20,000), education, health insurance, usual place to receive medical care, whether the interview was conducted in English rather than Spanish, and whether the respondent was born in the United States. We did not include how long the respondent has lived in the United States because that item was asked only of people who were foreign born. Consequently, we conducted a separate set of regressions among immigrants, keeping the same set of variables but substituting whether the person had lived in the United States for <15 years for US born. To investigate the role of US citizenship in these analyses, a third set of regressions were conducted among immigrants and constructed with the replacement of US citizenship for time in the United States. We excluded Puerto Ricans in this third set of regressions because they are US citizens.

Results

The demographic and access to care characteristics of non-Latino white and non-Latino black groups are presented for comparison to the Latino ethnic subgroups (Table 1). More than a third of the participants from each of the Latino ethnic groups conducted their interview in Spanish; less than 50% of the participants from each of the groups was born in the United States. The non-Latino white group had higher annual income and education than did the minority groups. The Latino ethnic subgroups also had lower percentages of members having health insurance than did the non-Latino whites.

In the investigation into the bivariate relationships between racial/ethnic group and diabetes quality of care measures (Table 2), the Latino subgroups were substantially lower than the non-Latino whites, although none of the ethnic groups
(including non-Latino whites) had a high proportion of respondents who had heard of HbA1c. Similarly, more than two-thirds of all of the ethnic groups did not check their blood glucose at least once per day.

In the unadjusted regression models including all Latinos, with Puerto Ricans as the reference group, ethnic group was generally not a significant factor relating to the quality of care measures (Table 3). However, other social factors were generally significant. In the adjusted logistic regression analyses, ethnic group became more significant and other factors become nonsignificant (Table 4). Compared with Puerto Ricans, Mexicans and other Latinos were significantly less likely to have only one doctor for their diabetes care and management. Mexicans were less likely than Puerto Ricans to know about HbA1c, whereas people with at least a college education were more likely than less-educated people to know about HbA1c. In terms of receipt of eye exams during the previous year, ethnic subgroup was not a significant variable. Two factors were significant predictors of receipt of eye exams. People with health insurance were more likely to have had an eye examination during the previous year than people without health insurance, and people who answered the survey in Spanish were less likely to have an eye examination during the previous year than were those who answered in English. Birth in the United States versus birth...
outside of the United States was not a significant predictor in any of these regressions.

In the second set of logistic regression analyses, which included only Latino immigrants, used time in the United States as an acculturation variable, and used Puerto Ricans as the reference group, Mexicans (odds ratio [OR], 0.13; 95% CI, 0.02–0.81) and other Latinos (OR, 0.09; 95% CI, 0.01–0.63) were significantly less likely to have only one doctor for their diabetes care and management. In addition to ethnic subgroup, people who had a place to which they usually go when they are sick are more likely to have only one doctor for their diabetes care and management (OR, 6.36; 95% CI, 1.38–29.33). There were no significant differences between Latino groups regarding their knowledge about HbA1c; however, individuals with at least a college education were more likely than less-educated people to have had an exam for retinopathy within the previous year.

