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Smoking Among Hispanic/Latino Nationality Groups and Whites, Comparisons Between California and the United States

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Abstract

Introduction: Although California is home to the largest Hispanic/Latino population, few studies have compared smoking behavior trends of Hispanic/Latino nationality groups in California to the remaining United States, which may identify the impact of the states antitobacco efforts on these groups. This study compared smoking status, frequency, and intensity among Mexican Americans, Central/South Americans, and non-Hispanic Whites in California to the remaining United States in the 1990s and 2000s.

Methods: Data were analyzed using the 1992–2011 Current Population Survey Tobacco Use Supplement to report the estimated prevalence of smoking status, frequency, and intensity by decade, race/ethnicity, and state residence. Weighted logistic regression explored sociodemographic factors associated with never and heavy smoking ($\geq$20 cigarettes per day).

Results: There were absolute overall increases from 6.8% to 9.6% in never smoking across all groups. Compared to the remaining United States, there was a greater decrease in heavy smoking among Mexican American current smokers in California (5.1%) and a greater increase in light and intermittent smokers among Central/South American current smokers in California (9.3%) between decades. Compared to those living in the remaining United States, smokers living in California had lower odds of heavy smoking (1990s: odds ratio [OR] = 0.64, 95% confidence interval [CI] = 0.62, 0.66; 2000s: 0.54, 95% CI = 0.52, 0.55).

Conclusions: California state residence significantly impacted smoking behaviors as indicated by significant differences in smoking intensity between California and the remaining United States among Hispanic/Latino nationality groups. Understanding smoking behaviors across Hispanic/

Latino nationality groups in California and the United States can inform tobacco control and smoking prevention strategies for these groups.

Implications: The present study explored the differences in smoking behaviors between Whites, Mexican Americans, and Central South/Americans living in California versus the rest of the United States in the 1990s and the 2000s. The results contribute to our current knowledge as there have been minimal efforts to provide disaggregated cigarette consumption information among Hispanic/Latino nationality groups. Additionally, by comparing cigarette consumption between those in California and the remaining United States, our data may provide insight into the impact of California's antitobacco efforts in reaching Hispanic/Latino subpopulations relative to the remaining US states, many of which have had less tobacco control policy implementation.

Introduction

Cigarette smoking is an established major contributor to premature deaths,[1] has been causally linked to 20 cancers,[2,3] and is associated with other chronic diseases, such as cardiovascular disease.[1] To combat such preventable deaths and the detrimental health effects of smoking, California became one of the first states in the nation to initiate a statewide comprehensive tobacco control program.[4,5] For at least the past three decades, California has had a strong antitobacco climate, underscored by the inauguration of the California Tobacco Control Program in 1988 and its continuous funding since.[5] Previous research has shown significant differences in smoking behaviors between California and the rest of the United States across racial/ethnic groups,[6] suggesting the positive impact of the state's efforts on tobacco consumption[5,7] and tobacco-related diseases.[8,9] Moreover, as a "majority-minority" state, California is home to the largest minority population in the nation,[10] with nearly one-third of Hispanics/Latinos in the United States residing in California.[11] Considering California's vanguard position in tobacco control and the nation's growth toward racial/ethnic diversity, California serves as a model from which researchers and practitioners might draw insight on the impact of similar tobacco control programs on racial/ethnic groups, particularly Hispanic/Latino nationality groups.

Despite California's success in decreasing smoking prevalence,[12] extant research has not examined the impact of the state's efforts on Hispanic/Latino nationality groups in California.[7,13–15] A number of factors, such as neighborhood environments, occupational differences, and acculturation,[16] may contribute to differential smoking trends across Hispanic/Latino nationality groups. Although studies have examined smoking among Hispanics/Latinos, many have examined only one nationality group,[17,18] or examined Hispanics/Latinos without disaggregating the data by nationality group.[19] Considering the paucity of tobacco-related studies utilizing disaggregated Hispanic/Latino data,[20–24] more research is needed to understand Hispanic/Latino nationality group differences in smoking trends.

Given this gap in research, the first goal of this study was to examine smoking behaviors in the 1990s and 2000s among Mexican Americans, Central/South Americans, and non-Hispanic Whites (henceforth Whites) living in California compared to the rest of the United States. California is not only home to the largest Hispanic/Latino population in the nation, but also the largest populations of Mexican Americans, Guatemalans, and Salvadorans.[11] By comparing trends in smoking behaviors across decades, our study provides insight on the impact of California's efforts on cigarette consumption among Mexican Americans and Central/South Americans. Moreover, smoking intensity is associated with lower quality of life[25] and the adoption of other risky health behaviors,[26] which in turn, may also contribute to premature death. Considering the disproportionate disease burden and comorbidities experienced by smokers, particularly heavy smokers, the second goal of this study was to examine the association between heavy smoking and factors including sociodemographic characteristics, race/ethnicity, and state of residence (comparing California to the rest of the United States). We also investigated the association between these factors and never smoking to assess the potential impact of California's efforts on reducing overall smoking initiation.

