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Impact of the First Year of the COVID-19 on Unmet Healthcare Need among New York City Adults: a Universal Healthcare Experiment

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Abstract We examined the impact of the first year of the COVID-19 pandemic on unmet healthcare need among New Yorkers and potential differences by race/ethnicity and health insurance. Data from the Community Health Survey, collected in 2018, 2019, and 2020, were merged to compare unmet healthcare need within the past 12 months during the pandemic versus the 2 years prior to 2020. Univariate and multivariable logistic regression models evaluated change in unmet healthcare need overall, and we assessed whether race/ethnicity or health insurance status modified the association. Overall, 12% of New Yorkers ($N = 27,660$) experienced unmet healthcare during the 3-year period. In univariate and multivariable models, the first year of the pandemic (2020) was not associated with change in unmet healthcare need compared with 2018–2019 (OR $= 1.04$, $p = 0.548$; OR $= 1.03$, $p = 0.699$, respectively). There was no statistically significant interaction between calendar year and race/ethnicity, but there was significant interaction with health insurance status (interaction $p = 0.009$). Stratifying on health insurance status, those uninsured had borderline significant lower odds of experiencing unmet healthcare need during 2020 compared to the 2 years prior (OR $= 0.72$, $p = 0.051$) while those with insurance had a slight increase that was not significant (OR $= 1.12$, $p = 0.143$). Unmet healthcare need among New Yorkers during the first year of the pandemic did not differ significantly from 2018-2019. Federal pandemic relief funding, which offered no-cost COVID-19 testing and care to all, irrespective of health insurance or legal status, may have helped equalized access to healthcare.

Keywords Universal healthcare · COVID-19 · Health disparities

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Introduction

High costs in the United States (US) make healthcare inaccessible for those without financial resources or health insurance. In 2022, 4 in 10 adults reported delaying or forgoing medical care due to high out-of-pocket costs [1]. Healthcare affordability is affected by healthcare insurance coverage and socioeconomic status, both of which vary significantly by race and ethnicity [2, 3]. In 2019, the uninsured rates among

Hispanic (20%) and Black (11%) adults were higher than among White (8%) and Asian (7%) adults [4]. This pattern is reflected in reports of difficulty affording health care costs. In 2020, approximately 60% of Black adults and 65% of Hispanic adults reported difficulty affording health costs compared to 40% of White adults [1]. Among Black, Indigenous, and people of color (BIPOC), institutional racism, discrimination, and abuse in the healthcare system add barriers to accessing and utilizing medical care [5]. Discrimination against BIPOC paired with the high costs and limited financial resources have led to a history of disparities in healthcare access, utilization, and health-related outcomes by income and race/ethnicity [5]. This pattern can be seen on a national level in the US and a state level in New York [6].

The COVID-19 pandemic placed significant burdens on the healthcare system. During the first year of the pandemic, New York City (NYC) was the epicenter of COVID-19 outbreak in the US. Between February and December 2020, approximately 401,541 cases and 20,354 deaths were reported to the NYC Department of Health and Mental Hygiene (DOHMH) and COVID-19 incidence, hospitalization, and mortality rates disproportionately impacted low-income and BIPOC groups across the US and in NYC [7–9]. In NYC during spring 2020, the highest case counts were concentrated in low-income neighborhoods [8]. COVID-19 incidence was significantly higher among Black individuals (1590 per 100,000) than White individuals (988 per 100,000). Age-adjusted rates of hospitalization and death were highest among Black and Hispanic adults (699 and 248 per 100,000, respectively, among Black adults and 658 and 260 per 100,000, respectively, among Hispanic adults) compared to their White counterparts (314 and 123 per 100,000, respectively) [10].

Surges in the number of COVID-19 patients requiring care plus healthcare staffing shortages severely limited access to healthcare services for people needing acute and long-term care [7]. This was particularly true in NYC medical centers during the first year of the pandemic when healthcare facilities were overwhelmed by COVID-19 cases [11]. In April 2020, a cross-sectional analysis found that overall healthcare use among insured adults in the US had declined by 52% [12]. Towards the end of 2020, 36% of the non-elderly adult population in the US reported delaying care for non-COVID-19-related medical needs. Rates were highest among Black and Hispanic

individuals (39.7% and 35.5%, respectively) compared to Whites (34.3%). Key challenges to accessing care included high costs, fear of exposure to COVID-19, and limited health service availability [7, 13].

