

1 **Appendix: Technical Notes**

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3 **NHIS.**

4 The NHIS is a population-based health survey that is designed to monitor the health of the
5 civilian, U.S. noninstitutionalized population. Data are collected directly from household
6 members who self-report health status, health behaviors, and health outcomes. The annual NHIS
7 response rate is approximately 80% of eligible households, resulting in a sample of
8 approximately 30,000 sample adults surveyed annually.

9

10 **HUD Data.**

11 HUD collects administrative detailed data on families participating in its programs through the
12 HUD–50058, HUD–50058 MTW and HUD–50059. The data are stored in two databases: the
13 Public and Indian Housing Information Center and the Tenant Rental Assistance Certification
14 System. For the public housing and HCV programs, data are collected via housing agencies at
15 the local or state level. Data for the MF program type are collected through owners of private
16 buildings.

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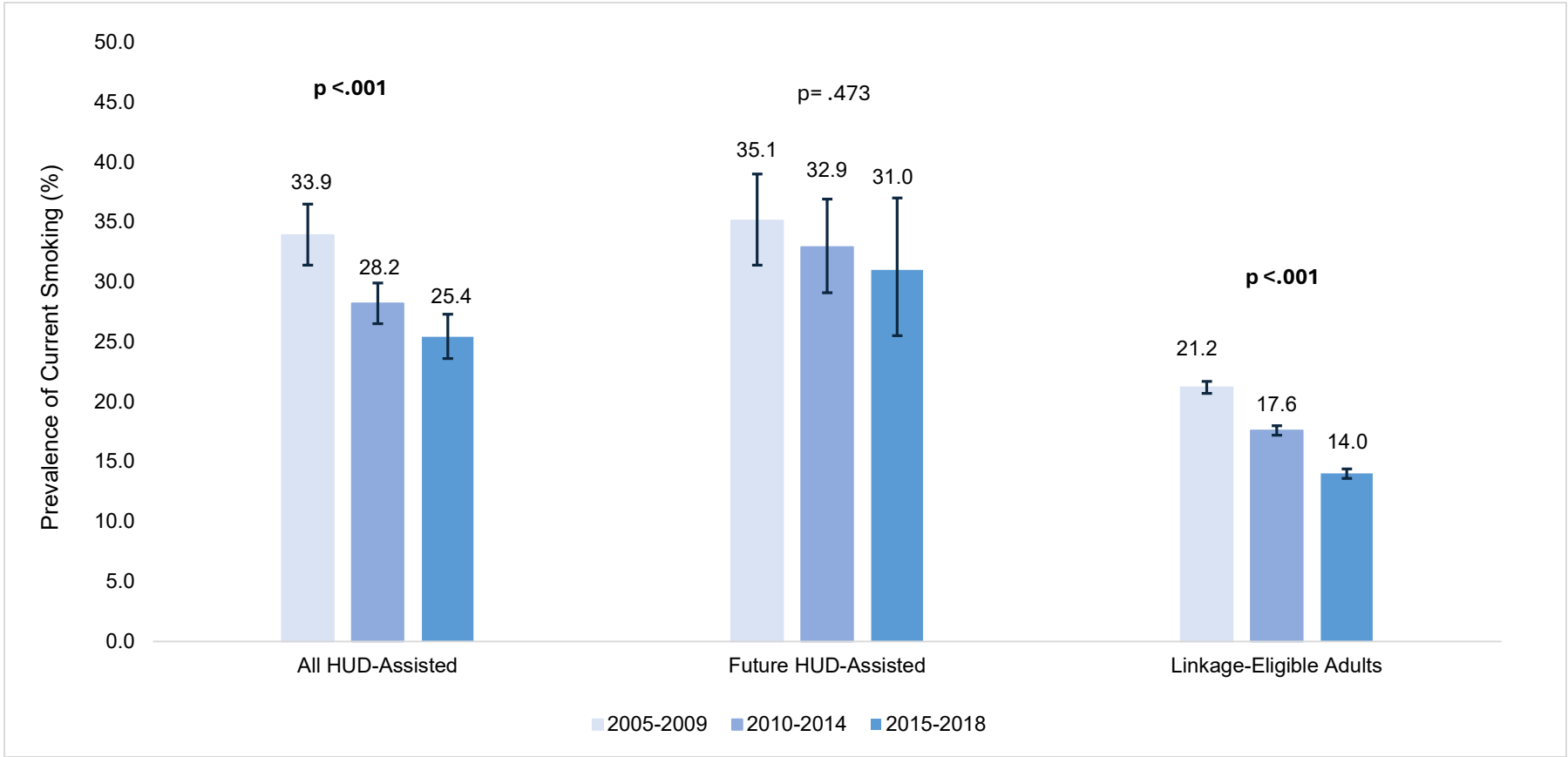
18 **NHIS-HUD Linked Data.**

