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Opioid Use Disorder in New York State 2022

EPIDEMIOLOGICAL PROFILE

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I. Background Summary

Opioid Use Disorder (OUD) is a chronic biopsychosocial disorder of public health significance characterized by misuse of opioid pain management substances.[1] According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* diagnostic criteria, symptoms of OUD include opioid cravings, high tolerance to opioids, withdrawal syndrome, and acknowledgment of the negative effects of opioids despite continued use.[2] Risk factors of OUD include limited access to mental health resources, social and community substance use exposure, and stress resulting from economic instability.[1]

Barriers exist in determining accurate prevalence and incidence rates of OUD in New York State (NYS) and the United States (US), requiring adoption of opioid use indicators as a proxy for OUD. Consequently, the estimated 2.1 million people with OUD in the US in 2016 was likely an underestimate.[3] The first barrier in determining accurate prevalence and incidence OUD rates is the disorder's chronic nature and susceptibility to relapse.[1] Second, population-wide surveys that aim to determine cases of OUD are limited due to exclusion of those incarcerated and without permanent addresses.[4] The use of administrative data instead of population-wide surveys does not solve this representation problem, because administrative data fails to account for those without health insurance and healthcare access.[4] These populations not being accounted for through traditional surveillance methods impact OUD prevalence and incidence rates because institutionalization, homelessness, and lack of healthcare access are risk factors for OUD.[1] Opioid misuse, burden, and overdose are utilized as proxies for the disorder because of these barriers in accessing the true prevalence and incidence rates of OUD.

Opioid misuse and burden illustrate substantial opioid use in both NYS and the US. Opioid misuse is defined as the inappropriate use of pain relievers,[5] and opioid burden is defined as the combined measure of opioid abuse, dependence, overdose deaths, outpatient visits to the emergency department, and hospital discharges for opioid overdose.[6] In 2019, 10.1 million Americans reported opioid misuse (3.7% of population 12+ years old).[5] In NYS alone, 145,000 people misused opioids annually from 2011 to 2014.[7] From 2018 to 2019, the rate of opioid burden decreased by 11.8% in NYS (283.1 per 100,000 people to 249.8 per 100,000 people).[7] Rates of opioid burden are unavailable for the US.

Furthermore, NYS is one of the top five states for drug overdose in the US, indicating that NYS is a priority population for OUD intervention.[8] For 2018 and 2019, the NYS overdose mortality rate across all opioid types remained at 15.1 per 100,000 people.[7] Despite this stabilization in overdose mortality for all opioid types, the NYS overdose mortality rate from synthetic opioids (e.g. fentanyl, methadone)[9] increased by 8.1% from 2018 to 2019 (11.1 per 100,000 people to 12.0 per 100,000 people).[7] This increase in deaths from synthetic opioids may suggest expanding use of synthetic opioids over prescription opioids, highlighting the need for adapting public health interventions. The 2021 national reported incidence rate of emergency department visits and hospitalizations due to opioid overdose was 179.9 per 100,000 people (35,153 visits and hospitalizations).[7] NYS's opioid overdose mortality rate for this same year was 15.1 per 100,000 people (2,955 deaths).[7] These incidence and mortality rates only begin to describe OUD's public health significance as medical assistance is not voluntarily sought out by those affected, further exacerbating the problem. For example, in 2019, less than 35% of adults with OUD nation-wide received treatment for their addiction in the previous 12 months.[10]

Although any person is susceptible to OUD, males between 25 and 44 years old, Non-Hispanic White people, and Sullivan County residents experienced the most opioid use in NYS. In the US, men are more likely to have OUD; in 2017, males experienced 32,337 deaths due to opioid poisoning whereas females experienced 15,263 deaths.[1] According to 2019 data from NYS, the age groups most likely to be affected by opioid-related mortality were 25 to 44 years old (27.1 deaths per 100,000 people).[11] Non-Hispanic White people had the highest opioid poisoning mortality rate (17.3 per 100,000 people), whereas non-Hispanic Asian/Pacific Islanders had the lowest mortality rate (1.8 deaths per 100,000 people).[11,12] In 2019, mortality rates were highest among the regions of NYS excluding New York City (NYC) (16.1 per 100,000 people excluding NYC, 15.1 per 100,000 people including NYC), with Sullivan County having the highest mortality rate (39.8 deaths per 100,000 people as of 2019).[7,11] From this data, it is imperative that OUD interventions target these groups.

