

Disparities in Marijuana and Tobacco Smoke Incursions Among New York City Families During Early Months of the COVID-19 Pandemic

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ABSTRACT

Objectives: Once the COVID-19 pandemic arrived in New York City (NYC), stay-at-home orders led to more time spent indoors, potentially increasing exposure to secondhand marijuana and tobacco smoke via incursions from common areas or neighbors. The objective of this study was to characterize housing-based disparities in marijuana and tobacco incursions in NYC housing during the pandemic.

Design: We surveyed a random sample of families from May to July 2020 and collected sociodemographic data, housing characteristics, and the presence, frequency, and pandemic-related change in incursions.

Setting: Five pediatric practices affiliated with a large NYC health care system.

Participants: In total, 230 caregivers of children attending the practices.

Main Outcome Measures: Prevalence and change in tobacco and marijuana smoke incursions.

Results: Tobacco and marijuana smoke incursions were reported by 22.9% and 30.7%, respectively. Twenty-two percent of families received financial housing support (public housing, Section-8). Compared with families in private housing, families with financial housing support had 3.8 times the odds of tobacco incursions (95% CI, 1.4-10.1) and 3.7 times the odds of worsening incursions during pandemic (95% CI, 1.1-12.5). Families with financially supported housing had 6.9 times the odds of marijuana incursions (95% CI, 2.4-19.5) and 5 times the odds of worsening incursions during pandemic (95% CI, 1.9-12.8). Children in financially supported housing spent more time inside the home during pandemic (median 24 hours vs 21.6 hours, $P = .02$) and were more likely to have asthma (37% vs 12.9%, $P = .001$) than children in private housing.

Conclusions: Incursions were higher among families with financially supported housing. Better enforcement of existing regulations (eg, Smoke-Free Public Housing Rule) and implementation of additional policies to limit secondhand tobacco and marijuana exposure in children are needed. Such actions should prioritize equitable access to cessation and mental health services and consider structural systems leading to poverty and health disparities.

KEY WORDS: environmental health disparities, marijuana incursions, public housing, tobacco incursions

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Housing is a key social determinant of health (SDOH), and structural inequities have led to disparate access to affordable, stable housing with health-promoting indoor environments.¹ Low-income communities of color face greater exposure to indoor environmental hazards such as secondhand tobacco smoke (SHTS) and pest infestations.^{1,2} The long-standing structural inequities that contribute to environmental and housing

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injustices fuel similar disparities in the health and financial impacts of the COVID-19 pandemic.³ The public health measures implemented in the United States to slow the spread of the SARS-CoV-2 virus in early 2020 (including stay-at-home orders, in-person school closures) led to more time spent at home, potentially exacerbating disproportionate exposures to environmental hazards such as SHTS.⁴

Exposure to SHTS, a mixture of toxic particulates and gases generated by combustion of cigarettes or other tobacco products, is of particular concern for children's health. Causal relationships between SHTS and respiratory tract infections, asthma, persistent adverse effects on lung function, acute and recurrent otitis media, chronic middle ear effusions, and sudden infant death syndrome (SIDS) have been established.^{2,5,6} Children can be regularly exposed to SHTS even if they live in a smoke-free household. Cigarette smoking within 25 ft of a building can lead to SHTS drift through doors and windows.⁷ In multiunit housing such as apartment buildings, exposure to SHTS can occur from smoking in neighboring units and common areas ("incursions").^{8,9} Evidence of tobacco incursions has been consistently found in nonsmoking units of apartment buildings.⁹⁻¹¹ Children living in nonsmoking apartments have 45% higher serum cotinine (nicotine metabolite) levels than children living in nonsmoking detached homes.¹² For densely populated cities such as New York City (NYC), tobacco smoke incursions are especially concerning as the majority of residents live in multiunit housing or homes in close proximity to public sidewalks and other outdoor spaces where people smoke.