19 NCHS and HUD have linked 1999-2018 NHIS data to HUD’s administrative data through 2019,
20 providing the opportunity for researchers to longitudinally examine relationships between
21 housing and health.¹²

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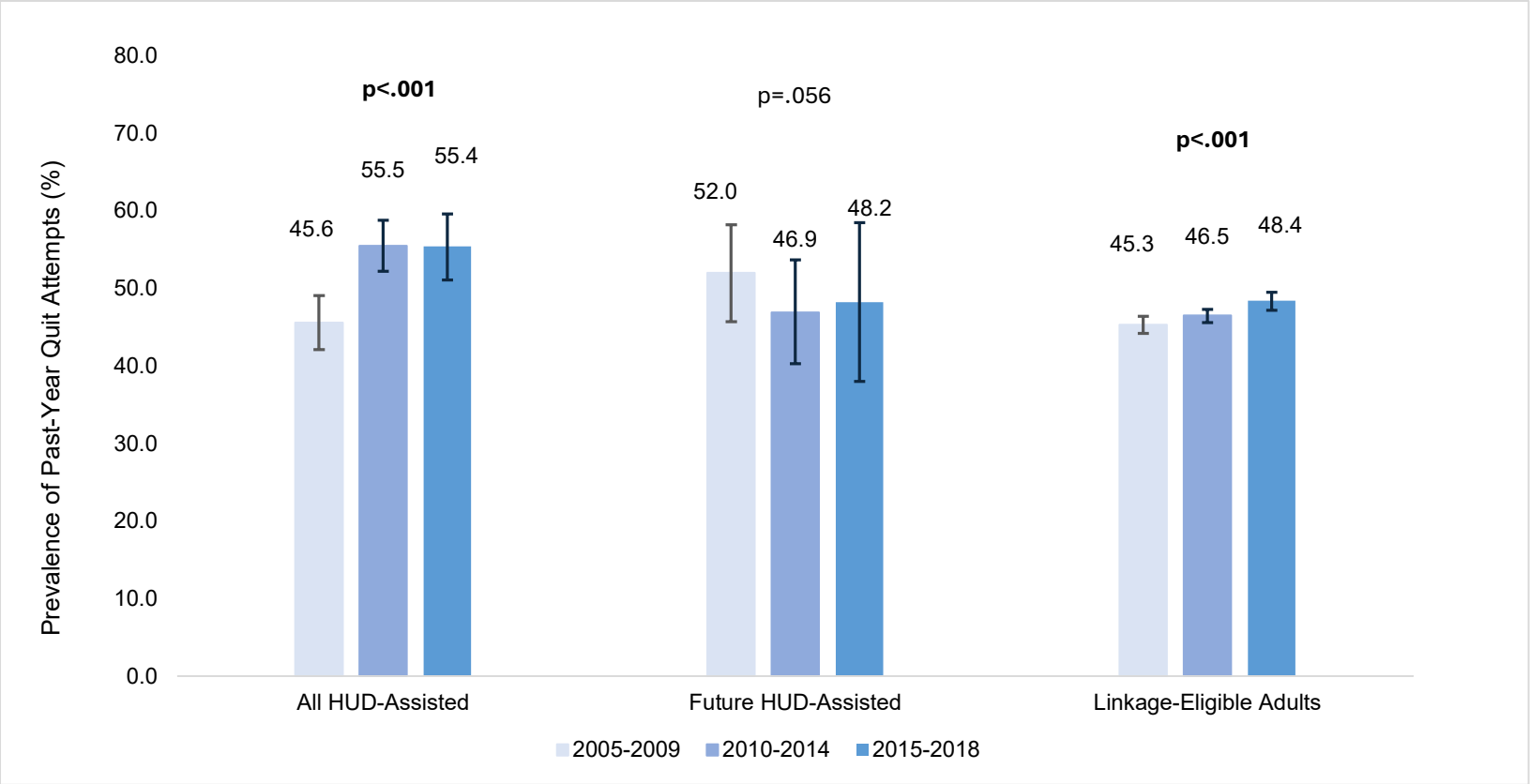
23 This study used 2005-2018 HUD-linked data. **This study uses the latest available NHIS-HUD**
24 **linked data (i.e., up to survey year 2018 and HUD assistance into 2019) that was released in**
25 **2022. Newer data is not currently available.** NHIS respondents were linkage-eligible during
26 the 2005–2018 survey years if they provided sufficient linkage information which included the
27 last four digits of their social security number (SSN), date of birth, sex, first name, and last name.
28 Respondents who refused to answer questions about their housing assistance status were
29 classified as linkage-ineligible. The linkage was mostly a deterministic, rules-based process.
30
31 The relatively small number of linkage-eligible HUD participants in NHIS necessitated
32 combining multiple survey years to produce reliable estimates. To examine changes in the
33 outcome measures over time, data was pooled into three time periods: 2005 to 2009, 2010 to
34 2014 and 2015.