To control COVID-19 spread, the federal government implemented policies that increased access to COVID-19-related healthcare [14]. The Coronavirus Aid, Relief, and Economic Security (CARES) Act and the Provider Relief Fund allowed medical centers to provide no-cost COVID-19-related healthcare (i.e., testing, treatment, and care) to all individuals, irrespective of health insurance or legal status [15, 16]. During this period, there were no changes in healthcare coverage for non-COVID-19-related medical needs, thus creating a unique experiment in which universal access to healthcare was provided in the US but exclusively for COVID-19-related needs [17].

Given the stress on the healthcare system and hesitancy among individuals to seek non-COVID-19 care due to fear of exposure to COVID-19 at healthcare facilities, we might expect the pandemic to be associated with increases in unmet medical care, especially for non-COVID-19 needs. Additionally, impacts of COVID-19 on BIPOC combined with disparities in healthcare access led us to surmise that increases in unmet, delayed, or avoided healthcare disproportionately burden BIPOC individuals. Therefore, this analysis examined the net impacts of the first year of the COVID-19 pandemic on the prevalence of unmet healthcare need among adults living in NYC. We explored the prevalence of unmet healthcare among NYC adult population overall and by race/ethnicity and health insurance status to understand whether the pandemic had a disproportionate impact on those individuals already experiencing disparities in healthcare access.

We focused our analysis on calendar year 2020 because there were unique characteristics associated with the first year of the pandemic in NYC impacting healthcare accessibility, such as critical staffing shortages, high COVID-19 case numbers, and distribution of funds from the CARES Act [18]. These characteristics were extreme in NYC, the epicenter of the US outbreak in 2020, and in response to COVID-19, the NYC health system evolved to provide universal COVID-19-related healthcare. For example, New York was the first state to mandate that insurers cover COVID-19 tests and waive cost-sharing [19]. NYC may be used as a case study to better understand the impact of COVID-19 on a

large city hit early-on and potentially inform strategies for how cities and states can prepare for or react to future disease epidemics.

Methods

Sample

For these analyses, we used publicly available data from three annual rounds of the Community Health Survey (CHS) conducted in 2018 and 2019 (before the COVID-19 pandemic) and 2020 (first year of the pandemic). CHS is an annual cross-sectional telephone survey conducted between March and December by the NYC Department of Health and Mental Hygiene (DOHMH). Each year, the CHS sampling frame is constructed from a list of household telephone numbers provided by a commercial vendor. A sample of households is selected via random sampling of the phone numbers associated with them, stratified on neighborhood as defined by the United Hospital Fund's neighborhood designations. Selected households are contacted, and one eligible adult per household is randomly selected and invited to complete a 25-min computer-assisted telephone interview. Those interviews are offered in a variety of languages including English, Spanish, Russian, Chinese, Bengali, and Haitian Creole. Individuals < 18 years old and those who do not reside in NYC, those in households without telephone service (land or cell phone), those living in group quarters (e.g., college dorms or nursing facilities), and institutionalized adults are not eligible to participate in the study [20].

Response rates (the proportion who participated among those selected, which includes those contacted and deemed eligible as well as those who could not be contacted) and cooperation rates (the proportion who participated among those who were successfully contacted and deemed eligible) were 8.4% and 82.8%, respectively, for 2018, 7.2% and 79.6%, respectively, for 2019, and 7.4% and 74.4%, respectively, for 2020 [20, 21]. CHS participants provided informed consent prior to completing the survey, and study procedures were reviewed and approved by the NYC DOHMH institutional review board [20].

Measures

The outcome of interest was unmet healthcare need, determined by an affirmative response to the question: "Was there a time in the past 12 months when you needed medical care [healthcare] but did not get it? Medical care includes doctor's visits, tests, procedures, prescription medication, and/or hospitalizations" [22]. The exposure of primary interest was the first calendar year of the COVID-19 pandemic (2020) versus the 2 years before the pandemic (2018–2019). We examined race/ethnicity and having health insurance as possible effect modifiers of the association between the COVID-19 pandemic and unmet healthcare need. Race/ethnicity was determined based on response to two survey questions: (1) "Are you Hispanic or Latino?" and (2) "Would you describe yourself as..." For the latter question, response options included White/North African/Mid-Eastern, Black, Asian/Pacific Islander, and Other. Responses to these two questions were combined into a 5-category race/ethnicity variable: White (reference), Black, Asian, Hispanic, and Other. Health insurance coverage was defined by a "yes" response to the question: "Do you have any kind of health insurance coverage, including private health insurance or government plans such as Medicare or Medicaid?"