Methods

Data Source

This study utilized the following sequential cross-sectional years from the Tobacco Use Supplement (TUS) to the Current Population Survey (CPS): 1992–1993, 1995–1996, 1998–1999, 2001–2002, 2003, 2006–2007, and 2010–2011. The CPS, administered by the US Census Bureau, uses a multistage probability sample design to collect monthly national and state data from approximately 60 000 households on labor force characteristics among the civilian, non-institutionalized US population age 15 and older.[27] The TUS, conducted in conjunction with the CPS every 3 years, collects data on tobacco use and related attitudes and practices among CPS participants. A detailed description of CPS methodology is published elsewhere.[27] The TUS-CPS self-response rate ranged from 62% (2006–2007) to 72% (1992–1993).[28] Analyses were restricted to those ages 18 to 64 years, self-responders (proxy responders were excluded), and those who completed the interview in person rather than by telephone. Analyses only included those identifying as non-Hispanic White, Mexican American, and Central/South American. Those identifying as *Other Spanish* as their Hispanic origin were excluded from analyses, as were African Americans and other race groups. Due to small sample sizes in California, Puerto Ricans (1990s: $N = 103$; 2000s: $N = 176$) and Cubans (1990s: $N = 85$; 2000s: $N = 114$) were also excluded from the analysis.

Measures

Cigarette Consumption

TUS-CPS respondents were asked, "Have you smoked at least 100 cigarettes in your entire life?" Respondents were considered ever-smokers if they answered, "Yes." Ever-smokers were further asked, "Do you now smoke every day, some days, or not at all?" Former smokers were defined as ever-smokers who reported not smoking at the time of the survey. Light daily smokers were defined as those every day smokers who consumed 1–5 cigarettes per day (CPD), moderate daily smokers were those every day smokers who consumed 6–19 CPD, and heavy daily smokers were those every day smokers who consumed 20 or more CPD. Those who indicated that they smoked only some days were considered intermittent

Table 1. Demographic Characteristics by Decade: Tobacco Use Supplements to the Current Population Survey, California and the United States sans California, 1992–2011

	Non-Hispanic white				Mexican American				Central/South American			
	1990s		2000s		1990s		2000s		1990s		2000s	
Variable	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
California												
Unweighted sample size	19 004		20 379		6995		10 808		1391		1805	
Age												
18–24	12.9	(12.4, 13.4)	13.3	(13, 13.5)	23.1	(21.7, 24.6)	19.9	(19.6, 20.1)	21.6	(19.9, 23.2)	17.5	(16.8, 18.3)
25–44	50.9	(50.5, 51.3)	42.3	(42.1, 42.6)	58.0	(57.3, 58.8)	55.3	(55, 55.6)	59.0	(57.8, 60.1)	54.3	(53.3, 55.2)
45–64	36.2	(35.8, 36.5)	44.4	(44.2, 44.6)	18.8	(18, 19.7)	24.8	(24.5, 25.1)	19.5	(18.2, 20.7)	28.2	(27.5, 28.9)
Gender												
Men	50.8	(50, 51.6)	50.6	(50.4, 50.7)	49.0	(46.3, 51.6)	50.2	(50, 50.4)	49.9	(46.8, 53.1)	49.4	(48.8, 50.1)
Women	49.2	(48.4, 50)	49.4	(49.3, 49.6)	51.0	(48.4, 53.7)	49.8	(49.6, 50)	50.1	(46.9, 53.2)	50.6	(49.9, 51.2)
Education level												
Less than high school	6.6	(6.4, 6.8)	4.8	(4.7, 5)	49.5	(48.9, 50.1)	41.3	(40.8, 41.8)	40.8	(39.8, 41.8)	35.3	(34.3, 36.2)
High school grad	24.6	(24.3, 24.9)	20.2	(19.9, 20.4)	26.8	(26.3, 27.3)	27.6	(27.3, 28)	24.4	(23.5, 25.3)	24.9	(24.1, 25.7)
Some college	35.8	(35.5, 36.1)	35.9	(35.6, 36.3)	18.3	(17.9, 18.7)	23.5	(23.2, 23.9)	23.1	(22.2, 24)	27.0	(26.1, 27.8)
College graduate	33.0	(32.6, 33.4)	39.1	(38.7, 39.4)	5.4	(5.1, 5.6)	7.6	(7.3, 7.8)	11.7	(11, 12.3)	12.8	(12.3, 13.4)
Language of interview[a]												
English	99.5	(99.4, 99.6)	98.9	(98.8, 98.9)	65.4	(64.6, 66.2)	63.4	(62.8, 64.1)	59.3	(57.9, 60.6)	62.4	(61.3, 63.5)
Spanish	0.2	(0.2, 0.2)	0.3	(0.3, 0.4)	34.5	(33.7, 35.3)	36.4	(35.8, 37.1)	40.5	(39.1, 41.8)	37.5	(36.4, 38.6)
United States sans California												
Unweighted sample size	341 000		406 841		13 168		25 345		3873		9006	
Age												
18–24	13.7	(13.1, 14.3)	14.1	(14.1, 14.1)	23.3	(22.3, 24.4)	22.3	(22.1, 22.4)	19.3	(18, 20.5)	19.1	(18.8, 19.4)
25–44	50.9	(50.3, 51.4)	42.6	(42.6, 42.6)	54.1	(53.3, 54.8)	54.2	(54, 54.4)	59.5	(58.1, 60.9)	54.8	(54.5, 55.2)
45–64	35.4	(35.3, 35.6)	43.3	(43.3, 43.3)	22.6	(22.1, 23.1)	23.6	(23.4, 23.7)	21.2	(20.7, 21.7)	26.1	(25.7, 26.4)
Gender												
Men	48.7	(48, 49.4)	49.3	(49.3, 49.3)	50.4	(48.5, 52.3)	53.8	(53.6, 54)	50.3	(48.2, 52.5)	52.2	(51.9, 52.5)
Women	51.3	(50.6, 52)	50.7	(50.7, 50.7)	49.6	(47.7, 51.5)	46.2	(46, 46.4)	49.7	(47.5, 51.8)	47.8	(47.5, 48.1)
Education level												
Less than high school	10.4	(10.3, 10.6)	7.8	(7.8, 7.9)	45.9	(45.3, 46.4)	43.5	(43.2, 43.9)	29.3	(28.6, 30)	30.9	(30.4, 31.4)
High school grad	34.8	(34.7, 35)	30.3	(30.2, 30.4)	29.0	(28.6, 29.4)	29.6	(29.4, 29.9)	29.5	(28.9, 30.1)	27.7	(27.3, 28.1)
Some college	28.1	(28, 28.1)	30.2	(30.1, 30.2)	18.5	(18.1, 18.9)	18.7	(18.5, 18.9)	23.6	(23, 24.2)	22.7	(22.3, 23.1)
College graduate	26.7	(26.6, 26.8)	31.7	(31.6, 31.8)	6.7	(6.5, 6.9)	8.1	(8, 8.3)	17.6	(17, 18.1)	18.7	(18.3, 19)
Language of interview[a]												
English	99.7	(99.7, 99.7)	99.7	(99.7, 99.7)	74.5	(73.8, 75.3)	70.1	(69.6, 70.5)	70.4	(69.5, 71.3)	63.3	(62.6, 64)
Spanish	0.1	(0.1, 0.1)	0.2	(0.2, 0.2)	25.4	(24.6, 26.1)	29.8	(29.3, 30.3)	29.3	(28.4, 30.1)	36.5	(35.9, 37.2)