There are disparities in SHTS exposure in NYC and beyond. Black children are more likely to be exposed to SHTS than children in other racial/ethnic groups and face predatory marketing efforts by the tobacco industry.^{2,13} Children in low-income neighborhoods are at an increased risk for SHTS exposure, given higher rates of tobacco use and greater concentration of tobacco retailers than high-income neighborhoods.² Adults living in public housing smoke tobacco at rates higher than the national average.¹⁴ Tobacco smoke incursions in nonsmoking households in public housing are prevalent; 62.3% of households in NYC public housing report incursions.^{9,11,15} Despite the 2018 implementation of the federal Smoke-Free Public Housing Rule for Public Housing Authorities (PHAs),¹⁶ follow-up studies suggest that nonsmoking households and common areas are still affected by tobacco smoke incursions.^{15,17}

Secondhand marijuana smoke (SHMS) generated by the combustion of marijuana contains many of the chemicals found in SHTS.¹⁸ The health effects of SHMS exposure are not yet clearly understood;

however, evidence suggests a link between psychoactive effects and impaired endothelial function.¹⁸ Similar to tobacco, marijuana smoke incursions can occur and have been more commonly reported in public housing than in private housing.^{19,20} A metabolite of marijuana, COOH-THC, has been detected in children living in NYC apartments.²¹ Marijuana smoke incursion is an emerging topic of research, especially as many states have legalized recreational cannabis and usage rates are increasing.²²

Tobacco and marijuana use patterns shifted during the pandemic. Some tobacco smokers reduced usage due to concerns of COVID-19 morbidity, while others increased usage possibly due to pandemic-related stress.^{23,24} Tobacco quit-lines received 27% less calls in 2020 than in 2019.²⁵ For marijuana, studies documented increased usage among medical marijuana users (especially with mental health conditions)²⁶ and among recreational users^{27,28}; while other studies showed no change during the early pandemic.²⁹ Despite varying usage trends, the stay-at-home orders presented an opportunity for increased exposure to smoke incursions. Our study's objective was to characterize the presence, frequency, and change in tobacco and marijuana smoke incursions during the initial months of the pandemic among families who utilize pediatric practices within our large NYC health system. We hypothesized that children living in financially supported housing (eg, public housing) were disproportionately impacted by tobacco and marijuana smoke incursions during the initial months of the pandemic. By understanding factors predictive of incursions, we can better target screening and referrals in the primary care setting and advocate for better enforcement and expansion of existing smoke-free policies to protect children's health.

Methods

We conducted a cross-sectional survey to examine the impact of COVID-19 and early stay-at-home orders on family well-being. Eligible participants were parents/caregivers of children aged 3 to 14 years who presented for a well-child or sick visit to one of 5 pediatric clinics in our NYC medical system within the previous year (February 2019 through March 2020). Potential participants meeting eligibility criteria were obtained using the "Slicer Dicer" feature in EPIC software (Epic Systems Corporation, Verona, Wisconsin). We randomly choose patients to contact using the randomize function in Microsoft Excel. During May through July 2020, trained research coordinators invited the eligible participants to fill out the survey (English or Spanish) and obtained informed consent. Participants self-administered the survey in Research

Electronic Data Capture (REDCap) hosted at Icahn School of Medicine at Mount Sinai, or responded via telephone with a researcher. Icahn School of Medicine at Mount Sinai Institutional Review Board approved the study on April 18, 2020 (study# 20-00503).

Measures and variables

The survey collected self-reported sociodemographic information about the participant and the child and included question modules on topics such as food insecurity, home environmental issues, remote learning, and parental stress. The survey was largely based on existing validated instruments, modified for the pandemic. To characterize housing support, we asked if any of the following applied to the home: *owned by New York City Housing Authority (NYCHA)*; *receive Section-8*; *receive other help in paying for our home*; or *none of the above*. For participants who reported NYCHA (“public housing”), Section-8 (housing voucher), or other help to pay rent, we classified them as having “financial housing support”; the remainder as “private housing.” Housing structure was classified as follows: *house separate from any other house (a stand-alone home)*; *a house connected to one or more houses (duplex, triplex, townhouse, rowhouse)*; *an apartment or condominium building (with private kitchens and bathrooms)*; *a dormitory, hotel, shelter, or boarding house (with shared or public kitchens and/or bathrooms)*; *other*. While we define both connected houses and apartments/condominiums as “multiunit housing,” we chose to include all housing types, given that incursions occur in stand-alone houses from outdoor smoking done within 25 ft of the building.

