

# State Medicaid Expansion, Community Interventions, and Health Care Disparities in a United States–Mexico Border Community

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Mexican Americans and other Latinos suffer from a high burden of chronic disease.<sup>1,2</sup> For example, 79% of Mexican American adults and 78% of all Latino adults are overweight or obese compared with 67% of non-Hispanic Whites, and half of Latinos born in 2000 will develop diabetes in their lifetimes compared with less than one third of non-Hispanic Whites.<sup>1,2</sup> Identifying effective programs and policies to improve the health of Mexican Americans and other Latinos is a top public health priority, both to reduce health disparities and because even small improvements can yield large health and economic benefits at the population level.

Poor access, use, and quality of health care services may contribute to high rates of chronic disease among Mexican Americans and other Latinos. Latinos are less likely than are other racial/ethnic groups to have health insurance, attend regular medical checkups, have a usual source of care, or be regularly screened for several forms of cancer and other chronic conditions.<sup>3–8</sup> Latinos are also more likely to delay needed care, have chronic conditions that go undiagnosed or are diagnosed at later stages, have negative outcomes related to their chronic conditions, and be unsatisfied with their providers.<sup>4,9,10</sup> Health care access and use is even poorer among Mexican Americans than most other Latino subgroups.<sup>4</sup>

Latinos face numerous social, economic, and structural barriers to health care. As a group, Latinos have low income, high poverty rates, and poor educational attainment, factors consistently found to affect health and health care.<sup>11–13</sup> One third of Latinos are immigrants and 41% of Latino immigrants speak English less than very well, factors that can lead to linguistic and cultural barriers to health care.<sup>13,14</sup> Many immigrants, including 6 million

**Objectives.** We investigated whether access to and use of health care services increased among residents of a low-income, predominantly Mexican American border community affected by the expansion of Arizona’s Medicaid program in 2001 and multiple community-level programs and policies.

**Methods.** We used data from a probability sample of 1623 adult residents of Douglas, Arizona, who participated in cross-sectional health surveys in 1998 and 2010. Response rates were 83% and 86%, respectively.

**Results.** In 2010, participants were more likely to have a usual source of care, to have visited a provider in the previous year, and to have been screened for diabetes and hypertension and less likely to have delayed needed care or to have seen a regular provider in Mexico ( $P < .001$  for all outcomes). Improvements in access to and use of health care were most pronounced among residents with less than a high school education, which reduced or eliminated educational disparities in health care.

**Conclusions.** Expansion of public insurance programs can effectively reduce health care disparities when paired with other community-level policies and programs that target medically underserved populations. (*Am J Public Health*. 2014;104:e94–e100. doi:10.2105/AJPH.2014.302013)

who are undocumented, are ineligible for public health insurance programs that subsidize health care for other low-income populations.<sup>15–17</sup>

One potential way to reduce health care disparities faced by low-income and minority populations, including Latinos, is through public policy. The Affordable Care Act (ACA) includes several provisions expected to curb uninsurance and increase access to and use of health care services among medically underserved populations, including an individual mandate requiring most Americans to have health insurance; public health insurance exchanges that can be used to buy affordable, high-quality, and often subsidized insurance; and expanded eligibility for Medicaid to include individuals with incomes up to 138% of the federal poverty level (FPL) as set by the US Department of Health and Human Services.<sup>18</sup> It is important to understand whether the ACA and other policy- and community-level interventions can effectively reduce

health care disparities that Latinos and other low-income and minority populations face.

## DOUGLAS, ARIZONA

The context of this study is the border city of Douglas, Arizona, a predominantly low-income Mexican American community with a population of 17 378 in 2010.<sup>19</sup> More than 80.0% of Douglas residents are Latino, 93.0% of whom are of Mexican descent. One third of Douglas adults have less than a high school education compared with fewer than 15.0% of adults in Arizona and nationwide.<sup>20</sup> Similarly, 29.2% of Douglas families live in poverty, compared with 11.7% of Arizona families and 10.5% of families nationwide.

