Persistent Disparities in the Use of Health Care Along the US–Mexico Border: An Ecological Perspective

Elena Bastida, PhD, H. Shelton Brown III, PhD, and José A. Pagán, PhD

Objectives. We examined disparities in health care use among US–Mexico border residents, with a focus on the unique binational environment of the region, to determine factors that may influence health care use in Mexico.

Methods. Data were from 2 waves of a population-based study of 1048 Latino residents of selected Texas border counties. Logistic regression models examined predictors of health insurance coverage. Results from these models were used to examine regional patterns of health care use.

Results. Of the respondents younger than 65 years, 60% reported no health insurance coverage. The uninsured were 7 and 3 times more likely in waves 3 and 4, respectively, to use medical care in Mexico than were the insured. Preference for medical care in Mexico was an important predictor.

Conclusions. For those who were chronically ill, old, poor, or burdened by the lengthy processing of their documents by immigration authorities, the United States provided the only source of health care. For some, Mexico may lessen the burden at the individual level, but it does not lessen the aggregate burden of providing highly priced care to the region's neediest. Health disparities will continue unless policies are enacted to expand health care accessibility in the region. (*Am J Public Health.* 2008;98:1987–1995. doi:10.2105/AJPH.2007.114447)

Current political discourse on undocumented immigration and national security has heightened public awareness of the US–Mexico border. Arguments for tightening access to this border are proliferating in politics, the media, and the public at large. National debates highlight crossings from Mexico to the United States but largely ignore significant border crossings in the other direction. Because they are less controversial, crossings to the south are not publicized by the media; yet thousands throughout the southwestern United States cross monthly to obtain health care services in Mexico.

Use of health care services in Mexico by border residents is a well-documented, decades-old practice.[1–5] Much of what is known about it is based on limited samples,[6–8] the targeting of specific health care needs or products,[9] customs declarations,[10] or participant observation.[11] In recent years, this literature has grown to include options for extending US health care coverage across the border in the form of the expansion of Medicare and the availability of cross-border private health insurance coverage.[12–14]

Accounts of these crossings have become embedded in Southwestern folklore and common knowledge. Some stories exalt the outright benefits of the personalized attention and time provided by health care professionals in Mexico, whereas others tell of wrongful deaths and incapacitations resulting from poor diagnosis and incorrect treatment.[15–18] Characterizations of these practices vary widely from beneficial and worthwhile to an instrument of last resort primarily because of the lack of affordability of the US health care system.[19,20] Still, substantial knowledge gaps remain because much of what is known is based on anecdotal stories and nonprobability samples of border residents.

In this study, which had an ecological perspective,[21,22] we considered regional health insurance coverage, the border economy, and the confluence of 2 health care systems as 3 contextual factors that may significantly influence, beyond cultural preferences, the use of health care in Mexico. In particular, the South Texas region's high level of uninsurance is considered as a pivotal influence on health care use in Mexico. Existing explanations for uninsurance in the United States, which acknowledge area and regional variations to some extent, nonetheless typically emphasize individual characteristics, resulting in a national profile of the uninsured as poor, at a certain age, a minority, or an immigrant and unskilled worker.[23–27] This national profile of the uninsured describes important individual traits but diminishes the influence of ecological factors in accounting for significant regional variations in uninsurance rates. Although in the larger national context these individual attributes are major determinants of uninsurance, in the context of the US–Mexico border, these conditions are intensified by a binational economy and the unique characteristics of the health care systems in the United States and Mexico.

Data for this study came from the Border Epidemiological Study of Aging (BESA), an ongoing population-based study of Texas residents in selective border counties. Although only Texas border counties were included in this research, socioeconomic and demographic structures along the border are sufficiently similar to warrant the broader consideration of these findings in the region, with the exception of San Diego County, California.[28]

The proportion of the population without health insurance coverage—like many other aspects of health care and health—varies substantially by region. The 4 southwestern border states have uninsurance rates exceeding 18% and account for 30% of the total uninsured US population, with approximately 12 million uninsured residents.[29] About 26% of the children and adults in Texas are uninsured, with uninsurance rates particularly high in border communities (38%).[29]

The border economy is anchored on the Mexican labor market. It is characterized by low wages and composed of mostly services, manufacturing, and agribusiness industries[28] that typically pass on the high cost of health insurance premiums to their employees. The region's low wage structure resulted in a median annual household income of $25 433 in 2004 dollars before taxes for the counties studied, compared with $47 453

nationally.[30] We estimated that at least 43% ($10 880 ÷ $25 433) of the household income in these counties, on average, would have to be spent on family health insurance premiums to cover all family members, almost twice the percentage of the rest of the United States.[31] The US health care system is therefore rendered unaffordable for most border residents, even when employers may offer health insurance coverage.

The private sector of the health care system in Mexico maintains a competitive cost advantage over the US system and provides an alternative for US border residents who cannot afford US health care. This private sector in Mexico is literally well positioned near the border to ease access for patients from the United States. Medical doctors, pharmacies, and private clinics aggressively market their services in the US local media.