35 Appendix Figure 1. Smoking prevalence among all HUD-assisted adults (aged 18+), future HUD-assisted adults and linkage-eligible adults,
36 NHIS-HUD Linked Data, United States, 2005-2018



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38 All percentages are weighted column percentages
39 Error bars represent 95% Confidence Intervals
40 Boldface indicates statistical significance ($p < .001$)
41 Abbreviations: NHIS; National Health Interview Survey. HUD; U.S. Department of Housing and Urban Development.

42 Appendix Figure 2. Prevalence of past-year quit attempts among all HUD-assisted adults (aged 18+), future HUD-assisted adults and linkage-
43 eligible adults, NHIS-HUD Linked Data, United States, 2005-2018



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45 All percentages are weighted column percentages

46 Error bars represent 95% Confidence Intervals

47 Boldface indicates statistical significance (p<.001)

48 Abbreviations: NHIS; National Health Interview Survey. HUD; U.S. Department of Housing and Urban Development.

49 Appendix Table 1. Household characteristics of linkage-eligible adults, current HUD-assisted adults and future HUD-assisted adults, NHIS-HUD
50 Linked Data, United States, 2005-2018

Characteristics	Current HUD- Assisted (unweighted n=15,117 N (%))	Future HUD- Assisted (unweighted n= 2,619) N (%)	p-value ^a	Linkage-Eligible Adults (unweighted n= 303,033) N (%)	p-value ^b
Sex			.058		<.001**
Male	3,690 (27.7)	724 (30.1)		141,151 (49.5)	
Female	11,427 (72.4)	1,895 (69.9)		161,882 (50.5)	
Age					<.001**
18-24	1,542 (15.4)	407 (21.8)	<.001**	28,305 (12.0)	
25-44	4,586 (32.0)	916 (34.9)		102,152 (35.0)	
45-61	3,855 (24.8)	647 (22.8)		88,382 (30.4)	
62+	5,134 (27.8)	649 (20.5)		8,419 (22.7)	
Race and Hispanic Origin			.051		<.001**
Non-Hispanic, White	5,109 (36.6)	980 (41.3)		200,543 (70.1)	
Non-Hispanic, Black	6,193 (40.5)	1,016 (38.3)		35,836 (10.1)	
Other, Non-Hispanic	564 (3.7)	86 (3.5)		16,956 (5.4)	
Hispanic	3,001 (19.2)	485 (17.0)		16,956 (14.5)	
U.S. Region			<.05*		<.001**
Northeast	3,892 (26.1)	565 (21.4)		47,031 (16.9)	
Midwest	3,421 (23.6)	604 (24.3)		68,955 (23.9)	
South	5,121 (33.3)	979 (38.4)		110,925 (36.9)	
West	2,683 (17.0)	471 (15.8)		76,122 (22.3)	
Urbanization			<.001**		<.001**