We also describe the population in terms of birth sex (female versus male), age (18–24 [reference], 25–44, 45–64, and 65+ years), education level (less than high school, high school graduate, at least some college or technical school [reference]), household income (< 200% federal poverty level [FPL], 200–399% FPL, and ≥ 400% FPL [reference]), and not having a personal doctor/healthcare provider. Lastly, we looked at self-rated health (SRH) based on response to the question, "Would you say that in general your health is excellent, very good, good, fair, or poor?" Response options were dichotomized into an indicator for poor SRH (fair and poor) versus good SPH (excellent, very good, and good) [22].

Statistical Analyses

CHS data from 2018, 2019, and 2020 were merged, and 3-year combination weight and strata variables were obtained from the NYC DOHMH and added for analysis of the combined year complex sample data. The population was described overall and by unmet

healthcare need during the past 12 months. The statistical significance of differences in unmet healthcare need was assessed using the Rao Scott chi-squared test. Univariate and multivariable logistic regression models evaluated crude and adjusted associations between the COVID-19 pandemic (2020 versus 2018–2019 calendar years) and covariates with unmet healthcare need. The population characteristics of New Yorkers were unlikely to change significantly between 2018–2019 and 2020; thus, the multivariable model only adjusted for the hypothesized effect modifiers. However, in case demographic shifts occurred during the first year of the pandemic, perhaps due to an increase in the number of residents moving out of NYC in 2020, we conducted a sensitivity analysis and ran a multivariable model adjusted for participant characteristics.

Race/ethnicity and health insurance coverage were evaluated as potential effect measure modifiers. We assessed interaction among the variables by adding the 3-way interaction term (calendar year × health insurance × race/ethnicity) and all possible 2-way interaction terms (calendar year × race/ethnicity, calendar year × health insurance, and race/ethnicity × health insurance) to the multivariable model. If the 3-way interaction term was significant, we reran the multivariable model stratified on both race/ethnicity and insurance. If it was not significant, we removed the 3-way interaction term and assessed the 2-way interaction terms, running the stratified models if found to be significant. Analyses were conducted using SAS version 9.2 (Cary, NC), adjusted for the complex sampling, and weighted to the NYC population. Statistical significance was assessed at $\alpha = 0.05$.

Results

Descriptive Statistics

This study included data from 27,660 New Yorkers, of whom 18,767 were surveyed before the COVID-19 pandemic in 2018–2019 and 8733 during the first year of the COVID-19 pandemic in 2020. Overall, 12.2% of New Yorkers reported experiencing unmet healthcare in the past year. In 2018, 11.2% reported unmet care; in 2019, 12.9% of New York adults experienced unmet care; and in 2020, 12.5% reported unmet healthcare. The majority of New Yorkers were female

(53.6%); 13.1% were aged 18–24, 40.2% were 25–44, 31.5% were 45–64, and 15.2% were 65+ years of age. White participants made up 35.7% of the adult population, 26.9% were Hispanic, 22% identified as Black, 13.1% were Asian/PI, and 2.3% were of Other race. Most participants reported having at least some post-high school education (58.6%), 24% had completed high school, and 17.4% had not graduated from high school. Nearly half of New Yorkers earned < 200% of the FPL (44.4%), 17.7% earned 200–399% FPL, and 37.9% earned over 400% FPL. Most had health insurance coverage (88.4%), and 79.7% reported having a personal health care provider. Lastly, 78.4% of New Yorkers rated their health as good (Table 1).