### Table 2. Various Diabetes Management Issues for Each Ethnic Population*

<table>
<thead>
<tr>
<th></th>
<th>Non-Latino White</th>
<th>Non-Latino Black</th>
<th>Mexican</th>
<th>Puerto Rican</th>
<th>Other Latino</th>
<th>All Races</th>
<th>Latinos Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing one doctor for diabetes care</td>
<td>84.6 (1.17)</td>
<td>85.4 (1.88)</td>
<td>77.4 (3.15)</td>
<td>89.5 (4.27)</td>
<td>73.0 (5.12)</td>
<td>.042</td>
<td>.046</td>
</tr>
<tr>
<td>Seen a nurse/dietician in past year</td>
<td>42.1 (1.57)</td>
<td>51.9 (2.92)</td>
<td>49.4 (4.42)</td>
<td>49.1 (7.20)</td>
<td>36.1 (6.17)</td>
<td>.018</td>
<td>.228</td>
</tr>
<tr>
<td>Does not check blood glucose at least 1 time per day</td>
<td>63.9 (2.05)</td>
<td>69.7 (3.89)</td>
<td>67.0 (5.85)</td>
<td>69.6 (8.45)</td>
<td>85.3 (7.72)</td>
<td>.181</td>
<td>.198</td>
</tr>
<tr>
<td>Checks feet for sores 1 or more times per week</td>
<td>76.9 (1.33)</td>
<td>78.2 (2.30)</td>
<td>74.8 (3.18)</td>
<td>68.0 (8.24)</td>
<td>78.19 (4.98)</td>
<td>.740</td>
<td>.555</td>
</tr>
<tr>
<td>Has not heard of HbA1c</td>
<td>58.7 (1.70)</td>
<td>65.5 (2.75)</td>
<td>75.8 (3.70)</td>
<td>63.6 (6.84)</td>
<td>76.5 (5.34)</td>
<td>&lt;.001</td>
<td>.289</td>
</tr>
<tr>
<td>Doctor checked feet for ulcers during past year</td>
<td>68.8 (1.42)</td>
<td>80.4 (2.14)</td>
<td>68.5 (3.28)</td>
<td>77.3 (5.95)</td>
<td>63.1 (5.12)</td>
<td>&lt;.001</td>
<td>.229</td>
</tr>
<tr>
<td>Had exam for retinopathy during past year</td>
<td>65.5 (1.52)</td>
<td>70.8 (2.97)</td>
<td>54.7 (4.02)</td>
<td>67.2 (6.61)</td>
<td>67.9 (6.63)</td>
<td>.028</td>
<td>.089</td>
</tr>
<tr>
<td>Had cholesterol check during past year</td>
<td>81.7 (1.20)</td>
<td>79.2 (2.39)</td>
<td>72.8 (3.74)</td>
<td>66.7 (8.34)</td>
<td>78.0 (5.26)</td>
<td>.089</td>
<td>.510</td>
</tr>
<tr>
<td>Had blood pressure check during past year</td>
<td>94.2 (0.87)</td>
<td>92.8 (1.42)</td>
<td>85.3 (2.46)</td>
<td>91.7 (3.80)</td>
<td>90.8 (3.44)</td>
<td>.034</td>
<td>.203</td>
</tr>
</tbody>
</table>

*Data shown as % (standard error). \( \chi^2 \) P values are calculated across all ethnic groups and among Latino groups only (Mexicans, Puerto Ricans, and Other Latinos). HbA1c, glycosylated hemoglobin.

### Table 3. Unadjusted Logistic Regression Models Calculating the Relative Likelihood of a Latino Having One Doctor for Diabetes Care, Knowing About Glycosylated Hemoglobin, or Having Had an Exam for Retinopathy Within the Previous Year

<table>
<thead>
<tr>
<th></th>
<th>Has Only One Doctor</th>
<th>Knows About HbA1c</th>
<th>Retinopathy Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latino group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexican</td>
<td>0.40 (0.15 to 1.08)</td>
<td>0.56 (0.28 to 1.12)</td>
<td>0.59 (0.30 to 1.15)</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.32 (0.11 to 0.89)</td>
<td>0.54 (0.25 to 1.17)</td>
<td>1.03 (0.44 to 2.39)</td>
</tr>
<tr>
<td>College education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>1.17 (0.89 to 1.56)</td>
<td>2.38 (1.93 to 2.93)</td>
<td>1.42 (1.13 to 1.79)</td>
</tr>
<tr>
<td>Health insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>2.70 (1.82 to 3.99)</td>
<td>1.77 (1.13 to 2.76)</td>
<td>3.40 (2.31 to 5.01)</td>
</tr>
<tr>
<td>Usual place for care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>11.26 (6.12 to 20.73)</td>
<td>1.18 (0.63 to 2.19)</td>
<td>3.09 (1.68 to 5.66)</td>
</tr>
<tr>
<td>Interview language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Spanish</td>
<td>0.51 (0.33 to 0.80)</td>
<td>0.36 (0.24 to 0.54)</td>
<td>0.63 (0.44 to 0.91)</td>
</tr>
</tbody>
</table>