Douglas provides a compelling case study of how policy- and community-level interventions can affect health and health care disparities. In 2001, Arizona’s Proposition 204 expanded eligibility for the Arizona Health Care Cost Containment System (AHCCCS), Arizona’s

version of Medicaid, to include childless adults with incomes up to 100% of the FPL. Previously, the income threshold was 33% of the FPL. The expansion likely had an even larger effect in Douglas than in the rest of the state because of the city's much higher poverty rate.

For more than a decade, Douglas has also been home to community-level efforts to improve health and health care.<sup>21</sup> In 1998, a group of Douglas residents partnered with the University of Arizona and the Arizona Department of Health Services to conduct a household survey of health and health care among residents.<sup>22</sup> The study found that Douglas residents suffered from a high burden of chronic disease risk factors, including cigarette smoking, physical inactivity, unhealthy diets, obesity, and diabetes. Residents also had poor access to and use of health care services, with many lacking health insurance, receiving infrequent care, delaying needed care, and suffering from undiagnosed chronic diseases.

The study galvanized community members and their partners to develop and implement a range of programs to improve health and health care.<sup>23</sup> These efforts resulted in several funded projects in the subsequent years, including the following: the food bank in Douglas received funding for infrastructure improvements and to provide cooking and nutrition classes; the Southeast Arizona Health Education Center received a grant to provide diabetes education and care; and the Chiricahua Community Health Center, a federally qualified health center, received a rural health outreach grant and opened a health center in Douglas. The working group also partnered with health providers to provide diabetes screening and education in the local high school.

In 2002, the community–university partnership working group began to increasingly emphasize policy-level changes to improve health and health care among Douglas residents, particularly children and adolescents. The working group recognized a need for better health and nutrition policies in schools, which led to partnerships with school administrators, teachers, and students. Health education and physical education classes were reintroduced into schools' curricula, healthy changes were made to cafeteria food throughout the Douglas school district, and a district-wide nutrition policy was developed. In 2004,

the working group and its partners agreed to remove junk food from school vending machines and replace sugar-sweetened beverages with water and juice.

In 2005, the Arizona Prevention Research Center at the University of Arizona received funding from the Centers for Disease Control and Prevention to implement a comprehensive lifestyle intervention to prevent and control chronic disease, which was led by Latina community health workers.<sup>24</sup> The intervention consisted of a culturally tailored 12-week curriculum of interactive group sessions that covered heart disease, obesity, diabetes, hypertension, hypercholesterolemia, healthy eating, physical activity, and smoking. The program also promoted detection and treatment of chronic disease risk factors through regular checkups with participants' health care providers. Collectively, the many programs and policies implemented in Douglas provide a unique opportunity to understand whether population-level health policy (i.e., AHCCCS expansion) can be paired with targeted programs and policies to effectively reduce health care disparities in minority communities.

We sought to examine whether health care access and use among Douglas residents improved between 1998 and 2010, the period when the AHCCCS expansion and community-level programs and policies were implemented. We hypothesized that health insurance coverage would have increased over time among Douglas residents, primarily because of expanded eligibility for AHCCCS. We further posited that the community-level activities that co-occurred with the expansion would result in improvements in access, use, and quality of health care. Because the AHCCCS expansion and community-level changes were targeted at low-income and other socially disadvantaged populations, we also hypothesized that improvements in health care would be most pronounced among residents in the lowest socioeconomic strata.

## METHODS

Data are from the 1998 Douglas Community Health Survey and a follow-up survey conducted in 2010.<sup>22,25</sup> Both surveys were population-based household surveys representative of the Douglas, Arizona municipality and

its surrounding area. The sampling strategy and interview protocol were consistent across survey periods. Participants were selected on the basis of a stratified, clustered sample of households. Census blocks in Douglas were stratified by ethnicity and socioeconomic status. Blocks were then randomly selected within each strata. Occupied housing units within selected blocks were randomly selected, and all adult residents were invited to participate. In the 1998 survey, adults were defined as aged 20 years or older. In the 2010 follow-up, this definition was expanded to include those aged 18 years and older.

