

Smoking-Cessation Treatment



Use Trends Among Non-Hispanic White and English-Speaking Hispanic/Latino Smokers, Colorado 2001–2012

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Introduction: Most smokers who try to quit do not use an evidence-based treatment (EBT), and in 2001, Hispanic/Latino quit-attempters were about half as likely as non-Hispanic white (NHW) quit-attempters to use one. This study analyzed the patterns of EBT use in Colorado across a recent decade, 2001–2012.

Methods: Data were from The Attitudes and Behaviors Survey, a random cross-sectional population-level telephone survey. Data included NHW and English-speaking Hispanic/Latino respondents from 2001 ($n=11,872$), 2005 ($n=10,952$), 2008 ($n=12,323$), and 2012 ($n=13,265$). Statistical analyses were conducted in 2014–2015. EBT measures included nicotine-replacement therapy, prescription cessation medication, telephone quit-line coaching, and other counseling. Bivariate and multiple logistic regression analyses evaluated associations across years between EBT use and ethnicity, adjusting for covariates.

Results: Any EBT use increased with each successive survey year, and the relative increase from 2001 to 2012 was greater among Hispanic/Latino than NHW quit-attempters (75.7% vs 38.7%). However, adjusted for covariates, Hispanic/Latino quit-attempters in 2012 were still 54% less likely to use any EBT (AOR=0.46, 95% CI=0.34, 0.63), 45% less likely to use nicotine-replacement therapy (AOR=0.55, 95% CI=0.39, 0.77), and 50% less likely to use a prescription cessation medication (AOR=0.50, 95% CI=0.30, 0.85). Ethnicity was unrelated to use of a quit-line or other counseling service.

Conclusions: EBT use for smoking cessation has increased over the past decade, with more rapid increase among English-speaking Hispanics/Latinos compared with NHWs, but a large use gap remains. Healthcare and public health efforts are needed to clarify and overcome factors contributing to this ongoing disparity.

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Introduction

More than half of smokers attempt to quit annually, but only 6.2% remain abstinent for ≥ 6 months.¹ Quit success is roughly 1.5–2.5 times more likely with use of evidence-based treatment (EBT), which includes nicotine-replacement therapy

(NRT), either of two prescription medications, and counseling.²

Although only one fourth to one third of quit-attempters use an EBT,^{1,3–5} Hispanics/Latinos are only about half as likely as non-Hispanic whites (NHWs) to do so.^{6–10} The disparity is wider for use of cessation pharmaceuticals (13.9% for Hispanic/Latinos vs 34.7% for NHWs) than for counseling (4.2% for Hispanic/Latinos vs 6.4% for NHWs).¹ Lower cessation rates have been observed among Hispanic/Latino than NHW quit-attempters,⁷ although not consistently.^{1,6}

The current study examined Colorado's ethnic trends in use of smoking-cessation EBTs during 2001–2012 to determine whether ongoing public health efforts mitigated the disparities.

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Methods

Design and Study Population

The Attitudes and Behaviors Survey is a periodic cross-sectional population survey that randomly samples and interviews 12,000–15,000 Colorado adults. Methods have been described elsewhere.⁷ The survey uses a two-stage stratified cluster design and oversamples smokers and former smokers, African Americans and Hispanics/Latinos, and rural residents. Trained staff conducts telephone interviews in English or Spanish; cell phones have been included since 2008. The protocol is approved by the Colorado Multiple IRB. Overall (multi-stage) response rates¹¹ were 51% in 2001, 38% in 2005, 33% in 2008, and 38% in 2012.

The current study included NHW and English-speaking Hispanic/Latino respondents; Spanish-dominant Hispanic/Latino respondents ($n=1,462$; 190 smokers with a quit attempt) were excluded because their smoking patterns differed substantially from English-speaking Hispanics/Latinos and were too few to support separate analysis.

Measures

Analysis used the following measures: smoked ≥ 100 lifetime cigarettes, smoking status, number of past-year quit attempts ≥ 24 hours, duration of most recent quit attempt, past-year quit attempt with current abstinence ≥ 3 months, EBT use in last quit attempt, health status, health insurance status, healthcare visit within the past year, provider advice to quit, federal poverty level, education, age, and sex. EBT measures included NRT (patch, gum, inhaler, spray, lozenges), cessation medication (varenicline [2008–2012], bupropion, other), and telephone quit-line (2008–2012) or other counseling mode.