The price of health care north of the border is anchored within the larger systemic characteristics of the US health care system. Health insurance coverage premiums and health costs in US counties along the US–Mexico border are determined by national and statewide price structures. Instead of being discounted to take the border resident's low income into account, costs are higher than in the rest of the United States. For example, *Dartmouth Atlas of Health Care* estimates of total Medicare expenditures per enrollee were at the 95th percentile for the South Texas border region in 2003.[32] Moreover, Medicare, Medicaid, and most US private health insurance companies do not provide coverage in Mexico.[33]

We hypothesized that as the health care system in the United States becomes increasingly expensive relative to the alternative in Mexico, the incentive to cross the border for health care will remain an important option for border residents and an important dimension of the border's social context. Between 2001 and 2005, the period of this analysis, health care inflation in the United States was as high as 60%.[34] Therefore, our data allowed unique insights into how the high health care inflation in the United States affected health insurance coverage rates and health care use in Mexico by US border residents.

We drew on the previous considerations to investigate the use of health care services in Mexico by border residents. First, we identified significant predictors of health insurance coverage for US border residents. Second, we used these predictors to analyze how factors related to US-based health insurance coverage and the preference for Mexican medical care were associated with the use of medical care south of the border. Third, we explored the association between individual socioeconomic status, health and functional status, years of residence in the United States (for the Mexican-born group), and preference for Mexican medical care in predicting health insurance coverage and use of Mexican medical care.

METHODS

Data

We used waves 3 (2001–2002) and 4 (2005–2006) of the BESA. The sampling frame was based on maps drawn from the 1990 US Census; the total sample pool of participants was age adjusted by census tract to reflect the 1994 age structure and proportionally selected according to their overall representation within each tract. The baseline wave collected in 1994 to 1995 resulted in a final sample of 1089 households with a response rate of 89%, in which at least 1 member 45 years or older agreed to complete an in-home face-to-face interview in either Spanish or English. The weighted BESA sample represented more than 300 000 residents of Cameron, Hidalgo, Willacy, Starr, and Zapata counties. Loss to attrition was minimized by using a detailed follow-up plan that included establishing periodic contact with all participants through biannual telephone calls as well as with mailings of birthday and holiday cards. Further details on the study design can be obtained from earlier publications.[35,36]

The analysis reported here was based on data from waves 3 and 4 for 2 reasons. First, waves 3 and 4 emphasized health insurance and health care use in Mexico. Second, a younger cohort (37–45 years) was added in wave 3 and followed up in wave 4. This new cohort increased the total number of participants to 1048 and 960 in waves 3 and 4, respectively, despite an 8% attrition rate between waves. (Totals reported here for waves 3 and 4 do not correspond to the totals reported in the tables because we adjusted for missing values in the tables.) The inclusion of this younger cohort strengthened our analyses because it broadened the applicability of results to a larger population in this region.

The BESA included extensive information on socioeconomic, demographic, and health characteristics of respondents, as well as detailed information on the use of health care services in either the United States or Mexico (waves 3 and 4) and preferences for health care in Mexico (wave 4). The final sample included only Mexican American participants given their overrepresentation (more than 85%) along the Texas–Mexico border.

Variables

Our primary objective was to identify the factors that were related to health insurance coverage and the use of health care services in Mexico by border residents over a 48-month period. We estimated health care use logistic regression models that were adjusted for self-reported health status, activities and instrumental activities of daily living (ADL and IADL), age, years of education, marital status, gender, health insurance coverage, and household income. Classifications of health insurance coverage included any public (Department of Veterans Affairs, Medicaid, or Medicare) or private insurance. Eligibility for public health insurance coverage was related to income and immigration status. Preference for medical care in Mexico was measured by 3 items that asked respondents to compare the delivery of health care by physicians in the United States and Mexico. Use of health care in Mexico was measured by 3 variables: physician visits, hospital care, and the purchase of prescription medication in Mexico. After initial analysis, the frequency of hospital care use in Mexico was very low and, therefore, not relevant to the analysis.

For each model, dummy variables were created for each self-reported health category: excellent, very good, fair, and poor. Self-reported instrumental activities of daily living ADL and IADL were derived from the Older Americans Resources and Services scale.[37] This scale consists of 2 subscales that capture functional skills necessary for independent living. ADL taps into broader activities such as whether the respondent needs assistance conducting their finances while IADL measures daily activities for independent living such as assistance with bathing and feeding. ADL and IADL were

coded separately as dummy variables: 0 for no required assistance and 1 for at least 1 required assistance with a daily activity. Dummy variables for age were coded as younger than 50, 50 to 64, and 65 years or older for wave 3 and adjusted by 4 years in wave 4. Because more than 97% of the respondents 65 years or older were covered by Medicare in waves 3 and 4, this age category served as a reference in the analysis. Years of education were coded as fewer than 7 years of schooling, 7 or 8 years, 9 to 12 years, and 13 or more years of schooling. We included marital status dummy variables for single and married respondents, with widowed being the reference category. Preference for Mexican health care was coded as 1 if at least 1 item was positive and 0 otherwise.