Reports of unmet healthcare need in the past 12 months varied significantly by race/ethnicity (p < 0.001) with 17.5% Other race, 15.9% Hispanic adults, and 11.2% Black adults experiencing unmet care compared to 10.5% of White and 9.9% of Asian adults. Unmet healthcare need was higher among those without health insurance (22.6%) compared to those insured (10.8%, p < 0.001). Individuals without a personal healthcare provider reported higher levels of unmet healthcare need (17.6%) compared to those with a personal healthcare provider (10.7%, p < 0.001). Overall, 10.5% of adults who rated their health as good reported unmet healthcare need compared to 18.4% of those who rated their health as poor (p < 0.001). Among participants between 18 and 24 years old, 11.1% reported experiencing unmet healthcare need compared to 13.9% among those 25–44 years old, 12% of individuals 45–64 years old, and 8.7% of adults over 65 years old (p < 0.001). New Yorkers with a household income < 200% federal poverty level (FPL) reported higher levels of unmet healthcare need (13.9%) compared to those with an income 200–399% FPL (11.6%) and adults with an income over 400% FPL (10.5%, p < 0.001). Individuals with an education level less than high school reported the highest levels of unmet healthcare need in 2020 (14.2%) compared to high school graduates (12.3%) and adults with some college or college graduates (11.4%, p = 0.017) (Table 1).

Univariate and Multivariate Logistic Regression Models

In the univariate logistic regression model, the first year of the COVID-19 pandemic was not significantly

Table 1 Characteristics of the study population overall and by unmet healthcare need within the past 12 months

Characteristics	Total sample, *n* (weighted %)	Experienced unmet medical care when care was needed within the past 12 months?		*p* value*
		Yes, *n* (weighted %)	No, *n* (weighted %)	
Total	27,660 (100%)	3153 (12.2%)	24,347 (87.8%)	-
Calendar year				0.550
2018–2019	18767	2106 (12.0%)	16,661 (88.0%)	-
2020	8733 (33.3%)	1047 (12.5%)	7686 (87.5%)	-
Race/ethnicity				< .0001
White/N African/Mid-Eastern, non-Hispanic	9361 (35.7%)	933 (10.5%)	8428 (89.5%)	-
Black, non-Hispanic	6063 (22.0%)	615 (11.2%)	5448 (88.8%)	-
Hispanic	7721 (26.9%)	1169 (15.9%)	6552 (84.1%)	-
Asian/PI, non-Hispanic	3534 (13.1%)	317 (9.9%)	3217 (90.1%)	-
Other, non-Hispanic	821 (2.3%)	119 (17.5%)	702 (82.5%)	-
Health insurance coverage				< .0001
Yes	24,769 (88.4%)	2600 (10.8%)	22,169 (89.2%)	-
No	2621 (11.6%)	544 (22.6%)	2077 (77.4%)	-
Birth sex				0.605
Male	11,975 (46.4%)	1338 (12.0%)	10,637 (88.0%)	-
Female	15,413 (53.6%)	1801 (12.3%)	13,612 (87.7%)	-
Age group				< .0001
18–24	2077 (13.1%)	225 (11.1%)	1852 (88.9%)	-
25–44	9320 (40.2%)	1229 (13.9%)	8091 (86.1%)	-
45–64	9098 (31.5%)	1096 (12.0%)	8002 (88.0%)	-
65+	6952 (15.2%)	596 (8.7%)	6356 (91.3%)	-
Education				0.017
Less than high school	3867 (17.4%)	554 (14.2%)	3313 (85.7%)	-
High school graduate	5709 (24.0%)	654 (12.3%)	5055 (87.7%)	-
College (some college or college graduate)	17,766 (58.6%)	1924 (11.4%)	15,842 (88.6%)	-
Household income				< .0001
< 200% FPL	11,998 (44.4%)	1608 (13.9%)	10,390 (86.1%)	-
200–399% FPL	5083 (17.7%)	554 (11.6%)	4529 (88.4%)	-
400+% FPL	10,419 (37.9%)	991 (10.5%)	9428 (89.5%)	-
Has one or more personal doctor or health provider				< .0001
Yes	22,680 (79.7%)	2355 (10.7%)	20,325 (89.3%)	-
No	4675 (20.3%)	784 (17.6%)	3891 (82.4%)	-
Self-rated health				< .0001
Good SRH	20,953 (78.4%)	2053 (10.5%)	18,900 (89.5%)	-
Poor SRH	6461 (21.6%)	1087 (18.4%)	5374 (81.6%)	-