Statistical Analysis

Outcomes were use rates of each EBT type and any EBT. Associations between demographic and smoking characteristics by ethnicity were evaluated for each survey year using design-adjusted chi-square tests. All analyses were weighted to represent the Colorado adult population in each survey year (2011 was used for 2012 data) in age group, sex, education level, and race/ethnicity, based on U.S. Census estimates.

Unconditional multivariate logistic regression models were constructed to evaluate associations between EBT use and ethnicity among respondents who had a past-year quit attempt. Significant characteristics ($p < 0.05$) in bivariate analyses were further evaluated for retention in logistic regression models. Separate models were developed for each EBT outcome and included significant covariates in addition to ethnicity, age, sex, and survey year. Results are reported as AORs with 95% CIs. Significance tests used two-sided $\alpha < 0.05$. Analyses were conducted in 2014–2015.

Results

The Hispanic/Latino adult population was consistently younger than the NHW population and had less education, lower income, worse self-reported health, and lower rates of health insurance (Table 1).

Smoking prevalence declined among NHWs but remained unchanged among Hispanics/Latinos (Table 2). Daily consumption declined among both Hispanic/Latino and NHW smokers. Compared with NHW smokers, Hispanic/Latino smokers were consistently more likely to be non-daily smokers and smoke fewer cigarettes per day, and were less likely to visit a healthcare provider and receive cessation advice. No statistical difference was observed by ethnicity for established quitters. Smoking-related measures did not differ by sex among Hispanic/Latino smokers except that more women than men visited a provider ($p < 0.001$, data not shown).

Past-year quit-attempt rates declined overall, significantly among NHWs (61.6% to 50.7%, $p < 0.0001$) but not among Hispanics/Latinos (71.2% to 66.1%, $p = 0.25$) (Table 3). In every year, Hispanic/Latino smokers were more likely than NHW smokers to attempt quitting.

Use of EBT increased among both Hispanic/Latino and NHW quit-attempters. The rate of increase was nearly twice as large among Hispanics/Latinos as among NHWs (75.7% vs 38.7%), but by 2012, Hispanic/Latino quit-attempters were still only about half as likely as NHW quit-attempters to use an EBT. Among Hispanic/Latino quit-attempters, more women than men used the quit-line in 2008 ($p = 0.03$) but not in 2012; no other Hispanic/Latino sex differences were seen (data not shown).

Use of NRT accounted for most increased EBT use, rising from 8.8% to 13.8% among Hispanics/Latinos and from 18.9% to 24.5% among NHWs. Cessation medication use did not differ significantly by ethnicity except in 2008, when NHW quit-attempters were far more likely than their Hispanic/Latino counterparts to use varenicline (8.6% vs 1.3%) soon after U.S. Food and Drug Administration approval in 2006.¹² The quit-line was more widely used by NHW than Hispanic/Latino quit-attempters in 2008, but not in 2012; there was no ethnic difference in use of other counseling services in any year.

In multivariate logistic regression models, Hispanic/Latino quit-attempters had 52% lower adjusted odds of using an EBT (AOR=0.48, 95% CI=0.36, 0.66), 45% lower adjusted odds of using NRT (AOR=0.55, 95% CI=0.39, 0.78), and 48% lower adjusted odds of using a cessation medication (AOR=0.52, 95% CI=0.31, 0.87) (Table 4). Ethnicity was unrelated to use of quit-line or other counseling services.

Discussion

A large Hispanic/Latino-NHW disparity in smoking-cessation treatment remained unchanged for more than a decade in Colorado, even though treatment use increased nearly twice as fast among Hispanic/Latino quit-attempters, and despite Hispanic/Latino smokers having

Table 1. Characteristics of Colorado Hispanic/Latino and NHW Adults, 2001, 2005, 2008, and 2012