Trained, bilingual community health workers from the Douglas area conducted in-person interviews. To ensure consistency in interview protocols, 1 of the interviewers in the 1998 survey participated in the 2010 follow-up. Interviews covered a range of topics, including basic sociodemographic characteristics, access to and use of health care, and psychosocial, clinical, and behavioral health risk factors.

The 1998 survey included 915 participants, and the 2010 survey included 708 participants. Response rates in both years exceeded the targets of 80% (83% and 86%, respectively). There was no compensation for completion of either survey. Further details regarding the sampling and protocols for these surveys are available elsewhere.<sup>22,25</sup>

## Measures

Educational attainment is the main explanatory variable in this study because our primary interest is examining whether socioeconomic disparities in access to and use of health care changed between survey periods and because the 1998 survey lacked other typical measures (e.g., income, wealth). We classified participants' educational attainment as less than high school, high school graduate, or more than high school. The outcomes in our analyses include a range of health care access and use variables. We assessed participants' health insurance coverage on the basis of a question that asked, "Which of these medical coverage plans do you have now?" We classified participants' insurance as none, public, private, or both public and private. We examined whether patients had a regular health care provider on the basis of the following question: "Is there

a particular clinic, health center, or doctor that you usually go to when you are sick or need routine health care?" A follow-up question then asked about the type of provider (e.g., emergency department, private doctor) and whether the provider is located in the United States or Mexico.

We assessed health care use via the following questions, which we coded dichotomously: (1) "Have you had any visit to a health care provider in the past 12 months?" (2) "In the past 6 months, how many different times have you had to use the emergency room or urgent care clinic?" (3) "In the past 6 months, how many different times were you in the hospital for at least one night?" (4) "Was there a time in the past 12 months that you needed care but did not get it?" We examined screening for diabetes and hypertension on the basis of a question that asked, "Have you had any of the following clinical tests in the past 12 months? . . . Blood pressure checked? . . . Test for blood sugar?"

### Statistical Analyses

To assess whether health care outcomes changed between survey periods, we have presented the percentage distribution of each health care outcome stratified by survey year. We have also presented health care outcomes stratified by year and participants' educational attainment to assess changes in educational disparities in health care. We used the  $\chi^2$  test and *t* test to assess the statistical significance of changes across years in categorical and continuous variables, respectively.

We used multivariable logistic regression to understand whether health care outcomes have changed over time after adjustment for sociodemographic factors. We used interaction terms to assess whether changes differed between participants with less than a high school education and those with a high school education or more. We used Stata, version 12 (StataCorp LP, College Station, TX) for all analyses.

## RESULTS

We have presented the sociodemographic characteristics of participants in Table 1. We found no differences between survey periods in the distribution of gender, educational attainment, ethnicity, or nativity, but participants

**TABLE 1—Sociodemographic Characteristics of Adults: Douglas, Arizona, 1998 and 2010**

Characteristic	1998, % (95% CI) or Median (IQR)	2010, % (95% CI) or Median (IQR)	<i>P</i>
Gender			.118
Female	66.5 (63.4, 69.5)	62.7 (59.1, 66.3)	
Male	33.5 (30.5, 36.6)	37.3 (33.7, 40.9)	
Age, y	43 (32, 57)	53 (37, 67)	.001
Marital status			.003
Married	67.7 (64.7, 70.7)	59.6 (56.0, 63.2)	
Never married	15.3 (13.0, 17.7)	20.1 (17.1, 23.0)	
Divorced, widowed, or separated	17.0 (14.5, 19.4)	20.3 (17.4, 23.3)	
Educational attainment			.405
< High school	44.8 (41.4, 48.1)	42.7 (39.0, 46.3)	
≥ High school	55.2 (51.9, 58.6)	57.3 (53.7, 61.0)	
Ethnicity			.28
Latino	93.1 (91.4, 94.7)	91.7 (89.6, 93.7)	
Non-Latino	6.9 (5.3, 8.6)	8.3 (6.3, 10.4)	
Nativity			.253
US-born	40.0 (36.8, 43.2)	42.8 (39.1, 46.4)	
Foreign-born	60.0 (56.8, 63.2)	57.2 (53.6, 60.9)	
Self-rated health			< .001
Poor	5.0 (3.6, 6.5)	3.7 (2.3, 5.1)	
Fair	21.6 (18.9, 24.3)	18.1 (15.2, 20.9)	
Good	34.4 (31.3, 37.5)	52.4 (48.7, 56.1)	
Very good	25.4 (22.6, 28.3)	20.6 (17.6, 23.6)	
Excellent	13.5 (11.3, 15.7)	5.2 (3.6, 6.9)	