FPL federal poverty level, *SRH* self-rated health

associated with unmet healthcare compared to the 2 years prior, 2018–2019 (OR = 1.04, *p* = 0.548). Participants who identified as Hispanic and Other race had significantly higher odds of unmet healthcare need compared to White New Yorkers (OR = 1.61, *p* < .0001; OR = 1.81, *p* = 0.003, respectively). Those without health insurance had significantly higher odds of experiencing unmet healthcare need compared to uninsured individuals (OR = 2.41, *p* < .0001). In the multivariable model adjusted for the hypothesized effect modifiers, the results were similar: there was no significant association between unmet healthcare and

year one of the pandemic (OR = 1.03, p = 0.699). Participants identifying as Hispanic or Other race/ethnicity had higher odds of unmet healthcare need compared to White New Yorkers (OR = 1.36, p < .0001; OR = 1.74, p = 0.006, respectively). New Yorkers without health insurance had significantly higher odds of experiencing unmet healthcare need compared to uninsured individuals (OR = 2.19, p < .0001) (Table 2)**.**

For the sensitivity analysis, we reran the multivariable regression model adjusting for population characteristics that could have shifted during the first year of the pandemic due to population movement, including birth sex, age, race/ethnicity, education, income, self-rated health, having a personal health provider, and health insurance status. Findings were mostly consistent with the results described above. Calendar year 2020 was not associated with unmet healthcare need (OR = 1.01, p = 0.864). Participants who identified as Other race/ethnicity had significantly higher odds of experiencing unmet healthcare need compared to White New Yorkers (OR = 1.62, p = 0.017), but the association with Hispanic ethnicity was no longer significant. Lastly, uninsured individuals had 1.85 higher odds of experiencing unmet healthcare need compared to those with insurance (p < .0001) (Table 2).

Effect Modification

We found no evidence of significance in the 3-way interaction between the first year of the COVID-19 pandemic, race/ethnicity, and health insurance coverage in predicting unmet healthcare need (interaction term p value range 0.215–0.683). We ran the model with the 2-way interaction between COVID-19 pandemic year and health insurance and found that the interaction term was significant (p = 0.009). The two-way interaction between COVID-19 pandemic year and race/ethnicity was non-significant (p value range 0.081–0.893). We then reran the multivariate model stratified by health insurance coverage. Among uninsured New Yorkers, the first year of the COVID pandemic was associated with a lower odds of unmet healthcare need compared to the two prior years that was of borderline significance (OR = 0.72, p = 0.051). Among insured New Yorkers, unmet healthcare need was slightly higher during the first year of the pandemic compared to the two previous years, but

this difference was not statistically significant (OR = 1.12, p = 0.143) (Table 3).

Discussion

The COVID-19 pandemic surpassed the 1918 influenza pandemic as the deadliest in US history and NYC was severely impacted, particularly during the first year (2020) [23]. Surges in COVID-19 patients overloaded the capacity of medical care providers, compromising their ability to treat non-COVID-19 healthcare needs [24]. Despite this, we found that the proportion of New Yorkers who experienced unmet healthcare need during the first year of the pandemic did not differ significantly from the two years prior, 2018–2019. This finding was surprising given the number of New Yorkers who likely delayed medical care due to fear of COVID-19 exposure, financial loss from the pandemic, or limited healthcare service availability [17, 25].

While the lack of change in unmet healthcare need during the first year of the pandemic was consistent across race/ethnicity in the multivariate model adjusted for interaction, it was modified by health insurance status. In the regression model stratified by health insurance status, adults without insurance had decreased odds of experiencing unmet healthcare during the first year of the pandemic compared to the two previous years, while those with health insurance had a slight increase. The varying direction of the association suggests that the impact of unmet healthcare need had a differential effect by health insurance status. This finding may partially explain the lack of association between the first year of the pandemic and unmet care need in the population overall.

There are several potential explanations for the lack of increase in unmet healthcare need during the first year of the pandemic, particularly among those without health insurance. First, the CARES Act and the Provider Relief Fund provided free universal COVID-19 healthcare to all US residents between March 2020 and March 2022, irrespective of health insurance or legal status. These federal programs equalized access to healthcare for COVID-19-related health needs, including groups historically lacking healthcare access, e.g., those without health insurance, low-income, racial/ethnic minorities, undocumented immigrants, and others ineligible for

Table 2 Unadjusted and adjusted logistic regression models assessing the association of the first year of the COVID-19 pandemic and unmet healthcare need