Characteristics	2001			2005			2008			2012		
	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value
	Hispanic/ Latino (n=927)	NHW (n=10,945)		Hispanic/ Latino (n=989)	NHW (n=9,963)		Hispanic/ Latino (n=898)	NHW (n=11,425)		Hispanic/ Latino (n=1,332)	NHW (n=11,933)	
Sex			0.2932			0.0126			0.1476			0.0086
Male	51.8	49.5		55.7	49.3		46.9	50.4		45.0	51.0	
Female	48.2	50.5		44.3	50.7		53.1	49.6		55.0	49.0	
Age group			< 0.0001			< 0.0001			< 0.0001			< 0.0001
18–24 years	21.1	11.4		20.8	11.0		16.6	12.9		21.7	11.7	
25–44 years	48.6	42.5		47.2	39.4		45.5	35.5		39.4	32.8	
45–64 years	23.3	31.9		26.0	34.3		30.3	36.2		29.5	37.9	
≥65 years	7.0	14.2		6.0	15.3		7.5	15.3		9.4	17.6	
Education			< 0.0001			< 0.0001			< 0.0001			< 0.0001
<12 years	14.6	4.1		13.5	4.2		16.4	6.8		20.9	5.6	
High school graduate or GED	35.0	22.2		34.4	21.7		26.0	22.0		31.2	25.0	
Some college	27.6	29.7		30.1	27.7		36.1	35.6		32.0	30.9	
College graduate or higher	22.9	44.0		22.0	46.5		21.4	35.6		15.9	38.5	
Poverty status			< 0.0001			< 0.0001			< 0.0001			< 0.0001
<200% of federal poverty level	33.6	15.5		32.2	17.0		42.8	22.4		51.5	24.8	
≥200% of federal poverty level	66.4	84.5		67.8	83.0		57.2	77.6		48.5	75.2	
Perceived health status			0.0017			< 0.0001			0.0005			< 0.0001

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Table 1. Characteristics of Colorado Hispanic/Latino and NHW Adults, 2001, 2005, 2008, and 2012 (continued)

Characteristics	2001			2005			2008			2012		
	Hispanic/ Latino (n=927)	NHW (n=10,945)	p-value	Hispanic/ Latino (n=989)	NHW (n=9,963)	p-value	Hispanic/ Latino (n=898)	NHW (n=11,425)	p-value	Hispanic/ Latino (n=1,332)	NHW (n=11,933)	p-value
Excellent, very good, good	88.4	92.3	< 0.0001	84.9	91.9	< 0.0001	84.9	89.9	< 0.0001	77.2	86.5	< 0.0001
Fair, poor	11.6	7.7	< 0.0001	15.1	8.1	< 0.0001	15.1	10.1	< 0.0001	22.8	13.5	< 0.0001
Health insurance status												
No insurance	18.4	9.9	< 0.0001	26.8	12.7	< 0.0001	23.4	15.7	< 0.0001	23.0	12.6	< 0.0001
Medicaid	5.3	1.3	< 0.0001	5.1	1.5	< 0.0001	7.2	1.7	< 0.0001	14.6	4.1	< 0.0001
Medicare	3.2	8.8	< 0.0001	3.9	9.2	< 0.0001	5.0	10.4	< 0.0001	8.4	12.4	< 0.0001
Private	73.1	80.0	< 0.0001	64.2	76.6	< 0.0001	64.4	72.2	< 0.0001	54.0	70.9	< 0.0001

Note: Boldface indicates statistical significance ($p < 0.05$). GED, General Educational Development.; NHW, non-Hispanic white.

consistently higher prevalence of quit attempts. Smoking prevalence fell significantly during the period among Colorado’s NHW adults, but remained unchanged among Hispanic/Latino adults.

Wider use of EBTs among both groups is consistent with findings elsewhere⁴ and is associated with the quit-line starting in 2002 and its provision of free NRT starting in 2005. Quit-line promotion campaigns included media targeted to Hispanic/Latino smokers.¹³ However, the persistence of disparities in EBT use and smoking prevalence indicates that greater effort and more-effective strategies are urgently needed. Further research should determine whether similar patterns exist in other states and among other socioculturally and socioeconomically disadvantaged populations.

Nationally, Hispanic/Latino smokers are less likely than NHW smokers to be asked by providers about tobacco use, advised to quit, and offered cessation assistance.^{10,14} These gaps presumably contribute to the EBT disparity. Mistrust of EBTs and mistaken beliefs about their use also contribute to underutilization,¹⁵ and may be more common among Hispanics/Latinos: A cross-sectional survey¹⁶ found Hispanic/Latino smokers more likely than NHW smokers to believe NRTs are as bad as cigarettes, are addictive, and cause cancer. A focus-group study among Hispanic/Latino smokers found strong suspicions about NRT use and reluctance to use cessation medications.¹⁷ Hispanic/Latino smokers may reject the view of smoking as an illness and instead see it as a weakness that willpower and personal responsibility can overcome.^{16–18} Intervention research should develop relevant communications and counseling strategies for Hispanic/Latino smokers.