Years of residence in the United States for those born in Mexico were used to measure the degree of acculturation and, thus, familiarity with the US health care system. Preliminary analysis indicated that this measure was more consistent than was country of birth in discriminating for increased familiarity with the US health care system. Therefore, dummy variables were created as follows: fewer than 20 years in the United States, 20 to 39 years, and 40 years or more for wave 3 and adjusted by 4 years for wave 4. The reference category was being a US native.

TABLE 1—Distribution of Sociodemographic Characteristics for Insured and Uninsured Participants in Wave 3: Border Epidemiological Study of Aging, Texas, 2001–2002

	Uninsured (n = 310), Row % (Column %)	Insured (n = 727), Row % (Column %)
Age, y		
< 50	56.7 (41.0)	43.3 (13.4)
50–59	46.3 (32.3)	53.7 (16.0)
60–64	46.0 (23.9)	54.0 (12.0)
≥ 65	2.1 (2.9)	97.9*** (58.6)
Aged <65 y		
Women	54.2 (76.4)	45.8 (64.7)
Men	40.1 (23.6)	59.9*** (35.3)
Aged ≥ 65 y		
Women	1.7 (55.6)	98.3 (67.1)
Men	2.8 (44.4)	97.2 (32.9)
Marital status		
Married	36.1 (74.4)	63.9 (56.6)
Single	26.7 (15.2)	73.3 (17.9)
Widowed	14.8 (10.4)	85.2*** (25.5)
Household income, $		
< 7000	27.3 (24.5)	72.7 (28.2)
7000–15 000	32.2 (41.5)	67.8 (37.7)
15 001–30 000	41.0 (27.5)	59.0 (17.1)
> 30 000	14.2 (6.5)	85.8*** (17.0)
Education, y		
< 7	28.6 (53.9)	71.4 (57.5)
7–8	38.7 (11.6)	61.3 (7.9)
9–12	39.9 (27.4)	60.1 (17.7)
≥ 13	15.3 (7.1)	84.7*** (16.9)
Length of residence in United States (for Mexican born), y		
< 20	73.1 (22.4)	26.9 (3.5)
20–39	47.7 (34.3)	52.3 (16.0)
≥ 40	17.1 (10.6)	82.9 (21.7)
US native	19.1 (32.7)	80.9*** (58.8)
Employed		
Yes	46.2 (51.6)	53.8 (27.0)
No	22.9 (48.4)	77.1*** (73.0)

Note. Totals for wave 3 reflect adjustments for missing values for some of the variables presented.
***$P < .01$.

RESULTS

Between 2001 and 2005, uninsurance increased by 7% (from 52% to 59%) for all previously insured participants younger than 65 years. This insurance coverage decline reflects almost exclusively the loss of private insurance, which declined by 9% between waves. Tables 1 and 2 present the distributions of other sociodemographic characteristics by health insurance status. The proportion uninsured increased significantly during this time period (2001–2002 to 2005–2006). Health insurance coverage remained extensive for the 65 or older population, with about 97% reporting coverage—mostly through Medicare—in both waves. Uninsurance rates climbed for both men and women, but they increased more for men (15%). Note again that health care costs grew by approximately 60% over this period.[34]

We also observed major changes in health insurance coverage by income categories between waves. The percentage uninsured for the 2 lowest income categories decreased by 5%, whereas it increased by 11% and 18%, respectively, for those in the 2 highest income groups. Those reporting more than $30 000 in income experienced the most dramatic loss of coverage, which more than doubled in the 4-year period (14% to 32%). Uninsurance increased by 5% for the native born, but for the Mexican born, insurance coverage increased with years lived in the United States. Those more advantaged in income and education continued to report higher health insurance coverage, although it declined between waves. The younger age group remained the least likely to report health insurance coverage. Among employed participants, the percentage reporting health insurance coverage decreased

TABLE 2—Distribution of Sociodemographic Characteristics for Insured and Uninsured Participants in Wave 4: Border Epidemiological Study of Aging, Texas, 2005–2006

	Uninsured (n = 300), Row % (Column %)	Insured (n = 631), Row % (Column %)
Age, y		
<55	64.9 (63.1)	35.1 (16.2)
55–64	50.5 (32.1)	49.5 (14.9)
≥65	3.3 (4.9)	96.7*** (68.9)
Aged <65 y		
Women	61.2 (72.2)	38.8 (66.5)
Men	54.7 (27.8)	45.3 (33.5)
Aged ≥65 y		
Women	3.2 (71.4)	96.8 (72.4)
Men	3.4 (28.6)	96.6 (27.6)
Marital status		
Married	40.7 (74.6)	59.3 (51.8)
Single	32.6 (16.6)	67.4 (16.3)
Widowed	11.6 (8.8)	88.4*** (31.9)
Household income, $		
<7000	20.9 (12.0)	79.1 (22.1)
7000–15 000	28.1 (35.6)	71.9 (44.3)
15 001–30 000	51.6 (35.6)	48.4 (16.3)
>30 000	31.9 (16.7)	68.1*** (17.3)
Education, y		
<7	27.9 (56.0)	72.1 (68.3)
7–8	38.5 (7.0)	61.5 (5.3)
9–12	48.0 (25.7)	52.0 (13.1)
≥13	28.6 (11.3)	71.4*** (13.3)
Length of residence in United States (for Mexican born), y		
<24	70.3 (25.6)	29.7 (5.3)
24–43	50.0 (30.0)	50.0 (14.7)
≥44	13.3 (6.1)	86.7 (19.6)
US native	23.7 (38.3)	76.3*** (60.4)
Employed		
Yes	58.0 (61.9)	42.0 (22.5)
No	19.8 (38.1)	80.2*** (77.5)

Note. Totals for wave 4 reflect adjustments for missing values for some of the variables presented.
***$P < .01$.

by 12% between waves, paralleling the decline in coverage for those earning more than $30 000.