CI = confidence interval.

[a]Prevalence of "Other language" not presented.

Table 2. Cigarette Consumption Among Entire Population: Tobacco Use Supplements to the Current Population Survey, California and the United States sans California, 1992–2011

Consumption levels[a]	Non-Hispanic white					Mexican American					Central/South American				
	1990s		2000s		Absolute % change 1990s–2000s	1990s		2000s		Absolute % change 1990s–2000s	1990s		2000s		Absolute % change 1990s–2000s
	%	(95% CI)	%	(95% CI)		%	(95% CI)	%	(95% CI)		%	(95% CI)	%	(95% CI)	
California															
Unweighted sample size	19 004		20 379			6995		10 808			1391		1805		
Never	52.4	(52.1, 52.7)	62.0	(61.7, 62.3)	9.6	72.4	(71.9, 72.8)	80.1	(79.8, 80.4)	7.7	75.1	(74.1, 76.0)	82.3	(81.7, 83.0)	7.2
Ever	47.4	(47.1, 47.7)	37.4	(37.1, 37.7)	−10.0	27.4	(27.0, 27.9)	19.5	(19.2, 19.7)	−7.9	24.9	(23.9, 25.8)	17.5	(16.9, 18.2)	−7.4
Former	25.2	(25.0, 25.4)	20.9	(20.7, 21.1)	−4.3	13.3	(12.9, 13.6)	10.3	(10.1, 10.5)	−3.0	12.2	(11.5, 12.9)	9.3	(8.8, 9.8)	−2.9
Current	22.2	(21.9, 22.5)	16.5	(16.2, 16.7)	−5.7	14.2	(13.8, 14.6)	9.1	(8.9, 9.4)	−5.1	12.7	(11.8, 13.5)	8.2	(7.7, 8.7)	−4.5
LITS: occasional + daily, ≤5 cpd	5.6	(5.5, 5.7)	5.4	(5.3, 5.5)	−0.2	8.9	(8.6, 9.2)	6.1	(5.9, 6.2)	−2.8	7.9	(7.4, 8.4)	5.9	(5.5, 6.3)	−2.0
Moderate: daily, 6–19 cpd	6.5	(6.3, 6.7)	5.8	(5.7, 5.9)	−0.7	3.4	(3.2, 3.6)	2.4	(2.3, 2.5)	−1.0	3.4	(2.9, 3.8)	1.6	(1.4, 1.8)	−1.8
Heavy: daily, ≥20	10.1	(9.9, 10.3)	5.3	(5.2, 5.4)	−4.8	1.9	(1.7, 2.0)	0.7	(0.7, 0.8)	−1.2	1.4	(1.1, 1.7)	0.7	(0.6, 0.9)	−0.7
United States sans California															
Unweighted sample size	341 000		406 841			13 168		25 345			3873		9006		
Never	49.8	(49.7, 49.8)	56.6	(56.5, 56.6)	6.8	67.4	(66.9, 67.9)	75.6	(75.4, 75.8)	8.2	73.5	(72.8, 74.1)	81.0	(80.6, 81.3)	7.5
Ever	50.1	(50.0, 50.2)	42.8	(42.8, 42.9)	−7.3	32.5	(32.0, 33.0)	24.0	(23.7, 24.2)	−8.5	26.5	(25.8, 27.1)	18.7	(18.4, 19.1)	−7.8
Former	22.6	(22.5, 22.6)	20.0	(19.9, 20.0)	−2.6	12.3	(12.0, 12.5)	9.4	(9.2, 9.5)	−2.9	12.4	(12.0, 12.9)	8.6	(8.3, 8.8)	−3.8
Current	27.5	(27.4, 27.6)	22.9	(22.8, 23.0)	−4.6	20.3	(19.9, 20.7)	14.6	(14.4, 14.8)	−5.7	14.0	(13.6, 14.5)	10.2	(9.9, 10.4)	−3.8
LITS: occasional + daily, ≤5 cpd	4.9	(4.8, 4.9)	4.8	(4.8, 4.8)	−0.1	10.3	(10.1, 10.6)	8.4	(8.3, 8.5)	−1.9	7.6	(7.3, 8.0)	5.7	(5.5, 5.9)	−1.9
Moderate: daily, 6–19 cpd	6.9	(6.9, 6.9)	7.3	(7.3, 7.3)	0.4	5.8	(5.6, 5.9)	3.9	(3.8, 4.0)	−1.9	4.1	(3.9, 4.4)	3.1	(3.0, 3.3)	−1.0
Heavy: daily, ≥20	15.7	(15.7, 15.8)	10.8	(10.8, 10.9)	−4.9	4.2	(4.0, 4.4)	2.3	(2.2, 2.4)	−1.9	2.2	(2.0, 2.5)	1.3	(1.2, 1.4)	−0.9