NYS has implemented programs to prevent, alleviate further health complications among those affected, and decrease mortality from OUD. To prevent OUD, NYS has implemented the Drug Take Back program, a state-wide initiative that encourages people to discard unused pain drugs to pharmacies confidentially and free of cost.[13] From Drug Take Back drop-off locations, the United States Drug Enforcement Administration collected 43.3 tons of prescription medications in 2018 alone, indicating the popularity of this program in NYS.[13] In an effort to alleviate further health complications from OUD, NYS designed Drug User Health Hubs.[13] These Hubs provide culturally competent and judgment-free treatment services to those who use drugs to increase accessibility of health services.[13] By partnering with agencies like substance use programs and law enforcement, 1,918 people were referred to the Drug User Health Hubs in 2018.[13] To decrease OUD mortality, NYS has become a national leader in facilitating naloxone administration programs that aim to educate the public on how to identify opioid overdoses and administer naloxone, an overdose reversal drug.[13] From 2006 to 2021, over 700,000 community members were trained to administer naloxone.[11] Despite the popularity of these programs, opioid use persists in NYS.

The continued burden of OUD in NYS requires the expansion of existing programs and development of new programs. Thus, the goal of this epidemiological profile is to assess the populations most impacted by OUD to inform intervention design.

II. Sociodemographic Description

Understanding the demographics and socioeconomic status of the NYS population is pivotal in contextualizing OUD's public health significance. This section describes demographic and socioeconomic aspects of NYS's population using Decennial Census and American Community Survey (ACS) data.

A. Demographics

Population. The total population of NYS as determined by the 2020 Decennial Census was 20,201,249.[14] By population, NYS was the fourth largest state in the US, preceded by California (population size of 39,538,223),[15] Texas (population size of 29,145,505),[16] and Florida (population size of 21,538,187).[17] Within NYS, the most populous counties were Kings County (population size of 2,736,074), followed by Queens County (population size of 2,405,464) and New York County (population size of 1,694,251).[14] Since the 2010 Decennial Census, the state's population increased by 4.2% (832,147 people, 2021 ACS estimate).[14]

Age and Sex. According to the 2021 ACS estimates displayed in **Table 1**, the most densely populated age group for men living in NYS was 30 to 39 years old (14% of men), whereas the 20 to 29, 30 to 39, 50 to 59, and 60 to 69 years old age groups were equally distributed for women (13% of women in each group).[18] Only 3% of men and 5% of women were 80 years or older in NYS.[18] This general distribution is remarkably similar to the 2016 ACS data displayed in **Table 2**, except 15% of men were in the 20 to 29 years old age group, and women were primarily in either the 20 to 29 or 50 to 59 years old age groups (14% respectively) as compared to 2021 estimates.[19]

Race and Ethnicity. As displayed in **Table 3**, the 2020 Decennial Census reported that 55% of the NYS population was White.[14] Black people comprised the second largest racial category (15%), followed by Asian people and those with two or more races (10% and 9%, respectively).[14] American Indian/Alaska Native and Native Hawaiian/Other Pacific Islander were the smallest racial groups in the state (1% and <1%, respectively).[14] These population distributions are similar to the 2010 Decennial Census, where White people comprised 66% of the population, Black people were 16% of the population, followed by Asian people (7%) and people with two or more races (3%).[14] American Indian/Alaska Native and Native Hawaiian/Other Pacific Islanders were equally populated from the 2020 Census to the 2010 Census (1% and <1%, respectively).[14]

B. Socioeconomic status

Poverty and Income. As estimated by the 2021 ACS, the median household income in NYS was $74,314, which was $4,597 higher than the US median household income ($69,717).[20] By this same estimate, 13.9% of NYS community members lived below the federal poverty level, which was slightly higher than the national estimate (12.8%).[20]

Employment. The unemployment rate in NYS was estimated to be 43.1% by the 2021 ACS.[20] This estimate was only 2% higher than the average unemployment rate in the US (41.1%).[20] NYS's unemployment rate has gradually decreased, as this rate was estimated to be 40.8% in 2016 and 39.5% in 2019.[20] The 3.6% increase in unemployment rate observed from 2019 to 2021 may be due to the economic impacts of COVID-19.[20]

Education. As determined by the 2021 ACS, among those aged 25 years and older, it was estimated that 24.4% of people in NYS have a high school diploma or equivalent as their highest degree.[20] This estimate was 3.5% lower than the national estimate (27.9%).[21] Additionally, 2021 ACS estimates reveal that 11.9% of the NYS population's educational attainment was below a high school diploma or equivalent degree,[20] which was 3% higher than the national estimate (8.9%).[21]

Access to Healthcare. The 2021 ACS estimated that 5.2% of people in NYS lack health insurance coverage.[20] This estimate was 3.4% lower than the national estimate (8.6%).[20] The estimated percentage of people in NYS without health insurance coverage decreased by 0.9% since the 2016 ACS estimate (6.1%).[20] This rate has remained constant in the past few years, as the 2019 ACS rate was 5.2%.[20]