Note. CI = confidence interval; IQR = interquartile range. *P* values are derived from a  $\chi^2$  statistic for categorical variables or a *t* test for continuous variables.

in 2010 were older ( $P < .001$ ), less likely to be married ( $P = .003$ ), and more likely to report their overall health as good as opposed to poor, fair, very good, or excellent ( $P < .001$ ). In Table 2, we have presented health care outcomes among Douglas adults stratified by survey year. Access to and use of health care services improved between 1998 and 2010.

There were statistically significant changes in participants' health insurance coverage, usual source of care, and provider location as well as in whether participants made a health care visit in the previous year, delayed needed care in the previous year, and were screened for hypertension and diabetes in the previous year ( $P < .001$  for all outcomes). By contrast, there was no significant difference in the percentage of participants who visited the emergency department in the previous 6 months or who were hospitalized overnight in the previous 6 months. The percentage of participants who lacked health insurance

decreased from more than one third in 1998 to 18% in 2010, likely because participation in public insurance programs nearly doubled. Private health insurance coverage fell from 34% in 1998 to 21% in 2010.

The percentage of participants with a usual source of care in Mexico fell from 25% to 12%. Nine of 10 participants in the 2010 survey had visited a health care provider in the previous year, compared with three quarters in 1998, and the proportion who had delayed needed care fell from 19% to 13%. Screening rates also increased across survey years for both hypertension (from 76% to 88%) and diabetes (from 51% to 81%).

In Table 3, we have presented health care outcomes by participants' educational attainment. Many of the largest improvements in access to and use of health care were most pronounced among participants with low levels of education. In 1998, uninsurance rates were 1.5 to 2.0 times as high among participants

**TABLE 2—Access to and Use of Health Care Among Adults: Douglas, AZ, 1998 and 2010**

Variable	1998, % (95% CI)	2010, % (95% CI)	<i>P</i>
Health insurance			< .001
None	34.0 (30.9, 37.1)	18.1 (15.3, 20.9)	
Public	28.5 (25.6, 31.5)	54.9 (51.2, 58.6)	
Private	34.3 (31.2, 37.3)	20.5 (17.5, 23.5)	
Public and private	3.2 (2.0, 4.3)	6.5 (4.7, 8.3)	
Usual source of care			< .001
None	7.5 (5.8, 9.2)	3.4 (2.1, 4.7)	
Private doctor	29.7 (26.8, 32.7)	27.4 (24.1, 30.7)	
Public clinic	55.8 (52.5, 59.0)	67.2 (63.7, 70.7)	
Emergency department	...	...	
Multiple	6.9 (5.3, 8.6)	2.0 (1.0, 3.0)	
Provider location			< .001
United States	75.4 (72.5, 78.4)	88.3 (85.9, 90.7)	
Mexico	24.6 (21.6, 27.5)	11.7 (9.3, 14.1)	
Any health care visit, past year	73.3 (70.4, 76.1)	88.7 (86.4, 91.0)	< .001
Emergency department visit, past 6 mo	11.9 (9.8, 14.0)	12.4 (10.0, 14.9)	.76
Overnight hospital visit, past 6 mo	9.9 (7.9, 11.8)	7.6 (5.7, 9.6)	.12
Delayed care, past year	19.3 (16.7, 21.8)	12.6 (10.2, 15.1)	< .001
Hypertension screening, past year	76.0 (73.3, 78.8)	87.7 (85.3, 90.1)	< .001
Diabetes screening, past year	51.4 (48.2, 54.7)	80.9 (78.0, 83.8)	< .001