This article examines the presence, frequency, and change in tobacco and marijuana smoke incursions since the start of the stay-at-home orders (“shutdown”) on March 15, 2020, until the time of survey. To determine the presence of incursions, we asked: “Do you ever smell [tobacco/marijuana] smoke in your room/apartment/condominium coming from another apartment, when you are with your child?” For those answering *yes*, we then asked: “How often do you smell [tobacco/marijuana] in your home when you are with your child?”²⁰ We categorized the responses of *daily* or *weekly* as “high frequency” and *rarely* or *monthly* as “low frequency.” We also asked: “Since the start of the pandemic, how has this changed?” We categorized the responses of *increased a great deal* and *increased a little* into a new variable called “increased frequency” and *decreased a great deal* and *decreased a little* into “decreased frequency.” Those who did not notice a change responded *stayed the same*.

Statistical analysis

Analyses were conducted using SAS software v9.4m6 (Copyright 2018; SAS Institute Inc, Cary, North Carolina). Survey responses were first examined using descriptive statistics, including frequency and proportion for categorical variables and measures of central tendency for continuous variables. To compare categorical variables, we used chi-square or Fisher’s exact tests. For continuous variables, we used Wilcoxon’s rank sum test (non-normal distribution). For the logistic regression models, we used a backward selection method (“proc hplot”) to identify a minimum set of variables to predict exposure to incursions and reduce collinearity among included covariates (based on Schwarz Bayesian information criterion). Note that different models may be adjusted for different sets of covariates.

Results

Participant characteristics

Of the 2112 eligible participants randomly chosen across the 5 practices and contacted by our team, 272 consented to participate (response rate = 12.9%). Of those, 230 (84.5%) completed the survey and were included. The majority of surveys (209/230; 90.9%) were completed in English and the remainder in Spanish. On average, families completed the survey 94 ± 22 days after the shutdown. The Table presents demographic and housing characteristics of the overall study population and stratified by financial housing support.

Most respondents lived in multiunit housing including apartments or condominiums (167/226; 73.9%) or connected homes (eg, duplex) (23/226; 10.2%). Of those not living in multiunit housing, 31 of 226 (13.7%) families lived in stand-alone homes while 5 families lived in an “other” home (eg, temporary shelter). Nearly two-thirds of respondents (142/228; 62.3%) rented their home. Twenty-seven families (21.8%) received financial housing support (public housing, Section-8 voucher), and children in this type of housing were more likely to have public insurance (21/26; 80.8%) than those in private housing (34/191; 17.8%) ($P < .001$). Families with financial housing support were more likely to report “a lot” or “some” financial disruption from the pandemic than those in private housing ($P = .03$).

Children with financial housing support spent more time inside the home per day since the shutdown (median = 24 hours per day; interquartile range [IQR] = 2.4) than those in private housing (median = 21.6 hours per day; IQR = 5.5) ($P = .02$). Overall, 36

TABLE
Participant and Housing Characteristics From a COVID-19 Social Determinants of Health Cross-sectional Study of Families Served by 5 New York City Pediatric Practices Collected May to July 2020 (n = 230) and Stratification of Results by Families With Financial Housing Support^a (n = 27) Versus Families Without Housing Support (N = 201)