III. Data Disease Summary

This section aims to describe OUD in NYS by evaluating opioid burden, emergency department visits due to opioid overdoses, fatal opioid overdoses, Neonatal Abstinence Syndrome, and Human Immunodeficiency Virus transmission from injection opioid use. Rate of opioid burden is defined as a cumulative measure of opioid abuse prevalence rates, dependence prevalence rates, overdose mortality rates, outpatient visits to emergency departments incidence rates, and hospital discharges for overdose incidence rates.[6]

A. Opioid use over time

Despite an overall state-wide increase in opioid deaths since 2010, 2019 indicators revealed a decrease of opioid use in NYS but not nationally. According to the New York State Department of Health (NYSDOH), the 2019 NYS rate of opioid burden was 249.8 per 100,000 people,[6] the incidence rate of emergency department visits due to opioid overdose was 54.4 per 100,000 people,[22] and the opioid overdose mortality rate was 15.1 per 100,000 people.[23] In NYS opioid burden, emergency department visits due to overdose, and overdose deaths decreased overall from 2016 to 2019, with opioid burden experiencing the greatest decrease (15.9%),[6] followed by emergency department visits due to overdose (5.4%)[22] and overdose deaths (3.2%).[23] Despite this decrease from 2016 to 2019, the opioid overdose death rate has gradually increased in NYS since 2010, with an overall percent increase of 202%.[23] Not only were the opioid overdose incidence rates lower in NYS than nationally, but they were also experiencing opposite trends.[24] According to the Centers for Disease Control and Prevention (CDC), the US experienced a 6% increase in opioid overdoses from 2018 to 2019.[24] CDC data from this same year range indicated a 29% decrease of opioid overdoses in NYS specifically.[24] Furthermore, 2022 CDC data indicated a national opioid overdose incidence rate of 25.4 per 100,000 people, which is higher than the NYS 2019 opioid overdose incidence rate reported by the NYSDOH (15.1 per 100,000 people).[23,24]

B. Geographical distribution of opioid use

Opioid use indicators (i.e., opioid burden, emergency department visits due to overdose, and fatal overdoses) varied from region-to-region in NYS, but NYC, Western, and Central New York were most

severely affected. The geographic prevalence of opioid burden, emergency department visits due to opioid overdose, and opioid overdose deaths in 2019 was concentrated in the lake-bordering regions of Western and Central New York, as well as the Southeast region of the state.[6,22,23] As shown in **Table 4**, in 2019, the North Country had the lowest rates of opioid burden, emergency department visits due to opioid overdose, and opioid overdose deaths in the state (101.2 per 100,000 people for opioid burden, 26.8 per 100,000 people for emergency department visits, and 7.0 per 100,000 people in opioid overdose deaths).[6,22,23] The region with the highest rate of opioid burden was NYC (273.9 per 100,000 people),[6] whereas the region with highest emergency department visits due to opioid overdose incidence rate was the Finger Lake Region (100.3 per 100,000 people)[22] and the region with the highest opioid overdose mortality rate was Central New York (20.7 per 100,000 people) in 2019 (**Table 4**).[23] The 2019 state-wide mortality rates including and excluding NYC were roughly similar (15.1 per 100,000 people and 16.1 per 100,000 people respectively),[23] whereas this similarity was not observed for opioid burden and emergency department visits due to opioid overdose incidence rates (**Table 4**).[22,23]

C. Opioid use by sex and age

Sex. Although males had higher rates of opioid burden, emergency department visits due to overdose, and overdose deaths than females in NYS, the temporal trends of these rates were the opposite for the state versus national level. From 2016 to 2019, males consistently had a higher rate of opioid burden, emergency department visits due to opioid overdose, and overdose mortality than females in NYS. [6,22,23] For males in 2019, the rate of opioid burden was 366.0 per 100,000 people,[6] the emergency department visits due to opioid overdose incidence rate was 75.9 per 100,000 people, [22] and the opioid overdose mortality rate was 22.5 per 100,000 people in NYS.[23] For females in 2019, the rate of opioid burden was 140.1 per 100,000 people,[6] the emergency department visits due to opioid overdose incidence rate was 34.0 per 100,000 people, [22] and the opioid overdose mortality rate was 8.1 per 100,000 people in NYS.[23] In NYS, both males and females experienced a decrease in opioid use-indicating rates from 2016 to 2019 (14.3% decrease and 19.1% decrease respectively).[6,22,23] Nationally, the CDC reported a 4.3% increase in opioid overdose mortality rate in males and a 7.8% increase in opioid overdose mortality rate in females from 2018 to 2019,[24] whereas the NYSDOH reported a 5.0% decrease among males and a 10.1% decrease among females for this same period in NYS.[23] Despite the 2018 to 2019 decrease in opioid burden for both sexes, the opioid overdose deaths in NYS increased by 216.9% for males and 161.0% for females from 2010 to 2019.[23]