Characteristics	Univariate (unadjusted) logistic model				Multivariable logistic model			Sensitivity analysis, multivariate model adjusted for population characteristics		
	Sample size	Odds ratio	95% CI	p	Odds ratio	95% CI	p	Odds ratio	95% CI	p
Calendar year (ref = 2018–2019)										
First year of the pandemic (2020)	27660	1.04	0.91–1.19	0.548	1.03	0.90–1.18	0.699	1.01	0.88–1.16	0.864
Race/ethnicity (ref = White, non-Hispanic)	27660	-	-	-	-	-	-	-	-	-
Black, non-Hispanic	-	1.07	0.89–1.30	0.485	1.01	0.83–1.22	0.949	0.94	0.78–1.15	0.557
Hispanic	-	1.61	1.37–1.89	<.0001	1.36	1.15–1.60	<0.001	1.16	0.96–1.40	0.135
Asian/PI, non-Hispanic	-	0.94	0.75–1.18	0.581	0.89	0.72–1.13	0.363	0.78	0.62–1.00	0.048
Other, non-Hispanic	-	1.81	1.23–2.65	0.003	1.74	1.17–2.56	0.006	1.62	1.09–2.41	0.017
Health insurance (ref = yes health insurance)	27390	-	-	-	-	-	-	-	-	-
No health insurance	-	2.41	2.02–2.87	<.0001	2.19	1.83–2.63	<.0001	1.85	1.51–2.26	<.0001
Birth sex (ref = male)	27388	-	-	-	-	-	-	-	-	-
Female	-	1.04	0.91–1.18	0.606	-	-	-	1.11	0.97–1.28	0.126
Age (years) (ref = 18–24)	27447	-	-	-	-	-	-	-	-	-
25–44	-	1.29	1.03–1.63	0.030	-	-	-	1.25	0.98–1.58	0.068
45–64	-	1.09	0.86–1.38	0.471	-	-	-	1.05	0.82–1.34	0.709
65+	-	0.76	0.59–0.98	0.036	-	-	-	0.71	0.53–0.94	0.018
Education (ref = some college or college graduate)	27342	-	-	-	-	-	-	-	-	-
Less than high school	-	1.29	1.09–1.53	0.003	-	-	-	0.80	0.65–0.99	0.035
High school graduate	-	1.09	0.92–1.28	0.334	-	-	-	0.92	0.77–1.10	0.359
Income (ref = 400+%)	27660	-	-	-	-	-	-	-	-	-
< 200% FPL	-	1.38	1.19–1.60	<.0001	-	-	-	1.15	0.97–1.37	0.118
200–399% FPL	-	1.21	0.92–1.36	0.250	-	-	-	1.05	0.86–1.29	0.628
Personal care provider or doctor (ref = yes personal doctor)	27355	-	-	-	-	-	-	-	-	-
No personal doctor	-	1.78	1.53–2.07	<.0001	-	-	-	1.39	1.17–1.66	<0.001
Self-rated health (ref = good self-rated health)	27414	-	-	-	-	-	-	-	-	-
Poor SRH	-	1.93	1.68–2.22	<.0001	-	-	-	2.13	1.81–2.51	<.0001

CI confidence interval, *FPL* federal poverty level, *SRH* self-rated health

Table 3 Adjusted logistic regression models stratified by health insurance coverage for the association of COVID-19 pandemic calendar year and unmet healthcare need

	Yes health insurance coverage			No health insurance coverage		
	Odds ratio	95% CI	*p* value	Odds ratio	95% CI	*p* value
Calendar year						
2020 (vs. 2018–2019)	1.12	0.96–1.29	0.143	0.72	0.52–1.00	0.051

CI confidence interval

government-funded health insurance [26]. In addition, the Affordable Care Act ensured safety net coverage for those who lost health insurance and the 2020 Families First Coronavirus Response Act required states to keep people continuously enrollment in Medicaid [27].

Second, the scope and types of telehealth services expanded during the first year of the pandemic, as did reimbursement for telehealth services [15]. Select telehealth services were available to underinsured and uninsured adults through free clinics [16, 28]. One cross-sectional survey conducted in April 2020 found that 48% of consultation visits occurred via telehealth [12]. A proportion of adults who delayed in-person medical care during the first year of the pandemic continued receiving services via telehealth. This avenue to care may have contributed to the population who reported no unmet care despite decreases in access to in-person healthcare services and increases in healthcare need [29].