Data shown as odds ratio (95% confidence interval). HbA1c, glycosylated hemoglobin.
cated people to know about HbA1c (OR, 4.29; 95% CI, 1.48–12.41), as were individuals with health insurance (OR, 2.83; 95% CI, 1.01–7.95). In terms of the receipt of eye exams during the previous year, neither acculturation variables nor ethnic subgroup were significant variables. Puerto Ricans are US citizens and were therefore excluded from the next set of regressions that investigated the role of citizenship in predicting diabetes management issues (having only one doctor, knowing about HbA1c, and having an eye examination). Citizenship was not a significant predictor in any of the 3 regressions. As before, having a usual place of care was a significant predictor of having one doctor for diabetes care and management (OR, 7.54; 95% CI, 1.34–42.46); having a college education was a significant predictor of knowing about HbA1c (OR, 4.33; 95% CI, 1.24–15.08); and having health insurance was a significant predictor of having an eye examination during the previous year (OR, 2.73; 95% CI, 1.08–6.87).

**Discussion**

The results of this study suggest that grouping Latinos in the United States into one large homogenous category may obscure differences between ethnic subgroups in relation to the quality of care for diabetes. Although common demographic and access to care variables were significant independent predictors of diabetes management, ethnic subgroup was also a significant independent predictor, with Puerto Ricans having the best management. Except for Spanish language, which was a significant predictor in only 1 of the 9 regressions, measures of acculturation and immigration were not significant independent predictors of diabetes quality of care once we accounted for ethnic subgroup and access to care variables.

Some barriers to care and health beliefs in the Latino population may influence the primary care provider’s ability to deliver care. These include language, income, having a usual provider, and beliefs about illness and the role of medications. However, the current findings reinforce the importance of not conceptualizing minority populations according to simple and general categorizations. As shown previously with South Asians in England, where Pakistanis, Indians, and Bangladeshis exhibited differences, the current results suggest that Latino ethnic subgroup differences are important in diabetes quality of care. Cultural differences between ethnic subgroups are important and, when

---

**Table 4. Adjusted Logistic Regression Models Calculating the Relative Likelihood of a Latino Having Only One Doctor for Diabetes Care, Knowing About Glycosylated Hemoglobin, or Having had an Exam for Retinopathy Within the Previous Year**

<table>
<thead>
<tr>
<th>Latino Group</th>
<th>Has Only One Doctor for Diabetes Care</th>
<th>Knows About HbA1c</th>
<th>Retinopathy Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexican</td>
<td>0.24 (0.07 to 0.85)</td>
<td>0.39 (0.18 to 0.84)</td>
<td>0.77 (0.35 to 1.67)</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.15 (0.04 to 0.58)</td>
<td>0.50 (0.21 to 1.19)</td>
<td>1.07 (0.42 to 2.70)</td>
</tr>
<tr>
<td>College education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>1.19 (0.47 to 3.02)</td>
<td>2.68 (1.35 to 5.34)</td>
<td>0.76 (0.37 to 1.54)</td>
</tr>
<tr>
<td>Health insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>1.40 (0.50 to 3.95)</td>
<td>1.65 (0.75 to 3.66)</td>
<td>2.12 (1.10 to 4.10)</td>
</tr>
<tr>
<td>Usual place for care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>8.88 (2.73 to 28.89)</td>
<td>1.09 (0.28 to 4.21)</td>
<td>1.12 (0.44 to 2.83)</td>
</tr>
<tr>
<td>Interview language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Spanish</td>
<td>0.51 (0.23 to 1.13)</td>
<td>1.01 (0.43 to 2.35)</td>
<td>0.41 (0.19 to 0.88)</td>
</tr>
</tbody>
</table>