Urban	13,873 (95.0)	2,223 (87.3)		233,069 (80.8)	
Rural	748 (5.0)	268 (12.7)		53,966 (19.3)	
Marital Status			<.001**		<.001**
Married	1,454 (15.2)	397 (20.5)		141,850 (55.9)	
Widowed, Divorced, or Separated	6,923 (38.0)	1,070 (32.3)		77,338 (16.7)	
Never Married	6,344 (42.9)	961 (37.5)		65,424 (20.3)	
Living with Partner	370 (3.9)	190 (9.8)		17,938 (7.1)	
Education			.179		<.001**
Less than High School	5,485 (35.1)	824 (32.4)		41,808 (13.2)	
High School Graduate or GED	4,759 (32.8)	892 (35.1)		76,511 (26.1)	
Some College, No Degree	3,989 (26.6)	725 (26.6)		92,687 (30.6)	
College Graduate	817 (5.5)	156 (5.9)		90,828 (30.1)	
Work History			<.001**		<.001**
Worked in Past Week	4006 (29.3)	903 (36.6)		183,108 (63.4)	
Worked in Past 12 Months	1,131 (8.5)	318 (13.2)		19,604 (6.6)	
Did Not Work in Past 12 Months	8,118 (49.1)	1,117 (38.8)		85,834 (25.1)	
Never Worked	1,826 (13.0)	275 (11.4)		14,089(4.9)	
Presence of Children in Household			<.001**		<.001**
Yes	5,604 (42.0)	1,157 (48.7)		90,779 (35.1)	
No	9,513 (58.0)	1,462 (51.3)		212,254 (64.9)	
Presence of Older Adult Household Member			<.05*		.069
Yes	4,570 (26.0)	587 (21.9)		81,226 (24.2)	
No	10,547 (74.0)	2,032 (78.1)		221,807 (75.8)	
Presence of Household Member With Disability			<.05*		<.001**

Yes	8,502 (55.3)	1,320 (51.1)		79,441 (26.9)	
No	6,612 (44.7)	1,297 (48.9)		223,552 (73.1)	
Health Insurance Status			<.001**		<.001**
Private	1,348 (10.1)	355 (14.7)		162,939 (58.6)	
Public	11,775 (75.2)	1,752 (63.7)		95,349 (26.8)	
None	1,947 (14.8)	505 (21.6)		43,870 (14.6)	

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- 57 ^a Chi-squared tests compare current and future HUD-assisted adults
- 58 ^b Chi-squared tests compare current HUD-assisted and linkage-eligible adults
- 59 All percentages are weighted column percentages
- 60 Boldface indicates statistical significance (*p<.05, **p<.001)
- 61 Abbreviations: NHIS; National Health Interview Survey. HUD; U.S. Department of Housing and Urban Development.

62 Appendix Table 2. Household characteristics of all HUD-assisted current smokers and current smokers with past-year quit attempts, NHIS-HUD
63 Linked Data, United States, 2005-2009 and 2015-2018