Limitations

The current study has several strengths, including large population-based samples, oversampling of Hispanic/Latino adults, and use of consistent survey items across time. Limitations include the cross-sectional design, which precludes study of longitudinal changes within individuals. The study relies on self-report measures of smoking and EBT use; defining smokers using ≥ 100 lifetime cigarettes may not include all light or non-daily Hispanic/Latino smokers.¹⁹ Finally, the study sample had insufficient numbers of Spanish-speaking Hispanics/Latinos to support trend analysis of this growing population.²⁰ However, the study population does embody characteristics of roughly two thirds of U.S. Hispanic/Latino adults, 62%–68% of whom speak English or English/Spanish,^{21,22} 65% of whom are

Table 2. Smoking Characteristics by Ethnicity, Colorado, 2001, 2005, 2008, and 2012

Characteristics	2001			2005			2008			2012		
	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value
	Hispanic/ Latino (n=922)	NHW (n=10,920)		Hispanic/ Latino (n=974)	NHW (n=9,882)		Hispanic/ Latino (n=898)	NHW (n=11,396)		Hispanic/ Latino (n=1,329)	NHW (n=11,901)	
Smoking status			< 0.0001			< 0.0001			0.0003			0.0004
Current	22.1	19.1		24.4	15.6		24.9	18.4		21.8	16.7	
Former	17.2	26.2		16.1	21.6		21.6	27.9		19.8	26.7	
Never (<100 cigarettes in lifetime)	60.6	54.7		59.5	62.8		53.5	53.7		58.4	56.6	
Smoking frequency ^a			< 0.0001			0.2449			0.0059	100	100	0.0007
Nondaily	31.6	18.8		24.8	20.2		33.9	21.9		43.2	26.7	
Daily	68.4	81.2		75.2	79.8		66.1	78.1		56.8	73.3	
Mean no. of cigarettes per day ^b			< 0.0001			< 0.0001			< 0.0001			0.002
1–9	28.6	12.4		26.8	13.0		38.0	16.2		35.3	19.8	
10–20	64.2	68.9		67.7	69.0		56.8	70.4		62.2	71.5	
>20	7.2	18.8		5.5	18.1		5.2	13.4		2.5	8.7	
Medical provider visit in the last 12 months ^c			0.2284			0.0887			0.0004			0.0009
No visit	22.0	19.7		23.6	19.7		26.3	19.2		22.6	16.1	
One or more visits	78.0	80.3		76.4	80.3		73.7	80.8		77.4	83.9	
Medical provider advice to quit smoking in the last 12 months ^d			0.0336			0.8661			0.0216			0.0004
Yes	46.5	56.3		58.9	59.7		52.0	64.7		52.3	71.7	
No	53.5	43.7		41.1	40.3		48.0	35.3		47.7	28.3	
Established quitter last year ^a	4.8	8.5	0.1022	9.3	8.4	0.744	7.3	10.2	0.3884	9.4	9.8	0.907

Note: Boldface indicates statistical significance ($p < 0.05$).

^aAmong current smokers.

^bAmong current daily smokers.

^cAmong current smokers and past-year quitters.

^dAmong current smokers and past-year quitters who visited a provider in the last 12 months.

NHW, non-Hispanic white.

Table 3. Cessation Attempts and Treatment Use in the Past 12 Months Among Current Smokers, Colorado, 2001, 2005, 2008, and 2012

Variables	2001			2005			2008			2012		
	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value	Weighted %		p-value
	Hispanic/ Latino (n=284)	NHW (n=2,950)		Hispanic/ Latino (n=339)	NHW (n=2,303)		Hispanic/ Latino (n=239)	NHW (n=2,125)		Hispanic/ Latino (n=258)	NHW (n=1,997)	
One or more quit attempts	71.2	61.6	0.0139	74.6	64.8	0.0094	75.9	62.7	0.0042	66.1	50.7	0.0015
Use of any EBT ^{ab}	11.5	25.6	0.0005	13.2	24.1	0.0237	16.9	36.5	< 0.0001	20.2	35.5	0.0128
NRT ^c	8.8	18.9	0.0072	11.0	20.5	0.0421	11.9	25.3	0.0015	13.8	24.5	0.052
Prescription medications	4.8	8.9	0.131	2.1	5.2	0.0737	4.2	11.8	0.0077	4.6	10.6	0.1198
Varenicline (2008–2012)	—	—	—	—	—	—	1.3	8.6	0.0004	4.5	6.2	0.5865
Bupropion	4.4	6.9	0.3264	0.5	4.1	<0.0001	3.1	3.1	0.9959	0.1	3.1	< 0.0001
Quit-line	—	—	—	—	—	—	4.8	8.3	0.05	4.5	4.2	0.863
Other counseling	3.0	1.6	0.2881	2.0	2.4	0.8323	2.8	3.1	0.8556	1.3	5.4	0.0195

Note: Boldface indicates statistical significance ($p < 0.05$).