Table 3 presents the distribution of health and health care characteristics for waves 3 and 4 by health insurance status. Uninsured adults reported better health, as indicated by their self-rated health and activities of daily living in both waves; however, they were also more likely to report using medical care in Mexico during the previous year. For example, 76% and 63% of the uninsured adults, but only 24% and 17% of the insured adults, received medical attention in Mexico in waves 3 and 4, respectively.

Tables 4 and 5 report results from logistic regression models of the factors associated with health insurance coverage and visiting a doctor in Mexico within the previous year for waves 3 and 4. We also estimated a random-effects logistic regression model of health insurance coverage to take advantage of the panel (longitudinal) structure of BESA. The model included a dummy variable to identify the BESA wave (3 or 4). The adjusted odds ratio (OR) for the wave dummy variable was 0.27 (95% confidence interval [CI]=0.15, 0.48), which implies that the likelihood of being uninsured declined substantially over the 5-year period studied (2001–2002 to 2005–2006). However, the main results from estimating a random-effects logistic regression were similar to the results reported later in this section from separate logistic regression models for waves 3 and 4. As such, Tables 4 and 5 report only the results from the more parsimonious regression models for waves 3 and 4 separately.

Adults 65 years or older were more likely to be insured (because of Medicare) than were younger respondents. Women also were less likely to be insured than were men (although this finding was highly significant in wave 3, it was no longer statistically significant in wave 4). In both waves, a positive and highly significant relation was found between household income and the likelihood of having health insurance coverage. A similar result was evident for years of education, with those with more schooling also more likely to report health insurance coverage; the regression coefficient for this variable, however, was statistically insignificant at conventional levels in wave 3 but became highly significant in wave 4.

The regression coefficients for being unemployed and being insured changed between waves. Earlier, the unemployment coefficient was statistically insignificant and negative, but it became positive and statistically significant in the later wave. In wave 4, the unemployed were twice as likely as the employed to be insured, and the direction and strength of the association remained when we controlled for age. This was likely a result of the decline in private health insurance coverage among employed participants and larger national increases in health care costs over this period.[34]

Preference for doctor services in Mexico was measured only in wave 4, but as suggested by our conceptual framework, it was negatively related and highly significant to being insured. Those who disagreed with the positive statements about medical care in Mexico were twice as likely to be insured as those who agreed.

When compared with the native born, the Mexican-born respondents were less likely to

TABLE 3—Health and Health Care Indicators of Insured and Uninsured Participants: Border Epidemiological Study of Aging, Texas, 2001–2002 to 2005–2006

	Wave 3 (n = 1037)[a]		Wave 4 (n = 931)	
	Uninsured (n = 131), Row % (Column %)	Insured (n = 727), Row % (Column %)	Uninsured (n = 300), Row % (Column %)	Insured (n = 631), Row % (Column %)
Self-rated health				
Excellent	42.5 (29.3)	57.5 (17.1)	62.7 (48.8)	37.3 (13.9)
Very good	36.0 (36.8)	64.0 (28.2)	28.6 (23.3)	71.4 (28.1)
Fair	21.5 (28.0)	78.5 (44.1)	20.5 (25.4)	79.5 (47.6)
Poor	19.4 (5.9)	80.6*** (10.5)	10.3 (2.5)	89.7*** (10.4)
Activity of daily living dependency				
Yes	15.0 (10.4)	85.0 (25.4)	17.6 (13.1)	82.4 (29.2)
No	34.0 (89.6)	66.0*** (74.6)	36.8 (86.9)	63.2*** (70.8)
Instrumental activities of daily living				
Yes	18.5 (25.6)	81.5 (47.5)	44.3 (79.2)	55.7 (49.8)
No	37.5 (74.4)	62.5*** (52.5)	17.2 (20.8)	82.8*** (50.2)
Hospitalized for the previous 12 mo				
Yes	10.3 (5.2)	89.7 (19.3)	0.0 (0.0)	100.0 (2.9)
No	33.4 (94.8)	66.6*** (80.7)	36.7 (100.0)	63.3*** (97.1)
Hospitalized for the previous 5 y				
Yes	13.7 (11.1)	86.3 (30.1)	10.4 (6.8)	89.6 (29.0)
No	35.3 (88.9)	64.7*** (69.9)	39.5 (93.2)	60.5*** (71.0)
Received medical attention in Mexico				
Yes	57.4 (75.6)	42.6 (24.4)	64.1 (62.9)	35.9 (16.8)
No	12.3 (24.4)	87.7*** (75.6)	17.5 (37.1)	82.5*** (83.2)
Believe that Mexican doctors give more time				
Yes			74.4 (88.1)	25.6 (47.8)
No			26.5 (11.9)	73.5*** (52.2)
Believe that Mexican doctors explain things better				
Yes			73.4 (89.5)	26.6 (47.9)
No			22.9 (10.5)	77.1*** (52.1)
Believe that Mexican doctors listen carefully				
Yes			76.0 (90.7)	24.0 (43.7)
No			20.0 (9.3)	80.0*** (56.3)

[a]Totals for waves 3 and 4 reflect adjustments for missing values for some of the variables presented.
***$P < .01$.

be insured; however, the magnitude of the coefficient varied significantly by years of residence in the United States. Finally, those in better health were less likely to be insured, and this association remained even after we controlled for age.