Note. CI = confidence interval. *P* values are derived from a  $\chi^2$  statistic.

with less than a high school education than among high school graduates, but by 2010 uninsurance was equal. Participants with less than a high school education were significantly more likely in 2010 to have a usual source of care ( $P < .001$ ), for their usual provider to be in the United States ( $P < .001$ ), to have visited any provider in the previous year ( $P < .001$ ), and to have been screened for diabetes and hypertension in the previous year ( $P < .001$  for both outcomes) but less likely to have delayed needed care ( $P < .001$ ). These improvements among participants in the lowest educational strata resulted in greatly reduced or eliminated disparities relative to those with higher levels of education.

In Table 4, we have presented the results of 5 multivariable logistic regression models predicting whether participants had health insurance coverage, visited a provider in the previous year, delayed care in the previous year, and were screened for hypertension and diabetes in the previous year. The multivariable results suggest that, even after adjustment for sociodemographic factors, participants with less than a high school education were significantly more likely to have health insurance ( $P < .001$ ),

to have visited a health care provider ( $P < .001$ ), and to have been screened for hypertension ( $P < .001$ ) and diabetes ( $P < .001$ ) in 2010 than in 1998. Respondents were also less likely to have delayed care ( $P < .05$ ) in the later survey. The interaction terms suggest that improvements across survey years in health insurance coverage ( $P < .05$ ) and having visited any provider ( $P < .05$ ) were significantly smaller among participants with a high school education or greater relative to those with less than a high school education. Changes in screening rates for hypertension and diabetes followed a similar pattern, but differences between educational strata were not statistically significant.

## DISCUSSION

Our findings suggest that access to and use of health care services improved over time in the predominantly low-income, Mexican American community of Douglas, Arizona. We believe that improvements in care most likely stemmed from the mutually reinforcing effects of multiple state- and community-level policies and programs. At the state level, eligibility criteria

for AHCCCS, Arizona's version of Medicaid, were expanded in 2001 to include childless adults with income up to 100% of FPL (up from 33% of the FPL). During the same period, a federally qualified health center opened within the Douglas city limits, and community members, university partners, and others developed and implemented a range of programs and policies to improve health and health care.

Health insurance coverage increased dramatically among Douglas residents, from 66% in 1998 to 82% in 2010. This was largely because of increased use of public insurance among participants, which nearly doubled, from 29% to 55%. Interestingly, not all this increase was because of increased enrollment in AHCCCS. Further analyses (results not shown) suggest that the proportion of Douglas residents enrolled in Medicaid alone increased from 21% in 1998 to 31% in 2010, enrollment in Medicare alone increased from 7% to 18%, and enrollment in both programs increased from 2% to 10%. Increases in Medicare enrollment were because of 2 factors: the proportion of participants in our sample who were aged 65 years and older doubled from 15% in 1998 to 30% in 2010 and more seniors were enrolled in Medicare in 2010 than in 1998 (54% vs 85%, respectively). One explanation for this may be that community activities resulted in increased awareness of public insurance programs, which caused eligible but previously unenrolled seniors to enroll in Medicare.

We also found that the use of health care services improved over time. In 2010, participants were more likely to have a usual source of care, to have visited a provider in the previous year, and to have been screened for diabetes and hypertension but less likely to have delayed needed care or for their regular provider to be located in Mexico. This latter finding is of great importance because health care is typically much cheaper in Mexico for individuals who lack health insurance. We believe that the decrease in care seeking in Mexico is likely a direct result of increased health insurance coverage, a conclusion that is consistent with research finding that uninsurance and the high cost of health care in the United States are the primary reasons Mexican Americans seek care in Mexico.<sup>26–28</sup>

TABLE 3—Educational Gradients in Access to and Use of Health Care Among Adults: Douglas, AZ, 1998 and 2010