Characteristic	Overall, n (%)	Financial Housing Support, n (%)	Private Housing, n (%)	<i>P</i> ^b
	230	27 (11.8)	201 (88.2)	
Child ethnicity and race				<.001
Non-Hispanic White	114 (49.6)	1 (3.7)	81 (40.9)	
Non-Hispanic Black	45 (19.6)	8 (29.6)	24 (12.1)	
Hispanic	75 (32.6)	16 (59.3)	58 (29.3)	
Asian	34 (14.8)	2 (7.4)	29 (14.6)	
Non-Hispanic other	11 (4.8)	0 (0)	6 (3.0)	
Child has public insurance	57 (26)	21 (80.8)	34 (17.8)	<.001
Child has asthma	36 (15.8)	10 (37)	26 (12.9)	.001
Survey respondent ^c				.22
Mother	194 (85.1)	26 (96.3)	166 (83.4)	
Father	32 (14.0)	1 (3.7)	31 (15.6)	
Respondent education				<.001
Less than high school or high school graduate	36 (15.7)	11 (40.7)	25 (12.8)	
College (some college or graduate)	93 (40.6)	13 (48.2)	78 (39.8)	
Graduate degree	96 (41.9)	3 (11.1)	93 (47.4)	
Respondent employment status				.003
Employed full-time	129 (58.9)	8 (32)	121 (63)	
Employed part-time	20 (9.1)	4 (16)	15 (7.8)	
Unemployed, seeking employment	22 (10.1)	7 (28)	15 (7.8)	
Unemployed, not seeking employment	48 (21.9)	6 (24)	41 (21.3)	
English is primary language at home	190 (83)	24 (88.9)	164 (82)	.59
Number of children in home, mean (SD)	2.2 (0.9)	2.5 (1.1)	2.1 (0.9)	.087
Time spent inside the home prior to shutdown, median (IQR), mode	12 (6.1), 12	12 (5.0), 12	12 (6.2), 12	.43
Time spent inside home during shutdown, median (IQR), mode	21.6 (6), 24	24 (2.4), 24	21.6 (5.5), 24	.024
Home owner	76 (33.3)	3 (11.1)	73 (36.3)	.009
Type of housing				.72
Stand-alone home	31 (13.7)	2 (7.7)	29 (14.5)	
Multiunit housing	167 (73.9)	22 (84.6)	145 (72.5)	
Connected home (duplex, townhouse)	23 (10.2)	2 (7.7)	21 (10.5)	
Other	5 (2.2)	0 (0)	5 (2.5)	
Reported housing tobacco policy ^d				.75
Allowed in shared areas and inside units	3 (1.7)	0 (0)	3 (1.9)	
Only allowed inside units	39 (21.7)	5 (20.8)	34 (21.8)	
Only allowed in shared areas	5 (2.8)	1 (4.1)	4 (2.6)	
Not allowed in shared areas or inside units	105 (58.3)	16 (66.7)	89 (57)	
No policy—permitted anywhere	28 (15.6)	2 (8.3)	26 (16.7)	

(continues)

TABLE
Participant and Housing Characteristics From a COVID-19 Social Determinants of Health Cross-sectional Study of Families Served by 5 New York City Pediatric Practices Collected May to July 2020 (n = 230) and Stratification of Results by Families With Financial Housing Support^a (n = 27) Versus Families Without Housing Support (N = 201) (Continued)

Characteristic	Overall, n (%)	Financial Housing Support, n (%)	Private Housing, n (%)	P ^b
Degree of family's financial disruption due to pandemic				.009
A lot	37 (16.9)	10 (40)	27 (14)	
Some	59 (26.9)	6 (24)	52 (26.9)	
Just a little	50 (22.8)	5 (20)	45 (23.3)	
Not at all	73 (33.3)	4 (16)	69 (35.8)	

^aFamily receives financial support for housing such as public housing, Section-8, or other.

^bP values were derived from chi-square or Fisher's exact tests (if cell count ≤5) to compare frequencies between families with financial housing support and families without financial housing support. Bold P values are significant (P < .05).

^cOne respondent in each group identified race as "other." Omitted for brevity in the table.

^dFor families living in multiunit housing or connected homes (townhouse, duplex) (n = 190).

of 228 (15.8%) children have been diagnosed with asthma, with higher rates in families receiving financial housing support (10/27; 37%) than those in private housing (26/201; 12.9%) (P = .001).

Smoke incursions

Tobacco smoke incursions

Overall, 52 of 227 families (22.9%) reported tobacco smoke incursions when their child was present. Of those, 54.2% (26/46) reported frequent incursions. Since the shutdown, 10.6% (23/217) reported an increase in incursions, 5.1% (11/217) reported a decrease, and 84.3% (183/217) reported no change.

By housing structure, tobacco smoke incursions were reported by 24.2% (46/190) of families in multiunit housing and 16.7% (5/30) in stand-alone homes (P = .49).

Compared with families in private housing, families receiving financial housing support were more likely to report tobacco smoke incursions (55.6% vs 18.5%, P < .001), more frequent incursions (80% vs 42%, P = .03), and increased incursions since the shutdown (37% vs 6.8%, P < .001) (Figure 1). Families with financial housing support had nearly 4 times the odds of tobacco incursion (odds ratio [OR] = 3.8; 95% confidence interval [CI], 1.4-10.1; P = .01) and increased incursions (OR = 3.7; 95% CI, 1.1-12.5; P = .04) compared with those without financial