^aNRT, prescription medications (bupropion, varenicline, other cessation medications), telephone counseling (quit-line, 2008–2012), other cessation counseling mode.

^bAmong those smokers with one or more quit attempt.

^cNRT includes patch, gum, inhalers, sprays, or lozenges.

EBT, evidence-based treatment; NHW, non-Hispanic white; NRT, nicotine replacement therapy.

Table 4. AOR of EBT Use by Ethnicity

Characteristics	Any EBT ^a	NRT ^a	Prescription medication ^b	Quit-line ^c	Counseling ^d
Hispanic/Latino vs NHW	0.48 (0.36, 0.66)	0.55 (0.39, 0.78)	0.52 (0.31, 0.87)	0.70 (0.35, 1.40)	0.79 (0.40, 1.52)
Age	1.02 (1.01, 1.03)	1.02 (1.01, 1.03)	1.03 (1.02, 1.03)	1.01 (1.00, 1.02)	1.02 (1.01, 1.04)
Female vs male	1.25 (1.05, 1.50)	1.26 (1.04, 1.53)	0.96 (0.72, 1.27)	1.46 (0.93, 2.30)	1.25 (0.82, 1.91)
Non-daily smoking vs daily smoking ^e	0.59 (0.46, 0.77)	0.64 (0.48, 0.84)	—	0.33 (0.16, 0.65)	—
≥ 10 cigarettes per day vs < 10 cigarettes per day ^e	1.69 (1.40, 2.05)	1.80 (1.46, 2.22)	1.47 (1.09, 1.99)	—	—
No insurance vs public or private health insurance ^e	0.67 (0.53, 0.84)	0.72 (0.56, 0.93)	0.63 (0.43, 0.92)	—	—
No past-year medical provider visit vs one or more medical provider visits	—	—	0.57 (0.33, 0.98)	—	—
Medical provider advice to quit vs no advice ^e	1.60 (1.34, 1.92)	1.4 (1.2, 1.7)	2.00 (1.39, 2.87)	—	—
Fair or poor health vs excellent, very good, or good health	—	—	—	2.27 (1.43, 3.62)	—
Year 2012 vs 2001	1.60 (1.23, 2.09)	1.42 (1.07, 1.89)	1.01 (0.67, 1.53)	—	2.42 (1.27, 4.60)
Year 2008 vs 2001	1.78 (1.43, 2.21)	1.49 (1.17, 1.90)	1.21 (0.88, 1.67)	—	1.61 (0.92, 2.82)
Year 2005 vs 2001	0.91 (0.73, 1.14)	1.10 (0.87, 1.40)	0.47 (0.33, 0.67)	—	1.20 (0.66, 2.20)
Year 2012 vs 2008 ^f	—	—	—	0.50 (0.31, 0.82)	—

Note: Values are AOR (95% CI). Boldface indicates statistical significance ($p < 0.05$).

^aAdjusted for ethnicity, age, sex, non-daily smoking, heavy/moderate smoking, no insurance, medical provider's advice to quit, and survey year.

^bAdjusted for ethnicity, age, sex, heavy/moderate smoking, no insurance, medical provider visit, medical provider's advice to quit, and survey year.

^cAdjusted for ethnicity, age, sex, nondaily smoking, health status, and survey year.

^dAdjusted for ethnicity, age sex, and survey year.

^eReference category also includes those who were unknown or missing.

^fThe quit-line was operational and data collected in 2008 and 2012.

EBT, evidence-based treatment; NHW, non-Hispanic white; NRT, nicotine replacement therapy.

U.S.-born,²³ and 64% of whom have Mexican origin or ancestry.²⁴ Also, using pooled data across survey years, post hoc analysis showed that Spanish- and English-speaking Hispanic/Latino quit-attempters used any EBT at similar rates (15.35% vs 15.31%, $p=0.99$). Nevertheless, further study of Spanish-speaking U.S. smokers is needed.

Conclusions

Smoking-cessation treatment use increased in Colorado during 2001–2012, but large disparities remain among Hispanic/Latino quit-attempters. Greater public health efforts are needed to close the gap.

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