CI = confidence interval; LITS = light daily smokers and intermittent smokers. All consumption variables in this table are calculated with overall population as the denominator; bolded absolute changes highlight non-overlapping CIs between decades.

[a]Prevalence of "Unknown Smoking Consumption" not presented.

Table 3. Cigarette Consumption Among Current Smokers: Tobacco Use Supplements to the Current Population Survey, California and the United States sans California, 1992–2011

Consumption levels[a]	Non-Hispanic white					Mexican American					Central/South American				
	1990s		2000s		Absolute % change 1990s–2000s	1990s		2000s		Absolute % change 1990s–2000s	1990s		2000s		Absolute % change 1990s–2000s
	%	(95% CI)	%	(95% CI)		%	(95% CI)	%	(95% CI)		%	(95% CI)	%	(95% CI)	
California															
Unweighted sample size	4150		3283			975		967			174		139		
LITS: occasional + daily, ≤5 cpd	25.2	(24.7, 25.7)	32.6	(32.1, 33.2)	**7.4**	62.7	(61.6, 63.8)	66.2	(65.1, 67.2)	**3.5**	62.3	(59.4, 65.2)	71.6	(69.0, 74.3)	**9.3**
Moderate: daily, 6–19 cpd	29.3	(28.7, 29.9)	35.1	(34.6, 35.7)	**5.8**	24.1	(23.1, 25.2)	25.7	(24.8, 26.7)	1.6	26.7	(24.1, 29.2)	19.4	(17.0, 21.8)	**-7.3**
Heavy: daily, ≥20 cpd	45.5	(44.8, 46.2)	32.2	(31.7, 32.8)	**-13.3**	13.2	(12.2, 14.2)	8.1	(7.4, 8.8)	**-5.1**	11.0	(9.0, 13.0)	9.0	(7.1, 10.8)	-2.0
United States sans California															
Unweighted sample size	92 089		91 057			2657		3683			527		874		
LITS: occasional + daily, ≤5 cpd	17.7	(17.6, 17.8)	20.9	(20.8, 21.0)	**3.2**	51.0	(50.2, 51.8)	57.7	(57.0, 58.3)	**6.7**	54.4	(52.6, 56.2)	55.9	(54.5, 57.2)	1.5
Moderate: daily, 6–19 cpd	25.1	(25.0, 25.2)	31.9	(31.7, 32.0)	**6.8**	28.4	(27.7, 29.1)	26.5	(26.0, 27.1)	**-1.9**	29.5	(28.1, 31.0)	30.9	(29.7, 32.1)	1.4
Heavy: daily, ≥20 cpd	57.2	(57.1, 57.4)	47.2	(47.1, 47.4)	**-10.0**	20.6	(19.9, 21.3)	15.8	(15.4, 16.3)	**-4.8**	16.0	(14.4, 17.6)	13.2	(12.3, 14.2)	**-2.8**

CI = confidence interval; LITS = light daily smokers and intermittent smokers. All consumption variables in this table are calculated with current smokers as the denominator; bolded absolute changes highlight non-overlapping CIs between decades.

[a]Prevalence of "Unknown Smoking Consumption" not presented.