Tables 4 and 5 also report results from the logistic regression model of the factors related to visiting a doctor in Mexico during the previous year. Household income, length of residence in the United States, and health insurance coverage were the strongest predictors of visiting a doctor in Mexico in both waves. However, although these variables remained highly significant at the P less than .01 level, the magnitude of the regression coefficients changed between waves. In wave 3, household income lower than $7000 was the only significant income coefficient related to having visited a doctor in Mexico (OR=0.46; 95% CI=0.30, 0.72). By contrast, in wave 4, this association became highly significant for those with incomes between $7000 and $30 000. Those reporting household incomes of $7000 to $15 000 (OR=4.09; 95% CI=2.74, 6.09) and $15 001 to $30 000 (OR=3.39; 95% CI=2.38, 4.82) were more likely to visit a doctor in Mexico than were those with household incomes higher than $30 000. Adults with excellent health also were less likely to visit a doctor in Mexico than were those with poor health (OR=0.23; 95% CI=0.15, 0.37), but this association was not statistically significant in wave 4.

The most important findings for wave 3, however, were that the uninsured were more likely than were the insured to have visited a doctor in Mexico (OR=6.94; 95% CI=5.04, 9.55), and those who had lived in the United States less than 20 years also were more likely to have visited a doctor in Mexico than were those born in the United States (OR=4.09; 95% CI=2.70, 6.18). Both coefficients were statistically significant at the P less than .01 level. Although these associations remained statistically significant in wave 4 at P less than .01, the magnitude of the regression coefficients diminished for the uninsured between these 2 items. In wave 4, the insurance effect was attenuated somewhat by the stronger effect of length of residence in the United States. Those reporting the fewest number of years in the United States were more likely than were the native born to have visited a doctor in Mexico (OR=5.07; 95% CI=3.65, 7.04), and although the effect decreased somewhat as years of residence increased, it remained highly significant for all years when compared with the native born.

We also estimated a random-effects logistic regression model of visiting a doctor in Mexico. The model included a dummy variable to identify the BESA wave (3 or 4). The adjusted odds ratio for the wave dummy variable was 0.37 (95% CI=0.24, 0.56), which shows that the likelihood of visiting a doctor in Mexico decreased over the 5-year period studied. However, the adjusted OR for the uninsured variable did not change even when we estimated the model pooling the data (OR=7.27; 95% CI=3.76, 14.04). That is, the uninsured were much more likely than were the insured to visit a doctor in Mexico, and this was

TABLE 4—Logistic Regression Results for Factors Associated With Health Insurance Coverage and Doctor Visits in Mexico Among Participants at Wave 3: Border Epidemiological Study of Aging, Texas, 2001–2002

	Insured: Model 1		Visited Doctor in Mexico: Model II	
	b	OR	b	OR
Age, y				
<50	-5.35***	0.01	0.36	1.43
50–64	-4.82***	0.01	0.26	1.30
≥65 (Ref)		1.00		1.00
Gender				
Men	1.71***	5.51	-0.09	0.91
Women (Ref)		1.00		1.00
Marital status				
Married	0.17	1.18	-0.24	0.78
Single	1.14**	3.13	-0.23	0.79
Widowed (Ref)		1.00		1.00
Household income, $				
<7000	-2.40***	0.09	-0.77*	0.46
7000–15 000	-2.10***	0.13	0.28	1.32
15 001–30 000	-1.70***	0.18	0.27	1.31
>30 000 (Ref)		1.00		1.00
Education, y				
<7	-0.95	0.38	0.27	1.30
7–8	-0.65	0.52	0.002	1.00
9–12	-0.79	0.45	0.20	1.22
≥13 (Ref)		1.00		1.00
Employed				
No	-0.16	0.85	-0.51*	0.60
Yes (Ref)		1.00		1.00
Self-rated health				
Excellent	-2.56***	0.07	-1.44***	0.23
Very good	-3.00***	0.05	-0.52	0.60
Fair	-1.49***	0.24	-0.51	0.60
Poor (Ref)		1.00		1.00
Instrumental activity of daily living				
No	-0.45	0.63	0.26	1.30
Yes (Ref)		1.00		1.00
Activity of daily living				
No	-0.63	0.53	0.66**	1.94
Yes (Ref)		1.00		1.00
Length of residence in the United States, y				
<20	-1.47***	0.23	1.41***	4.09
20–39	-1.09***	0.34	0.62**	1.87
≥40	-0.36	0.70	0.11	1.12
US native (Ref)		1.00		1.00
Insured				
No			1.94***	6.94
Yes (Ref)				1.00

Note. OR = odds ratio.
*P<.1; **P<.05; ***P<.01.

statistically significant in both waves. Finally, the main results on the factors predicting the use of doctor services in Mexico did not change regardless of whether we estimated separate logistic regression models of waves 3 and 4 or a random-effects logistic regression model of medical care use in Mexico.