Gradient	< High School			High School Graduate			> High School		
	1998, % (95% CI)	2010, % (95% CI)	P	1998, % (95% CI)	2010, % (95% CI)	P	1998, % (95% CI)	2010, % (95% CI)	P
Health insurance			< .001			< .001			< .001
None	45.0 (39.9, 50.1)	17.5 (13.2, 21.9)		29.8 (23.9, 35.8)	19.7 (14.0, 25.4)		20.0 (14.9, 25.1)	17.5 (12.4, 22.6)	
Public	34.8 (29.9, 39.6)	71.9 (66.8, 76.9)		22.4 (16.9, 27.8)	51.1 (43.9, 58.2)		19.6 (14.5, 24.7)	34.6 (28.2, 40.9)	
Private	17.5 (13.6, 21.4)	6.6 (3.8, 9.4)		46.1 (39.6, 52.5)	21.3 (15.4, 27.1)		55.7 (49.4, 62.1)	39.2 (32.7, 45.7)	
Public and private	2.7 (1.0, 4.3)	4.0 (1.8, 6.2)		1.8 (0.0, 3.5)	8.0 (4.1, 11.9)		4.7 (2.0, 7.4)	8.8 (5.0, 12.5)	
Usual source of care			< .001			.037			.034
None	8.6 (5.7, 11.4)	2.7 (0.8, 4.5)		7.9 (4.4, 11.4)	2.7 (0.4, 5.0)		5.9 (2.9, 9.0)	5.1 (2.1, 8.0)	
Private doctor	32.9 (28.1, 37.7)	24.2 (19.3, 29.0)		26.3 (20.6, 32.0)	26.2 (19.9, 32.5)		26.3 (20.6, 31.9)	33.0 (26.8, 39.3)	
Public clinic	51.1 (46.0, 56.1)	71.5 (66.4, 76.6)		61.8 (55.5, 68.2)	70.1 (63.5, 76.6)		58.5 (52.2, 64.8)	58.7 (52.2, 65.3)	
Emergency department	...	...		0.4 (0.0, 1.3)	...		...	...	
Multiple	7.5 (4.8, 10.2)	1.7 (0.2, 3.1)		3.5 (1.1, 5.9)	1.1 (0.0, 2.5)		9.3 (5.6, 13.0)	3.2 (0.9, 5.6)	
Provider location			< .001			.005			.567
United States	66.1 (61.1, 71.1)	88.4 (84.8, 92.1)		82.9 (77.7, 88.0)	92.3 (88.4, 96.2)		86.5 (82.0, 91.0)	84.5 (79.6, 89.5)	
Mexico	33.9 (28.9, 38.9)	11.6 (7.9, 15.2)		17.1 (12.0, 22.3)	7.7 (3.8, 11.6)		13.5 (9.0, 18.0)	15.5 (10.5, 20.4)	
Any health care visit, past year	68.8 (64.1, 73.5)	91.7 (88.5, 94.8)	< .001	72.4 (66.5, 78.2)	82.4 (77.0, 87.9)	.015	80.5 (75.4, 85.6)	89.9 (85.9, 93.9)	.005
Emergency department visit, past 6 mo	12.5 (9.2, 15.8)	16.6 (12.4, 20.8)	.134	11.0 (6.9, 15.0)	10.6 (6.2, 15.1)	.915	11.0 (7.0, 15.0)	8.3 (4.6, 11.9)	.321
Overnight hospital visit, past 6 mo	11.4 (8.2, 14.7)	11.9 (8.3, 15.6)	.845	8.8 (5.1, 12.5)	3.7 (1.0, 6.4)	.038	8.1 (4.6, 11.6)	5.0 (2.1, 8.0)	.194
Delayed care, past year	22.7 (18.4, 26.9)	12.3 (8.5, 16.0)	< .001	15.8 (11.0, 20.5)	12.9 (8.1, 17.7)	.407	17.4 (12.5, 22.2)	12.9 (8.4, 17.4)	.186
Hypertension screening, past year	73.1 (68.6, 77.6)	91.1 (87.8, 94.3)	< .001	76.3 (70.8, 81.9)	81.4 (75.8, 87.0)	.21	80.9 (75.9, 86.0)	88.5 (84.3, 92.8)	.025
Diabetes screening, past year	52.4 (47.3, 57.5)	87.7 (84.0, 91.5)	< .001	48.2 (41.7, 54.8)	76.1 (69.9, 82.2)	< .001	50.8 (44.5, 57.2)	75.7 (70.0, 81.4)	< .001

Note. CI = confidence interval. Unless otherwise noted, *P* values are derived from  $\chi^2$  statistics and refer to the null hypothesis that a given health care outcome is the same across years among participants with equal levels of education. *P* values for regular provider are derived from the Fisher exact test because of small cell size.