Table 4. Results of Multivariable Analyses Predicting Never Smoking and Heavy Smoking Among Non-Hispanics, Mexicans, and Central/South Americans: Tobacco Use Supplements to the Current Population, 1992–2011

| | 1990s | | | | | | | | 2000s | | | | | | | |
| | Never smoking among entire population[a] (N = 382 187) | | | | Heavy smoking (daily, ≥20) among current smokers[a] (N = 99 851) | | | | Never smoking among entire population[a] (N = 468 620) | | | | Heavy smoking (daily, ≥20) among current smokers[a] (N = 98 941) | | | |
Variable	β	OR	95% CI	p	β	OR	95% CI	p	β	OR	95% CI	p	β	OR	95% CI	p
Age																
18–24	0.91	2.48	(2.43, 2.53)	<.0001	−1.10	0.33	(0.33, 0.34)	<.0001	0.83	2.29	(2.27, 2.31)	<.0001	−1.18	0.31	(0.30, 0.31)	<.0001
25–44	0.37	1.45	(1.44, 1.46)	<.0001	−0.34	0.71	(0.70, 0.72)	<.0001	0.30	1.34	(1.34, 1.35)	<.0001	−0.44	0.65	(0.64, 0.65)	<.0001
45–64 (Ref)																
Education level																
Less than high school	−1.29	0.28	(0.27, 0.28)	<.0001	1.19	3.28	(3.22, 3.35)	<.0001	−1.29	0.27	(0.27, 0.28)	<.0001	1.31	3.71	(3.62, 3.79)	<.0001
High school graduate	−0.94	0.39	(0.39, 0.39)	<.0001	0.89	2.44	(2.40, 2.48)	<.0001	−1.03	0.36	(0.36, 0.36)	<.0001	0.97	2.65	(2.60, 2.69)	<.0001
Some college	−0.67	0.51	(0.51, 0.51)	<.0001	0.54	1.72	(1.70, 1.75)	<.0001	−0.76	0.47	(0.46, 0.47)	<.0001	0.62	1.87	(1.83, 1.90)	<.0001
College graduate (Ref)																
Gender																
Men	−0.42	0.66	(0.66, 0.66)	<.0001	0.56	1.75	(1.72, 1.77)	<.0001	−0.32	0.73	(0.73, 0.73)	<.0001	0.56	1.74	(1.73, 1.76)	<.0001
Women (Ref)																
Language of interview[b]																
Spanish	0.58	1.78	(1.74, 1.83)	<.0001	−0.90	0.41	(0.38, 0.44)	<.0001	0.67	1.95	(1.91, 1.99)	<.0001	−0.88	0.42	(0.39, 0.45)	<.0001
English (Ref)																
Race/ethnicity																
Mexican American	0.87	2.40	(2.34, 2.45)	<.0001	−1.77	0.17	(0.16, 0.18)	<.0001	1.00	2.71	(2.67, 2.75)	<.0001	−1.71	0.18	(0.17, 0.19)	<.0001
Central/South American	1.00	2.73	(2.64, 2.82)	<.0001	−1.85	0.16	(0.14, 0.18)	<.0001	1.16	3.19	(3.11, 3.27)	<.0001	−1.79	0.17	(0.15, 0.18)	<.0001
Non-Hispanic white (Ref)																
State residence																
California	0.03	1.03	(1.02, 1.05)	<.0001	−0.45	0.64	(0.62, 0.66)	<.0001	0.14	1.15	(1.14, 1.17)	<.0001	−0.62	0.54	(0.52, 0.55)	<.0001
United States sans California (Ref)																
Race/ethnicity*State residence																
California, Mexican American	0.17	1.19	(1.15, 1.22)	<.0001	−0.08	0.93	(0.84, 1.02)	.14	0.08	1.08	(1.05, 1.11)	<.0001	−0.11	0.90	(0.80, 1.00)	.06
California, Central/South American	0.06	1.06	(1.00, 1.13)	.06	−0.07	0.93	(0.76, 1.15)	.51	−0.02	0.98	(0.93, 1.03)	.44	0.27	1.31	(1.02, 1.68)	.03

CI = confidence interval; OR = odds ratio.

[a]Analyses do not include those with "Unknown Smoking Consumption".

[b]Analyses do not include those who conducted interview in "Other Language".

smokers (ie, occasional/non-daily smokers). Light daily smokers and intermittent smokers (LITS) were combined into a single category.[29]

Sociodemographic Characteristics

Measures include age in years (18–24, 25–44, 45–64), education (less than high school, high school graduate, some college, college graduate), gender, language of interview (English or Spanish), self-reported race/ethnicity (White, Mexican American, and Central/South American), and state of residence (California vs. the rest of the United States, including the District of Columbia).

Statistical Analyses

Statistical analyses were conducted using Statistical Analysis Software, version 9.3 (SAS Institute Inc., Cary, NC). In order to maintain sufficiently large sample sizes of Mexican Americans and Central/South Americans, survey years 1992–1993, 1995–1996, and 1998–1999 were combined to create the 1990s decade, and survey years 2001–2002, 2003, 2006–2007, and 2010 were combined to create the 2000s decade.

Estimates were weighted using the household respondent's person-level TUS-CPS survey weights, which accounts for national and state population demographics (age, sex, race, Hispanic origin). Variance estimates used replicate weights with Fay's balanced repeated replication.[27] By decade, weighted prevalence rates for sociodemographic characteristics and cigarette consumption for each race/ethnicity were obtained using PROC SURVEYFREQ. Changes in smoking rates across decades were reported as absolute differences.