DISCUSSION

Our analyses indicated that health insurance coverage was an important predictor of seeking and receiving medical care in Mexico. In wave 3, it was the strongest predictor of using medical care in Mexico. However, the regression model in wave 4 provided a more complex profile of the uninsured population, which reflected both national health insurance trends and the overlapping national health systems along the border. Findings for wave 4 indicated a very high level of uninsurance—almost 60%—for the population younger than 65 years and major losses in health insurance coverage among the employed participants. The earlier lack of association between employment and health insurance coverage became statistically significant in wave 4.

The high health care cost changes in the United States adversely affected health insurance coverage in the border region. Between 2001 and 2005, uninsurance increased by 7% (from 52% to 59%) for all previously insured participants younger than 65 years. This decline reflects almost exclusively the loss of private insurance, which declined by 9% between waves. Thus, the private health care system in Mexico seems to have become a viable alternative for border residents losing health insurance coverage in the United States.

Preference for medical care in Mexico, measured only in wave 4, added an important dimension to the regression model explaining insurance coverage in this wave. Those who disagreed with positive statements about medical care providers in Mexico were more than twice as likely to be insured as were those who agreed, and they were also less likely to have used medical care in Mexico. Conversely, those who agreed were more likely to be uninsured and to use Mexican health care. Supplemental analyses found that a preference for Mexican medical care characterized the uninsured, and

TABLE 5—Logistic Regression Results for Factors Associated With Health Insurance Coverage and Doctor Visits in Mexico Among Participants at Wave 4: Border Epidemiological Study of Aging, Texas, 2005–2006

	Insured: Model 1		Visited Doctor in Mexico: Model II	
	b	OR	b	OR
Age, y				
<54	–4.15***	0.02	0.90**	2.50
54–64	–3.93***	0.02	0.03	1.03
≥65 (Ref)		1.00		1.00
Gender				
Men	0.12	1.13	–0.22	0.81
Women		1.00		1.00
Marital status				
Married	–0.38	0.69	0.92**	2.50
Single	–0.10	0.91	0.63	1.88
Widowed (Ref)		1.00		1.00
Household income, $				
<7000	–1.52***	0.22	0.68	1.98
7000–15 000	–1.39***	0.25	1.41***	4.09
15 001–30 000	–1.29***	0.28	1.22***	3.39
>30 000 (Ref)		1.00		1.00
Education, y				
<7	–0.94**	0.39	–0.21	0.81
7–8	–1.25**	0.28	0.14	1.16
9–12	–1.06***	0.35	0.33	1.39
≥13 (Ref)		1.00		1.00
Employed				
No	0.78**	2.18	–0.38	0.68
Yes (Ref)		1.00		1.00
Prefer Mexican doctor				
No	0.84***	2.32		
Yes (Ref)		1.00		
Self-rated health				
Excellent	–1.93***	0.15	0.55	1.73
Very good	–1.08*	0.34	0.44	1.56
Fair	–1.02*	0.36	0.47	1.60
Poor (Ref)		1.00		1.00
Instrumental activity of daily living				
No	–0.10	0.90	0.29	1.34
Yes (Ref)		1.00		1.00
Activity of daily living				
No	0.51	1.67	–0.17	0.85
Yes (Ref)		1.00		1.00
Length of residence in the United States, y				
<24	–2.31***	0.10	1.62***	5.07
24–43	–0.39	0.68	1.26***	3.53
≥44	–0.80**	0.45	0.70**	2.01
US native (Ref)		1.00		1.00
Insured				
No			1.14***	3.13
Yes (Ref)				1.00

Note. OR = odds ratio.
*$P < .1$; **$P < .05$; ***$P < .01$.

this relation remained after we controlled for socioeconomic factors.

An interesting profile of users and nonusers of Mexican health care emerged from these findings; those at the opposite ends of the household income categories were less likely to use medical care in Mexico for entirely different reasons. Participants with household incomes below $7000 reported either Medicaid coverage or dependence on free or reduced cost medical care in the United States. Conversely, those reporting incomes higher than $30 000 were more likely to have private health insurance and used US health care. Participants in the 2 middle-income categories were more likely to be uninsured and to use medical care in Mexico. Those receiving Medicare, unavailable in Mexico, did not use medical services in Mexico, regardless of country of birth or years in the United States.