All models were also adjusted for sex, age, family income, and immigrant status, which were not significant predictors in the full models. Data shown as odds ratio (95% confidence interval). HbA1c, glycosylated hemoglobin.
planning health care services for underserved
groups, necessitate an understanding of the com-
position and geographic heritage of the local mi-
nority population. In particular, Puerto Ricans
seem to have better diabetes management than the
other Latino groups. This may be because Puerto
Rico is a commonwealth of the United States,
which carries more implications for integration in
US society than just citizenship. In addition to
cultural differences, ancestry, particularly among
Latinos, seems to have relevance for health care
delivery because of differences in genetic admix-
ture. A recent study focusing on asthma found that
ancestry informative markers showed a greater-
than-expected degree of association between pairs
of ancestry informative markers on different chro-
mosomes in Mexicans and Puerto Ricans; this pro-
vides evidence for population substructure and/or
recent admixture, particularly as it was associated
with asthma. Consequently, the delivery of ap-
propriate care to help Latino patients manage a
chronic disease like diabetes must entail an under-
standing of literacy issues, religiosity, beliefs re-
garding health and illness, socioeconomic con-
straints, and potential genetic differences among
groups of different ancestries.

Although acculturation has been previously
linked to diabetes and diabetes outcomes in Latino
populations, the present set of variables used to
operationalize acculturation did not have signifi-
cant independent associations with quality of care
once ethnic subgroup was entered into the models.
Previous studies on acculturation and diabetes in
Latinos have not accounted for ethnic subgroups;
this accounts for our new findings. On the other
hand, it is possible that the variables that we
used to measure acculturation were too crude and
simplistic to appropriately represent nuances of
culture.

There are several limitations to this study. First,
the data set is cross-sectional, which limits the
ability to make inferences about causality. The
NHIS data do, however, allow us to make popula-
tion estimates for conditions for subgroups of the
US population. Secondly, although we were able to
separate out several Latino ethnic subgroups, be-
because of small numbers of people with diabetes we
were unable to split the population into every eth-
nic subgroup that the NHIS collected (eg, Domin-
icans, Cubans), and therefore were forced to clump
the smaller groups into an “Other Latino” group.

Thus, some group differences may have been
missed. Third, the question regarding the assess-
ment of physician-diagnosed diabetes, which was
the basis for people being in the study, did not
discriminate between those told that they had type
1 or type 2 diabetes. However, the quality of care
questions were applicable to individuals with either
type 1 or type 2 diabetes.

We attempted to assess the receipt of HbA1c
tests by the patients during the previous 12 months.
Unfortunately, in this self-report design, we were
unable to use this variable because it was only asked
of individuals who reported having heard of
HbA1c, thereby yielding very small sample sizes
among some of the Latino subgroups. Finally, al-
though Latinos are dispersed throughout the
United States, some groups are more likely to be in
certain regions and urban or rural areas than oth-
ers. Unfortunately, the 2003 NHIS did not contain
information that allowed us to evaluate the rural/
urban residence of the respondents.

In conclusion, ethnic subgroups of the US
Latino population with diabetes differ in their qual-
ity of care for this chronic disease. Future planning
of health services for the Latino population, which
is both growing in the United States and has a high
rate of diabetes, will need to consider the composi-
tion of the local population in terms more specific
than just “Latinos.”

References
1. Cowie CC, Rust KF, Byrd-Holt DD, et al. Preva-
ence of diabetes and impaired fasting glucose in
adults in the U.S. population: National Health and
Care 2006;29:1263–8.
2. Vijan S, Stevens DL, Herman WH, Funnell MN,
Staniford CJ. Screening, prevention, counseling, and
treatment for the complications of type II diabetes
mellitus. Putting evidence into practice. J Gen Intern
3. Smedley BD, Stith AY, Nelson AR. Unequal treat-
ment: confronting racial and ethnic disparities in
health care. Washington, DC: Institute of Medicine,
4. U.S. Census Bureau. Hispanic Americans by the
numbers. Available at http://www.infoplease.com/
of diabetes and impaired fasting glucose in adults—
United States, 1999–2000. MMWR Morb Mortal