Weighted logistic regression was conducted using PROC SURVEYLOGISTIC to predict never smoking among the entire population by decade and to predict heavy daily smoking among current smokers by decade. Logistic regression models included age, education, gender, language of interview, race/ethnicity, state residence, and an interaction term of state residence and race/ethnicity. If the interaction between state residence and race/ethnicity was significant, further logistic regression analyses stratified by state residence were conducted for each decade. The additional models predicting never/heavy smoking included race/ethnicity, age, education, gender, and language of interview. This study was exempt for review by the Institutional Review Board at Claremont Graduate University.

Results

Sociodemographic Characteristics

Table 1 presents sociodemographic characteristics for each self-reported race/ethnicity across the 1990s and 2000s for California and the rest of the United States. Across both decades and the nation, the largest proportions of Mexican Americans and Central/South Americans reported being aged 25–44 years. With the exception of Central/South Americans living in the rest of the United States during the 1990s, the largest proportions of Mexican Americans and Central/South Americans in California and the rest of the United States reported having less than a high school education.

Prevalence of Cigarette Consumption

Cigarette consumption for each race/ethnicity across the 1990s and 2000s for California and the rest of the United States among the entire population and current smokers are respectively presented in Table 2 and Table 3.

Whites

Between decades, there was a significant increase in never-smokers in California (9.6%) and the rest of the United States (6.8%). By contrast, there was a significant 4.3% decrease in the proportion of former smokers in California between decades (1990s: 25.2% ± 0.2%; 2000s: 20.9% ± 0.2%) compared to a 2.6% decrease in the rest of the United States (1990s: 22.6% ± 0.1%; 2000s: 20.0% ± 0.1%).

Among current smokers in California, there was a significant 7.4% increase in the proportion of LITS between decades. Throughout the rest of the United States, there was a significant 3.2% increase in the prevalence of LITS among current smokers between the 1990s and the 2000s. Among current smokers, there was a significant 13.3% decrease in heavy smoking prevalence for Whites in California (1990s: 45.5% ± 0.7%; 2000s: 32.2% ± 0.6%). Among White current smokers in the rest of the United States, there was a significant 10.0% decrease in the prevalence of heavy smokers between the 1990s (57.1% ± 0.2) and the 2000s (47.2% ± 0.2%).

Mexicans Americans

Between decades, there was a significant increase in never-smokers in California (7.7%) and the rest of the United States (8.2%). There was a significant 3.0% decrease in the proportion of former smokers in California between decades (1990s: 13.3% ± 0.4%; 2000s: 10.3% ± 0.2%) compared to a 2.9% decrease in the rest of the United States (1990s: 12.3% ± 0.3%; 2000s: 9.4% ± 0.2%).

Among current smokers in California, there was a significant 3.5% increase in the proportion of LITS between decades. Throughout the rest of the United States, there was a significant 6.7% increase in the prevalence of LITS among current smokers between the 1990s and the 2000s. Among current smokers, the prevalence of Mexican American heavy smokers in California was 13.2% ± 1.0% in the 1990s and 8.1% ± 0.7% in the 2000s, indicating a significant 5.1% decrease in the prevalence of heavy smokers. Among Mexican American current smokers in the rest of the United States, there was a significant 4.8% decrease in the prevalence of heavy smokers between the 1990s (20.6% ± 0.7%) and the 2000s (15.8% ± 0.5%).

Central/South Americans

Between decades, there was a significant increase in never-smokers in California (7.2%) and the rest of the United States (7.5%). There was a significant 2.9% decrease in the proportion of former smokers in California between decades (1990s: 12.2% ± 0.7%; 2000s: 9.3% ± 0.5%) compared to a 3.8% decrease in the rest of the United States (1990s: 12.4% ± 0.5%; 2000s: 8.6% ± 0.3%).

Among current smokers, there was a significant 9.3% increase in the proportion of LITS in California between decades (1990s: 62.3% ± 2.9%; 2000s: 71.6% ± 2.7%) compared to a nonsignificant 1.5% increase in the rest of the United States (1990s: 54.4% ± 1.8%; 2000s: 55.9% ± 1.4%). Moreover, there was a nonsignificant 2.0% decrease in heavy smokers in California (1990s: 11.0% ± 2.0%; 2000s: 9.0% ± 1.9%) compared to a significant 2.8% decrease in the rest of the United States (1990s: 16.0% ± 1.6%; 2000s: 13.2% ± 1.0%).

Correlates of Never Smoking and Heavy Smoking

Table 4 presents results from multivariable logistic regressions exploring the association of never and heavy smoking, with sociodemographic characteristics, race/ethnicity, and state residence by

decade. Never smoking was examined among the entire population, and heavy smoking was examined among current smokers.