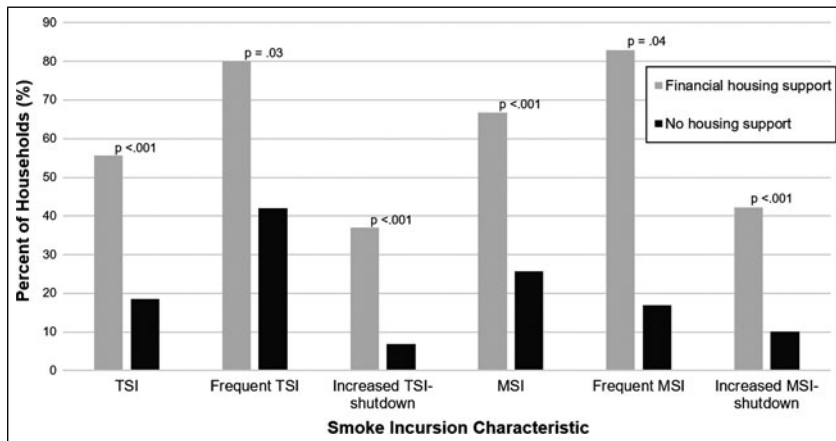


FIGURE 1 The Presence, Frequency, and Change in Tobacco Smoke Incursion and Marijuana Smoke Incursion During the Early Months of the COVID-19 Shutdown (May-July 2020) for Families Served by 5 New York City Pediatric Practices, Stratified by Households That Receive Financial Housing Support (Including Public Housing, Section-8 Vouchers) Compared With Households That Do Not Receive Financial Housing Support^a

Abbreviations: MSI, marijuana smoke incursion; TSI, tobacco smoke incursion.

^aFrequent tobacco or marijuana smoke incursions represents "daily" or "weekly" incursions.

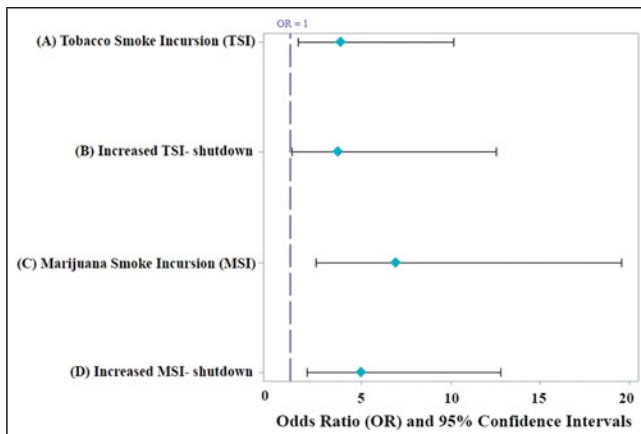


FIGURE 2 The Forest Plot Shows OR Values and 95% Confidence Intervals for Families With Financial Housing Support (Versus Families Without Financial Housing Support) From Our Exploratory Multivariate Logistic Regression Analyses for the Dependent Variables in the Cross-sectional Survey During the Early Months of the COVID-19 Shutdown (May-July 2020) for Families Served by 5 New York City Pediatric Practices^a. Abbreviations: MSI, marijuana smoke incursion; OR, odds ratio; TSI, tobacco smoke incursion.

^aThe dashed vertical line indicates an OR value of 1. The results show the following: (A) TSI, adjusted for clinic practice; (B) increased TSI since the pandemic-related shutdown, adjusted for clinic practice and insurance type; (C) presence of MSI, adjusted for insurance type and home ownership; and (D) increased MSI since the pandemic-related shutdown, adjusted for home ownership. This figure is available in color online (www.JPHMP.com).

housing support (Figure 2). The incursion model adjusted for clinic location, and the pandemic-related increase incursion model additionally adjusted for insurance type.

Marijuana smoke incursions

Overall, 69 of 225 families (30.7%) reported marijuana smoke incursions when their child was present; of those, 62.1% (41/66) reported frequent incursions. Since the shutdown, 13.9% (30/215) of families noticed an increase in marijuana smoke incursion, 5.1% (11/215) noticed a decrease, and 81% (174/215) noticed no change. By housing structure, 33% (62/188) of families in multiunit housing and 16.7% (5/30) of those in stand-alone homes reported marijuana incursions ($P = .09$).

Compared with families in private housing, the families receiving financial housing support were more likely to report marijuana incursions (66.7% vs 25.8%, $P < .001$), more frequent incursions (83% vs 17%, $P = .04$), and a pandemic-related increase in incursions (42.3% vs 10.1%, $P < .001$) (Figure 1). Those with financial housing support had nearly 7 times the odds of marijuana incursion (OR = 6.9; 95% CI, 2.4-19.5; $P < .001$) after adjusting for home ownership status and insurance type. They also had 5 times the odds of an increase in marijuana incursion

(OR = 5.0; 95% CI, 1.9-12.8; $P < .001$) compared with those in private housing after adjusting for home ownership status (Figure 2).