Findings from both waves indicated that for the most economically disadvantaged border residents, the private health care system in Mexico, which requires cash payment at the time of service, remained beyond their actual means and was not a plausible option. The overlapping presence of these 2 health care systems in the region facilitates and limits health care options for the uninsured. Results indicate that private medical care in Mexico serves as a safety net for the uninsured—but only for those who are generally healthier, physically mobile, unburdened by immigration restrictions, and able to pay cash for the service. For those in poor health, unable to pay, or burdened by immigration restrictions, accessibility to US health care is limited not only by their lack of health insurance coverage but also by the region's large uninsured population, which limits the quantity and quality of health care services available to all residents. Private health care providers in Mexico, inaccessible to them, further reduce the number of available US health care providers because the former provide health care services in the region at a relatively lower cost when compared with that in the United States. Although primary care in Mexico lessens the burden for minor primary care emergencies, as may be the case with many childhood infectious conditions at the individual level, it undermines the health care system at the community and regional level because low rates of private health care

insurance coverage are likely to make the US border less attractive to US health care providers considering a location for their practice.

Conclusions

Findings reported here have implications for public health practice and policy. Medical care in Mexico may provide an attractive option to low-paid workers; however, our data analysis strongly suggests that it is mainly an option for minor emergencies. Separate data analyses for major health emergencies or specialized health care services identified very low or no use. Therefore, the Mexican private health care system is not a substitute for serious conditions requiring specialist care, surgery, or hospitalization, nor does it reduce the economic burden of providing these highly priced services to the numerous uninsured people in the region. Moreover, our findings indicate that US-based private health insurance remains highly unaffordable to many border residents, with only 13% of those younger than 65 years reporting having private health insurance coverage.

The analyses presented here suggest that the conditions that influence the lack of health insurance coverage by growing numbers of working- and middle-class Americans at the national level are intensified along the border. They also highlight the limitations of health care alternatives in Mexico as a substitute for US health care. In all, results from this study indicate that existing disparities in health care access will continue to undermine the health status of the region's population unless major health care policy reforms are initiated to promote greater accessibility to US health care.

Limitations

Our data allowed us to study only Mexican Americans, by far the largest population group along the US–Mexico border. Moreover, our probability sample was representative of only selected Texas border counties. Although the border region, with the exception of San Diego County, is sufficiently similar to warrant consideration of findings presented here, these results cannot be directly generalized to other border populations. This study also was limited by the exclusion of younger respondents (younger than 37 years). However, given the direction of the findings, we expect that the inclusion of younger adults and children would only have increased the numbers of uninsured respondents and the use of Mexican medical care, when not limited by household income, immigration, or health status. We acknowledge that cross-border health care use also occurs during the winter months by US and Canadian retirees[33]; however, the research design did not call for their inclusion. Finally, some Mexican nationals use health care facilities on the US side of the border; however, studying this population was beyond the scope of our article. ■

About the Authors

Elena Bastida is with the Center on Aging and Health and the Department of Sociology, University of Texas–Pan American, Edinburg. H. Shelton Brown III is with the Health Economics Division of Management, Policy and Community Health, Michael & Susan Dell Center for Advancement of Healthy Living Institute for Health Policy, University of Texas School of Public Health, Austin. José A. Pagán is with the Institute for Health Policy and the Department of Health Economics, University of Texas Pan American, Edinburg.

Requests for reprints should be sent to Elena Bastida, PhD, School of Public Health, University of North Texas Health Science Center, 3500 Camp Bowie Blvd, Fort North, TX 76107 (e-mail: bastida@hsc.unt.edu).

This article was accepted September 30, 2007.

Contributors

E. Bastida originated and designed the study and obtained funding. All authors contributed to the analysis and interpretation of the data and the writing and revisions of the final article.

Acknowledgments

This work was supported by National Institute of General Medical Sciences (grant NIGMS78BT498W) and the National Center on Minority Health and Health Disparities (grant 2R24MD001779-04).

The authors wish to thank Tibebe Assefa for coordinating the data entry procedures, assisting with the data analyses, and contributing to the interpretation of results. The authors also wish to thank Armando Domínguez for coordinating the fieldwork data collection for all waves of the Border Epidemiological Study of Aging.

Note. The findings and interpretations of the data presented here are those of the authors and do not necessarily represent those of the funding agency.

Human Participant Protection

The study was approved by the institutional review board of the University of Texas–Pan American.

References

1. Borrell J. Health care bargains in Mexico. *Time.* June 15, 1987;129(24):60.

2. Warner DC. Health issues at the US-Mexican border. *JAMA.* 1991;265:242–247.

3. Health care, just across the border. *US News & World Report.* December 7, 1992;113(22):12.

4. Macias EP, Morales LS. Crossing the border for health care. *J Health Care Poor Underserved.* 2001;12: 77–87.

5. Ruiz-Beltran M, Kamau JK. The socio-economic and cultural impediments to well-being along the US-Mexico border. *J Community Health.* 2001;26: 123–132.

6. Calvillo JP, Lal L. Pilot study of a survey of US residents purchasing medications in Mexico: demographics, reasons, and types of medications purchased. *Clin Ther.* 2003;25:561–577.

7. Thompson W. Utilización y prácticas de servicios de salud por los Mexico-Americanos de la Frontera del Valle Bajo del Río Bravo. [Patterns of health care utilization among border Mexican Americans from the Rio Grande Valley]. *Rev Salud Fronteriza/Border Health Rev.* 1993;9: 2–10.

8. Tabet SR, Wiese WH. Medications obtained in Mexico by patients in southern New Mexico. *South Med J.* 1990;83:271–273.