Across both decades, results of the multivariable logistic regressions were found to be similar. Compared to those aged 45–64 years, those who were younger had higher odds of being never-smokers and lower odds of engaging in heavy smoking. Those with lower educational attainment compared with college graduates had lower odds of being never-smokers and greater odds of being heavy smokers. Compared to women, men had lower odds of being never-smokers (1990s: odds ratio [OR] = 0.66, 95% confidence interval [CI] = 0.66, 0.66; 2000s: OR = 0.73, 95% CI = 0.73, 0.73) and greater odds of engaging in heavy smoking (1990s: OR = 1.75, 95% CI = 1.72, 1.77; 2000s: OR = 1.74, 95% CI = 1.73, 1.76). Moreover, those who opted to conduct the interview in Spanish had greater odds of being never-smokers (1990s: OR = 1.78, 95% CI = 1.74, 1.83; 2000s: OR = 1.95, 95% CI = 1.91, 1.99) and lower odds of being heavy smokers (1990s: OR = 0.41, 95% CI = 0.38, 0.44; 2000s: OR = 0.42, 95% CI = 0.39, 0.45).

Those who self-identified as being Mexican American or Central/South American had greater odds of being never-smokers and lower odds of engaging in heavy smoking compared to Whites. Moreover, those living in California had higher odds of being never-smokers (1990s: OR = 1.03, 95% CI = 1.02, 1.05; 2000s: OR = 1.15, 95% CI = 1.14, 1.17) and lower odds of being heavy smokers (1990s: OR = 0.64, 95% CI = 0.62, 0.66; 2000s: OR = 0.54, 95% CI = 0.52, 0.55) compared to those living in the rest of the United States.

In the 1990s, results showed significant interaction between state residence and race/ethnicity when modeling never smoking (Wald χ^2 = 118.53, df = 2, p < .0001), but no significant interaction was found for heavy smoking (Wald χ^2 = 2.44, df = 2, p = .30). In the 2000s, results showed significant interaction between state residence and race/ethnicity when modeling never smoking (Wald χ^2 = 35.9994, df = 2, p < .0001) and heavy smoking (Wald χ^2 = 9.3167, df = 2, p < .01). To address concerns related to the interactions between state residence and race/ethnicity, separate multivariable logistic regression models were conducted for each decade stratified by state residence to examine factors affecting never smoking and heavy smoking. The significant ORs were all in the same direction as shown in Table 4 (Supplementary Tables 1 and 2).

Discussion

This is one of the first studies to compare trends of smoking behaviors of Hispanics/Latino nationality groups and Whites living in California and the rest of the United States. Results generally showed increases in never-smokers, increases in LITS, and decreases in heavy smokers across decades in both California and the rest of the United States within each nationality group. Overall, the smoking prevalence in California was lower compared to the rest of the United States across all racial/ethnic groups; however, trends between decades were not consistently favorable for California relative to the rest of the United States. Although California showed greater improvements between decades in smoking behaviors particularly among Whites, Mexican American heavy smokers, and Central/South American LITS compared to the United States, our findings suggest that further research is needed to ensure Hispanic/Latino nationality groups equally benefit from antitobacco efforts being implemented not only in California but also the rest of the nation.

Among White current smokers, California experienced a greater increase in LITS and a greater decrease in heavy smokers compared to the rest of the United States. Among Mexican American current smokers, there was a slightly greater decrease in heavy smoking among those living in California compared to those living in the rest of the United States. Compared to the rest of the United States, California experienced a greater increase in the prevalence of Central/South American LITS. This finding was not observed among Mexican Americans, as there was a greater increase in LITS in the rest of the United States compared to California. Results further showed that respondents identifying as Mexican American or Central/South American, as well as those living in California, had greater odds of being never-smokers and lower odds of being heavy smokers.

The observed differences between California and the rest of the United States among Mexican American heavy smokers and Central/South American LITS may at least be partially explained by California's aggressive antitobacco efforts. As the cornerstone of California's efforts, the California Tobacco Control Program aims to deter potential tobacco users from initiation and to ultimately stop current use by influencing the social norms concerning tobacco.[5] The program also seeks to transform the environment surrounding tobacco through media, local policies, and law enforcement.[5] Results from the multivariable analyses further support this notion, as California state residence was significantly associated with increased odds in never smoking and decreased odds in heavy smoking as compared to the remaining United States across the 1990s and 2000s. Interestingly, multivariable analyses also showed significant interaction effects between nationality group and state residence, suggesting that state residence affects never and heavy smoking differently between Hispanic/Latino nationality groups relative to Whites. The existence of tobacco laws and regulations unique to each state, such as occupational smoking regulations[30] and clean air laws,[31] may provide insight on the differential impact of state residence on smoking. Future research is warranted to identify and explore additional features of state residence that may affect never smoking and heavy smoking across Hispanic/Latino groups.

Changes in social norms toward smoking coupled with the promotion of a tobacco-free environment may further explain the overall increases in never-smokers between decades seen not only in California but also the rest of the United States. With smoke-free laws present in 27 states, nearly half of the nation is subject to such policies,[32] shown to reduce smoking prevalence and intensity.[30,33,34] Interestingly, despite the increase in never-smokers across the nation, results show decreases in former smoking. Due to the cross-sectional nature of the data, it is difficult to infer causality for this finding. The decrease in former smoking may be related to deaths of ever-smokers or the decrease in smoking initiation. Future research is needed to explore the underlying mechanisms affecting the prevalence of former smoking.