Dual smoke incursions

Overall, 36 families (15.8%) had both tobacco smoke and marijuana smoke (“dual”) incursions, and those who reported tobacco incursions were more likely to report marijuana incursions ($P < .001$). More than half (51.8%) of families with financial housing support reported dual incursions compared with 10.9% in private housing ($P < .001$).

Families in NYCHA buildings

Of the 27 families receiving financial housing support, 18 lived in NYCHA public housing buildings, 3 received Section-8 vouchers, and 5 received other type of financial assistance. Of the 18 NYCHA families, 11 (64.7%) reported a “no smoking” building policy. Twelve of 18 (66.7%) NYCHA families reported tobacco smoke incursions, and 38.9% (7/18) reported an increase since the shutdown. Of those with tobacco incursions, 83.3% (10/12) reported frequent occurrence during the shutdown. Fourteen of 18 (77.8%) NYCHA families reported marijuana smoke incursions, with 85.7% (12/14) reporting frequent occurrences and 44.4% (8/18) reporting an increase since the shutdown. Twelve of 18 NYCHA families (66.7%) reported dual incursions. Half of NYCHA families (9/18) have a child with asthma, and these families reported high rates of tobacco (7/9; 77.8%), marijuana (8/9; 88.9%), and dual (7/9; 77.8%) smoke incursions.

Disparities among pediatric practices

The 5 practices included in our study serve pediatric populations with disparate sociodemographic characteristics (see Supplemental Digital Content Table S1, available at <http://links.lww.com/JPHMP/A864>). For example, 2 practices serve almost exclusively children with private insurance and housing, while 1 practice serves predominantly children with public insurance and financial housing support. The presence of tobacco and marijuana incursions differed significantly among practices (see Supplemental Digital Content Table S2, available at <http://links.lww.com/JPHMP/A865>). Figure 3 shows disparities in patient and incursion characteristics for 2 disparate practices.

Discussion

Our study highlights disparities in tobacco and marijuana smoke incursions, with low-income families facing disproportionate exposure during the

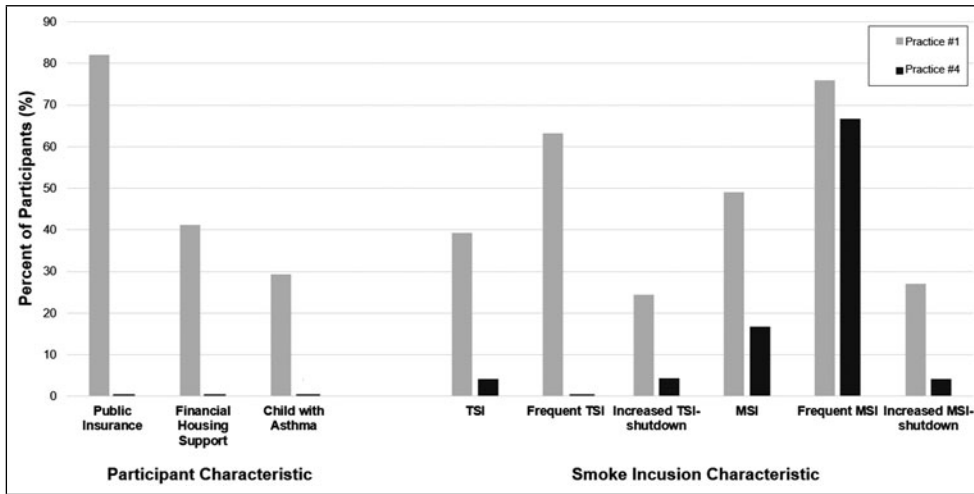


FIGURE 3 Highlighting Disparities Between 2 Pediatric Practices in a Large Urban Health Care System—Practice 1 (n = 53) and Practice 4 (n = 24) From a Cross-sectional Survey During the Early Months of the COVID-19 Shutdown (May-July 2020) for Families Served by 5 New York City Pediatric Practices^a

Abbreviations: MSI, marijuana smoke incursion; NYCHA, New York City Housing Authority (public housing agency); TSI, tobacco smoke incursion.