Importantly, our data also suggest that increases in health insurance coverage and improved use of health care services were most pronounced among participants with the lowest levels of education. Almost all the educational disparities in health care that we observed in the 1998 data were eliminated by 2010. Low-education participants in 2010 were just as likely as their better-educated counterparts to have health insurance, to have a regular source of care, to have visited a provider in the previous year, and to have been screened for diabetes and hypertension.

Although important for understanding the health care experiences of Douglas residents, we believe our findings may also have important implications for health care disparities in other contexts. During the period covered by our data, Douglas residents were affected by the passage of Arizona's Proposition 204, which expanded income eligibility for Arizona's version of Medicaid from 33% of the FPL to up to 100% of the FPL. This policy-level change is similar to a key provision of the ACA, which gives states the option of expanding

eligibility for Medicaid to individuals with incomes up to 138% of the FPL. The large improvements in access to and use of health care services we observed in Douglas suggest that health policies such as the ACA may be most effective when paired with other programs and policies that specifically target populations with health disparities.

### Strengths and Limitations

This study has numerous important limitations. As with any survey data, the composition and characteristics of participants in our sample may have been influenced by response bias, which could have an unknown influence on our results. Although response rates were very high in both years (83% in 1998 and 86% in 2010), the influence of response bias on our results cannot be ruled out. A further limitation is that our data were collected from cross-sectional surveys at 2 periods, which precludes definitively identifying the cause of changes in health care outcomes. The improvements we observed were large in magnitude and consistent across numerous health services-related

outcomes, which leads us to the inference that upstream factors at the community and policy levels were likely responsible.

This interpretation is strengthened by our findings that these relationships persisted in multivariable models that adjusted for several population characteristics that can affect health care and may have changed over time. Similarly, although we infer that increases in health care use were most plausibly a consequence of decreased uninsurance, these increases may also have been caused by a decline in the health status of the population. We attempted to control for changes in health status by including self-reported general health in our multivariable analyses, but we were unable to further control for objectively measured chronic conditions (e.g., diabetes, hypertension) that may have also changed over time.

Another important limitation is that our analyses were restricted to variables collected in both the 1998 and 2010 surveys. Data regarding participants' income were not collected; thus we relied on educational attainment to classify participants' socioeconomic

**TABLE 4—Logistic Regression Models Predicting Health Care Access and Use Variables Among Adults: Douglas, AZ, 1998 and 2010**