This study's findings further contribute to literature by responding to the ongoing call for tobacco research to utilize disaggregated data of Hispanic/Latino nationality groups. Aggregated data may mask the progress made by states in tobacco control by obscuring subpopulation differences that may result from differential impact of tobacco policies. Previous research using aggregated data found greater increases in LITS and greater decreases in heavy smoking among Hispanic/Latino current smokers living throughout the United States compared to those in CA.[6] However, results of the present study showed a slightly greater decrease in heavy smoking among Mexican American heavy smokers and greater increases in Central/South American LITS living in California.

The use of disaggregated data in tobacco research also provides greater insight for smoking intervention efforts and policies specific to Hispanic/Latinos. Although Hispanic/Latinos from different national origins share many similarities in culture and history, the studies utilizing some degree of disaggregated Hispanic/Latino data underscore the distinctive smoking behaviors among subpopulations.[20–24] Given these distinctions, interventions should consider tailoring their approaches for specific Hispanic/Latino nationality groups with a special focus on LITS. Increasing cigarette smoking cessation, particularly among Mexican and Central/South Americans would be beneficial, as a greater proportion of current smokers in both nationality groups are LITS. Focusing on cessation among these nationality groups may be more beneficial, as those who smoke at low-intensity have rarely been included in cessation studies and been shown to have higher mortality risks as compared to never-smokers.[35] Tailoring interventions to Hispanic/Latino nationality groups may help to offset the cost of smoking for this population, which totaled over $1 billion dollars in California alone.[36]

Results of this study also show consistent effects of sociodemographic factors on smoking behaviors in both the 1990s and 2000s. Our findings suggest that those who are younger, more educated, women, and completed interviews in Spanish are more likely to be never-smokers and less likely to be heavy smokers. These results support existing research illustrating gender differences in smoking behaviors across Hispanic/Latino nationality groups, where men have a greater prevalence of current smokers and are more likely to be heavy smokers.[20,22] Findings of this study also support existing research showing English language use is positively associated with smoking consumption among Hispanics/Latinos.[37,38] The persistent influence of these sociodemographic factors across decades highlight the continued need for interventions to address the social inequalities that disproportionately impact vulnerable and disadvantaged groups.[39] Future research on how such sociodemographic factors can be incorporated as part of the solution to address tobacco use among disadvantaged groups would be beneficial. Longitudinal data are also needed to examine within-subject tobacco disparities over time.

Several limitations must be considered when interpreting the results of this study. Because the study aggregates survey years into decades, the occurrence of strong tobacco policy enactment (period effect) may interact with age and/or cohort effects. This is an area of future study that may elucidate the relationship between strong tobacco control policies and its effect on different cohorts through the years. The study also does not take into account other major Hispanic/Latino national origin groups (Puerto Ricans and Cubans) due to small sample sizes in California. According to the US 2010 Census,[11] Mexican Americans, Cubans, and Puerto Ricans make up the largest Hispanic/Latino groups in the nation, with over a million Puerto Ricans living in New York and Cubans living in Florida. Existing literature has shown that Puerto Ricans and Cubans are more likely to be current smokers and heavy smokers compared to their Mexican American counterparts.[20,21,23,40] Future analyses are needed to examine smoking trends among these groups focused within these states given the context of tobacco control initiatives. Because of limitations in the data used, this study also did not disaggregate Central and South American nationality groups, both of which may present distinctive smoking behaviors.[22] Because of the nature of self-reported data, results of the present study may be biased. Existing research revealed underreporting of cigarette consumption among Mexican Americans when comparing self-reported cigarette use and serum cotinine concentrations.[41] Given this, the use of biochemical measures to supplement self-reported consumption may provide more objective conclusions of smoking behaviors among groups of interest. Finally, in order to maximize sample size, factors relating to immigration status, which has been shown to be significantly associated with smoking behaviors,[22,23,42] was not included in the study as such questions were not in the 1992–1993 survey years.

Hispanic/Latino immigrants generally have lower smoking prevalence than their US-born counterparts,[19,40,43,44] although one study found no nativity difference.[40] However, recent research shows that, with a few exceptions, nativity differences in smoking among Hispanics/Latinos have remained fairly constant since the late 1990s.[45] Although the current study could not address nativity specifically, language of interview is closely correlated, and we found that respondents who interviewed in Spanish were more likely to be never-smokers and less likely to be heavy smokers, which is consistent with the literature. These findings suggest that an important area for future research is how race/ethnicity, socioeconomic status, and immigration-related factors combine to influence smoking behaviors among Hispanic/Latino subpopulations.

Despite these limitations, our study fills a significant gap by comparing smoking consumption rates among disaggregated Hispanic/Latino nationality groups in California and the remaining United States. Our analyses suggest that California has been somewhat effective in reaching Mexican Americans and Central/South Americans; however, future avenues of research may need to particularly focus on tobacco cessation among these groups. Our findings call for future research based on disaggregated Hispanic/Latino data in monitoring health risk behaviors over time. Utilizing disaggregated data to compare smoking trends between Hispanic/Latino nationality groups living in states with a comprehensive control program can help guide policy makers and practitioners in their efforts to reduce tobacco related disparities.

Supplementary Material

Supplementary data is available at *Nicotine & Tobacco Research* online.

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Declaration of Interests

None declared.

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