^aThe left side of the bar graph shows characteristics of families including percentage of children with public insurance, families receiving financial housing support, and children with asthma. The right side of the bar graph shows characteristics of TSI and MSI, as well as frequent (daily or weekly) TSI and MSI, and an increase in incursions during the early months of the COVID-19 pandemic shutdown.

pandemic shutdown. For tobacco smoke, our findings confirm incursion disparities among families living in financially supported housing compared with private housing (55.6% vs 18.5%), consistent with studies conducted prior to the pandemic.^{11,19,20} Our overall incursion prevalence (22.9%) was lower than the overall NYC prevalence (37.7% in 2017); however, for the subset of families with financial housing support, the prevalence (55.6%) was nearly 50% greater than NYC overall.³⁰ For marijuana, our results reveal incursion disparities among families living in financially supported housing compared with private housing (66.7% vs 25.8%), similar to previous studies.^{19,20}

Our study provides insight into the experience of smoke incursions during the early pandemic when children were spending most of their time indoors. Families in financially supported housing were more likely to report an increase in both tobacco and marijuana smoke incursions than those in private housing. Their children also spent more time inside the home during a typical day during the shutdown than children in private housing (24 hours vs 21.6 hours). Although our study could not quantify how these factors influenced the magnitude of exposure during the pandemic, any amount of SHTS exposure in children is harmful and is particularly concerning for children with asthma. In our study, 37% of families living in financially supported housing had a child with asthma compared with 12.9% of families in private housing, a disparity shown in other studies.^{31,32} Among children

living in NYCHA buildings, 50% had an asthma diagnosis and more than three-fourths of these children experienced tobacco, marijuana, and/or dual smoke incursions.

To protect public health, comprehensive smoke-free policies in both indoor spaces (eg, homes, workplaces) and public outdoor spaces (eg, parks, schools) are needed and recommended by leading health organizations including the American Academy of Pediatrics (AAP)³³ and the US Centers for Disease Control and Prevention (CDC).³⁴ For multiunit housing in particular, both the AAP and the CDC call for smoke-free buildings. Residents of multiunit housing, both public and private, generally support smoke-free policies.³⁵⁻³⁷ In July 2018, the federal Smoke-Free Public Housing Rule went into effect for all PHAs¹⁶; however, follow-up studies suggest that enforcement has been challenging and tobacco smoke incursions are still detected in nonsmoking units and common areas.^{15,17}

In our study, two-thirds of NYCHA families reported tobacco incursions and the incursions were more frequent for 39% during the early pandemic. Only 11 of 18 (64.7%) NYCHA residents reported a “no smoking” policy in their building despite that PHA buildings enacted a smoke-free policy in 2018. These results highlight the need for better enforcement of NYCHA’s smoke-free policy and increased outreach to raise awareness among residents. Such efforts should be done in a thoughtful way that incorporates resident-endorsed strategies to increase the likelihood of successful implementation.³⁸ Another

key component of implementation and enforcement is the equitable provision of tobacco cessation tools and programs; however, the pandemic created additional barriers to the access of cessation services and clinics.²⁵ In addition, the social isolation, anxiety, and other mental health impacts of the pandemic may make cessation more difficult and relapse in former smokers is more common.²⁵ These challenges are compounded by the health and financial impacts of the pandemic, which were worse for low-income, Black, and Latinx families.^{3,39} In our study, families living in public housing experienced more financial disruption during the early pandemic than those living in private housing. The enforcement of smoke-free policies should not lead to punitive measures that would evict families for smoking-related lease violations, given the harmful impacts of housing instability and homelessness. Enforcement strategies should instead focus on a collaborative approach that connects families with resources and support services. For example, increased investment in the NYCHA “Community Health” program, which connects residents with wellness services (eg, mental health, tobacco cessation),⁴⁰ can facilitate increased compliance with the smoke-free policy.