Variable	Health Insurance, OR (95% CI)	Health Care Visit, OR (95% CI)	Delayed Care, OR (95% CI)	Hypertension Screening, OR (95% CI)	Diabetes Screening, OR (95% CI)
<b>Year</b>					
1998 (Ref)	1.000	1.000	1.000	1.000	1.000
2010	2.569*** (1.739, 3.794)	3.836*** (2.335, 6.302)	0.565* (0.363, 0.880)	2.624*** (1.609, 4.279)	4.832*** (3.168, 7.369)
<b>Educational attainment</b>					
< high school (Ref.)	1.000	1.000	1.000	1.000	1.000
≥ high school	2.095*** (1.491, 2.942)	2.174*** (1.521, 3.107)	0.749 (0.511, 1.099)	1.876*** (1.302, 2.703)	1.265 (0.923, 1.735)
≥ high school × 2010	0.518* (0.309, 0.870)	0.499* (0.270, 0.924)	1.357 (0.759, 2.426)	0.563 (0.307, 1.033)	0.641 (0.382, 1.076)
<b>Age, y</b>					
1.040*** (1.030, 1.050)	1.034*** (1.024, 1.045)	0.989* (0.979, 0.998)	1.038*** (1.027, 1.049)	1.037*** (1.028, 1.045)	
<b>Male</b>					
1.009 (0.772, 1.320)	0.481*** (0.362, 0.640)	0.750 (0.551, 1.019)	0.604*** (0.452, 0.807)	0.703** (0.549, 0.900)	
<b>Marital status</b>					
Married (Ref)	1.000	1.000	1.000	1.000	1.000
Never married	1.349 (0.943, 1.929)	0.718 (0.503, 1.027)	0.758 (0.508, 1.131)	0.671* (0.470, 0.957)	0.877 (0.637, 1.208)
Divorced, widowed, or separated	1.060 (0.740, 1.518)	0.875 (0.578, 1.323)	0.731 (0.486, 1.097)	0.861 (0.566, 1.309)	1.045 (0.744, 1.468)
<b>Latino</b>					
0.854 (0.449, 1.625)	0.528 (0.267, 1.042)	1.536 (0.802, 2.944)	0.637 (0.323, 1.257)	1.289 (0.814, 2.040)	
<b>Foreign-born</b>					
0.293*** (0.217, 0.396)	1.009 (0.743, 1.371)	0.918 (0.668, 1.262)	0.876 (0.642, 1.196)	1.011 (0.777, 1.315)	
<b>Self-rated health</b>					
Poor (Ref)	1.000	1.000	1.000	1.000	1.000
Fair	0.850 (0.412, 1.754)	0.332 (0.0969, 1.139)	0.635 (0.335, 1.205)	0.370 (0.109, 1.261)	0.511 (0.245, 1.063)
Good	0.680 (0.339, 1.365)	0.181** (0.0546, 0.602)	0.492* (0.267, 0.908)	0.227* (0.0687, 0.748)	0.366** (0.181, 0.741)
Very good	0.827 (0.402, 1.702)	0.185** (0.0549, 0.621)	0.302*** (0.155, 0.589)	0.230* (0.0688, 0.769)	0.395* (0.192, 0.812)
Excellent	0.779 (0.359, 1.688)	0.162** (0.0468, 0.562)	0.383* (0.184, 0.795)	0.227* (0.0657, 0.785)	0.432* (0.202, 0.927)

Note. CI = confidence interval; OR = odds ratio.

\* $P < .05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$ .

status. Similarly, we were unable to determine what effect, if any, changes in the income distribution of participants may have had on health care access and use. This may be particularly important because of the economic recession, which could have pushed an unknown proportion of participants below the income threshold for AHCCCS. We believe this is not a fatal flaw, however, because Census data suggest that poverty rates in Douglas remained relatively stable during the period covered by our surveys (i.e., 29.2% in 2000 and 30.0% in 2007–2011).<sup>20,29</sup>

This study also has several important strengths. Medicaid expansions occur infrequently but have the potential for large, population-wide effects. Our ability to study such an expansion using data collected pre- and postimplementation is a major strength. The co-occurrence of community-level efforts in Douglas during the same period represents a unique “natural experiment” into the effect that complementary policies and programs

can have on reducing health disparities in medically underserved, low-income, minority communities. Thus, the novelty and importance of our study was enhanced by the community-level programs and policies that took place in Douglas and likely supplemented the effects of the AHCCCS expansion.

### Conclusions

We found that health insurance coverage and access to and use of health care services improved significantly and substantially among residents of Douglas, Arizona, between 1998 and 2010. Improvements were greatest among residents in the lowest socioeconomic strata, suggesting that policy- and community-level interventions can be effectively paired to reduce health care disparities. Our findings suggest that public policies to improve access to health insurance, such as those implemented under the ACA, may yield the greatest health benefits when paired with other community-level programs

and policies that specifically target medically underserved populations. ■

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### Contributors

B. A. Langellier conceptualized the study and conducted the analyses. J. G. de Zapien and C. Rosales oversaw data collection in 1998 and 2010 and helped interpret results. M. Ingram and S. C. Carvajal oversaw data collection in 2010 and helped interpret results. All authors contributed to the writing of the article.

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### Human Participant Protection

All study protocols were approved by the University of Arizona's institutional review board.

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