Increases observed in telehealth use only offset approximately 40% of the declines in in-person healthcare visits, which suggests that unmet healthcare need among adults was not completely addressed by expanded telehealth services [12]. This brings us to a third possible explanation. Given the severity of the epidemic in NYC, it is possible that the individuals who would have seen a provider under normal circumstances chose not to access healthcare because of COVID-19 exposure risk in healthcare facilities. If this was an active choice, it may not have been reported as an unmet healthcare need. This explanation was confirmed by another analysis that explored reasons why non-elderly fee-for-service Medicare beneficiaries experienced delayed care during the pandemic. Park and Stimpson found that among non-elderly adults with no disabilities, the most common reason for not seeing a doctor despite medical need was the perception that the issue was

not serious enough [30]. It is possible that individuals who perceived their health needs as not requiring care would not consider themselves as having experienced an unmet healthcare need. Perceptions of healthcare need may have been affected by the context and risk associated with accessing care. Thus, self-reported unmet healthcare need could be a poor proxy for actual unmet healthcare need, especially during a disease outbreak.

Federal pandemic relief policies began loosening in early 2022. For example, the Pandemic Relief Fund ended in April 2022, meaning that the federal government stopped providing free universal healthcare for COVID-19-related needs. Later, in March 2023, continuous enrollment for Medicaid recipients ended, meaning that states were able to disenroll people from Medicaid. In May 2023, the Biden Administration announced the end of the COVID-19 public health emergency (PHE), which signaled the end of federal funding for COVID-19 vaccines, tests, or treatments. After federally purchased COVID-19 vaccines and tests are depleted, individuals will cover costs themselves or through health insurance [31]. This change will create cost barriers that negatively affect those disproportionately impacted by COVID-19, as well as low-income and uninsured and underinsured individuals [32].

Our study had several limitations that should be considered in interpreting the results. First, the outcome variable asked participants to recall unmet healthcare experienced "within the past 12 months." For survey participants interviewed in early 2020, this period included pre-pandemic months. However, it is likely that individual's recall drew more from immediate or recent health need at the time of the survey as opposed to past events, characteristic of recall bias [33]. Findings may not be generalized to other time periods because contextual factors like transmission levels, healthcare capacity, and COVID-19-related

healthcare policies changed after the first year of the pandemic as COVID-19 evolved. Additionally, our results are not generalizable to populations outside of NYC because the spread of infection and lockdown measures in 2020 were more severe in NYC than in other parts of the US. On the other hand, one key strength of this study was its use of a population-representative survey. The CHS sample size was large (N = 27,660) with less than 3% missing data (N= 565) and 2018, 2019, and 2020 CHS datasets used consistent methodology and survey questions over time.

The pandemic can be seen as a natural experiment; therefore, it is unlikely that the prevalence of risk factors for unmet healthcare need changed significantly among New Yorkers during the study time period. Nonetheless, during the first year of the pandemic, many jobs transitioned to remote work and a proportion of employees in NYC moved out of the city. Any differences in population characteristics pre- versus post-pandemic could confound the primary association so we conducted a sensitivity analysis to adjust for potentially important characteristics such as sex, age, education, subjective health, and having a health provider. Even after adjusting for these factors, we found no difference in unmet healthcare need during the first year of the pandemic compared to the two prior years for the population overall. The study sample size was large ($N = 27,660$) therefore, lack of significant associations was unlikely due to low statistical power.

We believe this analysis to be one of the first to examine potential impacts of universal healthcare in the US during a period when population healthcare need was high, and the government financed no-cost COVID-19 healthcare. Although our findings are restricted in scope, they suggest that even a limited version of universal healthcare had a major impact in preventing exacerbation of healthcare access disparities. With the COVID-19 pandemic becoming entrenched coupled with ending pandemic-related programs, there will be additional opportunities to explore the population health impacts during a pandemic as policies are initiated and later terminated. As population data becomes available, such as upcoming years of CHS data for 2021–2023, additional analyses should be conducted to understand ways that changes in healthcare policies and programs effect health and healthcare access disparities during a pandemic. Time comparisons similar to what we present in

this analysis can be implemented to compare unmet healthcare need pre-pandemic, early pandemic, and late pandemic after universal COVID-19 healthcare ended. These analyses will help us gauge how government policies impact population health, which is vital to informing how states and cities respond to COVID-19 and future epidemics.

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