As of July 2021, 18 states, the District of Columbia, and 2 US territories have fully legalized marijuana recreational use,⁴¹ but there are no laws prohibiting marijuana smoking around children.⁴² New York State legalized recreational marijuana use in March 2021; marijuana smoking is now allowed in any area tobacco smoking is permitted (including public outdoor spaces).⁴¹ Other states that have decriminalized adult marijuana use (such as New Jersey) only allow use on private property, which may lead to increased smoking inside the home. Marijuana is not explicitly addressed in the Smoke-Free Public Housing Rule; however, given its current federal status as a Schedule 1 drug, it is not permitted in any PHA buildings.¹⁶ If future federal laws permit recreational marijuana use in PHA buildings, public housing residents can be directed to smoke outside the building (25 feet away, as required with cigarettes under the HUD [Department of Housing and Urban Development] rule)⁷ if compatible with local marijuana laws. Future studies should monitor for marijuana smoke incursions as trends in combustible marijuana use evolve.

Our results also highlight that patient populations within a health system can face disparities in environmental and social risk factors. Adequate resources and incentives should be provided to practices serving a high percentage of low-income children to better address environmental and SDOH. SDOH screening programs have shown to be feasible and effective to address a wide range of unmet needs.^{43,44}

Integration of screening for tobacco and marijuana smoke exposure as part of an SDOH program can facilitate the provision of resources, such as information on establishing a smoke-free home or a referral to cessation program (see Supplemental Digital Content Table S3, available at <http://links.lww.com/JPHMP/A866>). Clinical providers can document and code for the diagnosis and treatment of tobacco and/or marijuana smoke exposure during patient encounters.⁴⁵

For families struggling with smoke incursions, some strategies may reduce incursions (eg, filling in cracks, using a door draft stopper, improving ventilation); however, the only effective method to completely eliminate smoke incursions is a building-wide smoke-free policy.⁴⁶ Families in private housing can access tool kits for tenants and landlords on how to create such a policy, while public housing residents can access information on implementation of the Smoke-Free Public Housing Rule (see Supplemental Digital Content Table S3, available at <http://links.lww.com/JPHMP/A866>). While not substitutions for policies or structural interventions that address upstream SDOH, such clinic-based resources can empower families to reduce exposures.

Limitations

Our study has several limitations. Enrolled caregivers may not reflect our clinic population as a whole (self-selection bias), and our results may not be generalizable beyond this convenience sample of NYC families. Our small sample size, especially in financially supported housing, limits the strength of our analysis. The study relied on recall and reporting of tobacco and marijuana incursions; incursions may be present in a home, although caregivers do not smell it. We did not collect biomarkers of exposures such as urinary cotinine or THC-COOH, nor environmental measures such as air nicotine levels. Future studies can collect biomarkers and/or air nicotine levels to determine accuracy of self-report. The participants were surveyed one time during the shutdown; these findings may not happen during other circumstances (eg, if spending less time inside the home, a family may report fewer incursions). Finally, the survey was conducted prior to the legalization of recreational marijuana in New York and therefore may underestimate the current magnitude of marijuana incursions.

Conclusions

The importance of addressing home environmental issues including SHTS exposure has become increasingly apparent during the pandemic when children were spending up to 24 hours per day indoors.

Implications for Policy & Practice

Federal, state, and local jurisdictions considering housing-related policies to improve public health and reduce health inequities should take into account the impact of marijuana and tobacco smoke incursions on the health of housing residents, especially children:

- During the pandemic, our sample of NYC children in public housing experienced significantly more marijuana and tobacco incursions than children in private housing. This scenario highlights environmental inequities and related health outcomes such as asthma, which disproportionately affects low-income children in public housing.
- Our study and others highlight the need for improved enforcement of the Smoke-Free Public Housing Rule in order to protect the health of the more than half a million public housing residents in NYC⁴⁸ (and the nearly 9 million people living in public housing across the United States.⁴⁹)
- Implementation of additional policies to limit secondhand marijuana exposure and incursions is needed to protect public health, especially since recreational marijuana is now legalized in 18 states, the District of Columbia, and 2 US territories.⁴¹
- Strategies for implementation and enforcement of smoke-free policies should consider the structural systems leading to poverty and health disparities² and prioritize access to wellness support services.

Better enforcement of existing regulations including the Smoke-Free Public Housing Rule and implementation of additional policies to limit SHMS exposure in children have the potential to improve public health outcomes. Beyond exposure to SHMS and SHMS, many children faced new or exacerbated unmet social needs during the pandemic such as food insecurity, loss of childcare, and financial stressors.^{4,47} It is critical for future child-focused research, programs, and policies to account for the cumulative impact of environmental and social stressors on child well-being and address the structural inequities contributing to health disparities.

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