9. Potter JE, Moore AM, Byrd TL. Cross-border procurement of contraception: estimates from a postpartum survey in El Paso, Texas. *Contraception.* 2003;68: 281–287.

10. McKeithan EK, Shepherd MD. Pharmaceutical products declared by US residents on returning to the United States from Mexico. *Clin Ther.* 1996;18: 1242–1251.

11. Casner PR, Guerra LG. Purchasing prescription medication in Mexico without a prescription: the experience at the border. *West J Med.* 1992;156:512–516.

12. Warner DC, Reed K, eds. *Health Care Across the Border: The Experience of US Citizens in Mexico.* Austin: University of Texas System–LBJ School of Public Affairs; 1993. US–Mexican Policy Studies Series, Policy Report No. 4.

13. Warner DC, ed. *Getting What You Paid For: Extending Medicare to Eligible Beneficiaries in Mexico.* Austin: University of Texas System–LBJ School of Public Affairs; 1999. US–Mexican Policy Studies Program, Policy Report No. 10.

14. Warner DC, Schneider PG, eds. *Cross-Border Health Insurance: Options for Texas.* Austin: University of Texas System–LBJ School of Public Affairs; 2004. US–Mexican Policy Studies Program, Policy Report No. 12.

15. Landeck M, Garza C. Utilization of physician health care services in Mexico by US Hispanic border residents. *Health Mark Q.* 2002;20:3–16.

16. Smith JC. Fears not stifling sales at pharmacies in Nuevo Progresso. *The Monitor.* February 11, 2005:1A.

17. Williamson R. For many, obtaining medicine from Mexico is a very necessary risk. *The Monitor.* January 25, 2004:1A.

18. DeLeon J. Swimming student drowns at UTPA. *The Monitor.* June 14, 1996:1A.

19. Cortez T. Veterans vent healthcare concerns. *Laredo Morning Times.* December 18, 2002:20A.

20. Roberts C. Lawmaker says state should provide better border med care. *Laredo Morning Times.* January 26, 2001:1A.

21. Macintyre S, Maciver S, Sooman A. Area, class and health: should we be focusing on places or people? *J Soc Policy.* 1993;22:213–234.

22. Kawachi I, Berkman LF. *Neighborhoods and Health.* New York, NY: Oxford University Press; 2003.

23. DeNavas-Walt C, Proctor BD, Lee CH. *Current Population Reports: Income, Poverty, and Health Insurance Coverage in the United States: 2003.* Washington, DC: US Census Bureau; 2004.

24. Sources of health insurance and characteristics of the uninsured: analysis of the March 2004 Current Population Survey Issue Brief, No. 276, December 2004. Available at: http://www.ebri.org/pdf/briefspdf/1204ibi.pdf. Accessed March 12, 2007.

25. Angel RJ, Angel JL. The extent of private and public health insurance coverage among adult Hispanics. *Gerontologist.* 1996;36:332–340.

26. Trevino FM, Moyer ME, Valdez R, Stroup-Benham CA. Health insurance coverage and utilization of health services by Mexican Americans, mainland Puerto Ricans and Cuban Americans. *JAMA.* 1991;265:233–237.

27. Shah N, Carrasquillo O. Twelve-year trends in health insurance coverage among Latinos, by sub-group and immigration status. *Health Aff.* 2006;25:1612–1619.

28. Texas Comptroller. The economy: growth without prosperity. Available at: http://www.window.state.tx.us/border/ch02/ch02.html. Accessed April 7, 2006.

29. US Census Bureau. Small Area Health Insurance Estimates (SAHIE) program. Available at: http://www.census.gove/hhes/www/sahie/index.html. Accessed April 17, 2008.

30. US Census Bureau. Small Area Income and Poverty Estimates (SAIPE) program. Available at: http://www.census.gov/hhes/www/saipe/index.html. Accessed April 17, 2008.

31. Gabel J, Claxton G, Gil I, et al. Health benefits in 2005: premium increases slow down, coverage continues to erode. *Health Aff (Millwood).* 2005;24:1273–1280.

32. *The Dartmouth Atlas of Health Care: Data Tools.* Available at: http://www.dartmouthatlas.org/data_tools.shtm. Accessed March 12, 2007.

33. Warner DC. Cross border health insurance and aging Mexicans and Mexican Americans. In: Angel JL, Whitfield KE, eds. *The Health of Aging Hispanics: The Mexican Origin Population.* New York, NY: Springer; 2007:202–210.

34. Claxton G, Gabel J, Gil I, et al. Health benefits in 2006: premium increases moderate, enrollment in consumer-directed health plans remains modest. *Health Aff (Millwood).* 2006;25:W476–485.

35. Bastida E, Pagan JA. The impact of diabetes on adult employment and earnings of Mexican Americans: findings from a community based study. *Health Econ.* 2002;11:403–413.

36. Brown HS III, Pagán JA, Bastida E. The impact of diabetes on employment: genetic IVs in a bivariate probit. *Health Econ.* 2005;14:537–544.

37. Duke University Center for the Study of Aging and Human Development. *Multidimensional Functional Assessment: The OARS Methodology.* Durham, NC: Duke University Press; 1978.