Characteristic	HUD-assisted current smokers			HUD-assisted current smokers with past-year quit attempts		
	2005-2009 Survey Years (unweighted n=1,209) N (%)	2015-2018 Survey Years (unweighted n=1,185) N (%)	p-value	2005-2009 Survey Years (unweighted n=593) N (%)	2015-2018 Survey Years (unweighted n=624) N (%)	p-value
Sex			.723			.021
Male	303 (30.2)	367 (31.1)		115 (21.8)	178 (29.6)	
Female	906 (69.8)	818 (68.9)		478 (78.3)	446 (70.4)	
Age			<.001**			<.001**
18-24	146 (12.5)	56 (6.8)		76 (12.9)	36 (8.2)	
25-44	477 (42.3)	389 (37.1)		247 (45.4)	215 (36.6)	
45-61	392 (30.7)	415 (33.6)		195 (30.7)	221 (34.0)	
62+	194 (14.5)	326 (22.6)		75 (11.0)	152 (21.2)	
Race and Hispanic Origin			.196			.158
Non-Hispanic, White	445 (47.0)	559 (46.0)		191 (44.6)	264 (42.1)	
Non-Hispanic, Black	520 (35.3)	446 (41.2)		280 (39.7)	254 (43.6)	
Other, Non-Hispanic	16 (1.4)	23 (1.7)		*	11 (2.0)	
Hispanic	209 (13.4)	123 (11.0)		*	74 (12.4)	
HUD Program Type			.617			.281
Housing Choice Voucher Program	571 (50.3)	555 (50.0)		293 (50.7)	305 (52.6)	
Public Housing Program	311 (23.3)	273 (20.1)		148 (23.7)	129 (17.6)	
Multifamily Program	327 (26.4)	357 (29.9)		152 (25.6)	190 (29.8)	
U.S. Region			.072			.080

Northeast	277 (21.1)	263 (24.0)		133 (21.5)	139 (25.2)	
Midwest	351 (32.3)	277 (23.6)		188 (34.8)	142 (22.9)	
South	397 (31.2)	470 (39.2)		189 (29.8)	251 (38.7)	
West	184 (15.3)	175 (13.3)		83 (14.0)	92 (13.2)	
Urbanization			.847			.897
Urban	1103 (94.7)	1,083 (94.4)		554 (95.0)	578 (95.2)	
Rural	58 (95.3)	80 (5.62)		25 (5.0)	36 (4.8)	
Marital Status			<.05*			<.05*
Married	110 (17.6)	93 (11.6)		*	52 (12.3)	
Widowed, Divorced, or Separated	503 (36.6)	552 (39.6)		243 (36.3)	277 (37.0)	
Never Married	566 (42.0)	491 (41.7)		290 (43.0)	270 (43.7)	
Living with Partner	27 (3.9)	48 (7.1)		*	25 (6.9)	
Education			.011			.668
Less than High School	475 (37.4)	395 (34.0)		223 (35.3)	195 (32.0)	
High School Graduate or GED	395 (34.3)	354 (29.9)		182 (31.8)	196 (31.4)	
Some College, No Degree	303 (25.5)	378 (32.2)		170 (30.2)	205 (33.0)	
College Graduate	36 (2.8)	53 (4.0)		18 (2.8)	26 (3.5)	
Work History			.571			.881
Worked in Past Week	345 (28.5)	300 (27.2)		172 (27.9)	159 (29.0)	
Worked in Past 12 Months	140 (12.0)	100 (10.1)		78 (12.9)	60 (11.2)	
Did Not Work in Past 12 Months	624 (51.9)	692 (54.4)		298 (51.4)	362 (52.7)	
Never Worked	101 (7.6)	91 (8.3)		45 (7.8)	43 (7.2)	
Presence of Children in Household			<.001**			<.05*
Yes	591 (50.4)	410 (39.0)		313 (52.8)	233 (41.4)	
No	618 (49.6)	775 (61.0)		280 (47.2)	391 (58.7)	

Presence of Older Adult Household Member			<.001**			<.001**
Yes	148 (11.1)	245 (17.5)		56 (8.9)	117 (17.2)	
No	1061 (88.9)	940 (82.5)		537 (91.1)	507 (82.8)	
Presence of Household Member With Disability			.343			.930
Yes	713 (60.8)	764 (63.3)		345 (61.5)	400 (61.2)	
No	496 (39.2)	422 (36.7)		248 (38.5)	224 (38.8)	
Health Insurance Status			<.001**			<.001**
Private	95 (8.0)	106 (9.9)		44 (7.4)	60 (10.5)	
Public	883 (70.8)	968 (80.6)		433 (71.1)	499 (79.4)	
None	229 (21.2)	106 (9.6)		115 (21.5)	62 (10.1)	

64 *Value does not meet CDC and requirements.

65 All percentages are weighted column percentages

66 Boldface indicates statistical significance (*p<.05, **p<.001)

67 Abbreviations: NHIS; National Health Interview Survey. HUD; U.S. Department of Housing and Urban Development.