Age. The highest rates of opioid burden, emergency department visits due to overdose, and overdose deaths were among middle aged people in NYS, but temporal trends revealed the largest change in opioid deaths among older age groups. NYS data from 2019 indicated that the 25 to 44 years old age group had the highest opioid burden rate (513.7 per 100,000 people),[6] emergency department visits due to opioid overdose incidence rate (102.4 per 100,000 people),[22] and opioid overdose mortality rate (27.3 per 100,000 people),[23] whereas the 0 to 17 years old age group had the lowest opioid burden rate (3.9 per 100,000 people),[6] emergency department visits due to opioid overdose incidence rate (2.7 per 100,000 people),[22] and opioid overdose mortality rate (0.2 per 100,000 people).[23] In NYS, the 18 to 24 years old age group shared a uniquely large decrease in rates among all three indicators described as compared to the other age groups in 2019.[6,22,23] From 2016 to 2019, the NYS opioid burden rates among the 18 to 24 age group decreased by 55.4%[6] and the emergency department visits due to opioid overdose incidence rates decreased by 49.9%.[22] The group with the smallest rate change from 2016 to 2019 was the 45 to 64 years old age group for opioid burden (3.7% increase)[6] and the 25 to 44 years old age group for emergency department visits due to opioid overdose (2.2% decrease) in NYS.[22] For opioid overdose deaths in NYS, the 65+ years old age group experienced the largest change in mortality rate (45.7% increase) and the 0 to 17 years old age group experienced the smallest change in mortality rate (0.0% change) from 2016 to 2019, with the 25 to 44 years old age group having the largest mortality rate (27.3 per 100,000 people in 2019) and the 0 to 17 years old age group having the smallest mortality rate (0.2 per 100,000 people in 2019).[23] This large increase among the 65+ years old age group in NYS may be due

to populations of people with OUD increasing in age as opposed to new diagnoses of OUD occurring within the age group.

D. Opioid use by race and ethnicity

Although Non-Hispanic White people had the highest rates of opioid burden, emergency department visits due to overdose, and overdose deaths, rates among this racial group have fallen; Alternatively, the rates for Hispanic and Non-Hispanic Black populations have increased in NYS, but not necessarily nationally. Interestingly, from 2016 to 2019, opioid burden, emergency department visits due to opioid overdoses, and opioid overdose death rates only notably decreased among Non-Hispanic White people in NYS (**Figure 1**).[6,22,23] NYS Non-Hispanic Black people experienced a 2.8% increase of opioid burden,[6] 32.1% increase in emergency department visits due to opioid overdoses,[22] and a 26.7% increase in opioid overdoses from 2016 to 2019.[23] Similarly, from 2016 to 2019, Hispanic people experienced a 0.2% increase of opioid burden,[6] 24.6% increase in emergency department visits due to opioid overdoses,[22] and a 23.7% increase in opioid overdoses in NYS.[23] For this same year range in NYS, non-Hispanic Asian and Pacific Islander populations experienced very little change in opioid burden rate and emergency department visits due to opioid overdose incidence rate (0.5% decrease and 0.0% increase, respectively),[6,22] but a 46.1% increase in opioid overdose mortality rate.[23] Unlike these other racial groups, Non-Hispanic White people experienced an overall decrease in opioid burden, emergency department visits due to opioid overdoses, and opioid overdose mortality rates (25.3% decrease, 18.8% decrease, and 14.9% decrease respectively) from 2016 to 2019 in NYS.[6,22,23] This difference may be due to opioid use interventions only positively affecting Non-Hispanic White populations due to inequitable distribution of intervention resources. As displayed in **Table 5,** the national drug overdose mortality rate reported by the CDC in 2020 was consistently higher among all racial and ethnic groups than the data for NYS in 2019.[23,25] In addition to drug overdose mortality rates being consistently higher nationally, the trends observed in NYS across racial and ethnic groups were not necessarily observed in other states. According to the HEALing Communities Study, Kentucky and Ohio experienced different trends from NYS from 2018 to 2019, but Massachusetts experienced similar trends.[26] Thus, the observations made for NYS cannot be generalized to all other states.

E. Opioid use impact on Neonatal Abstinence Syndrome

Neonatal Abstinence Syndrome (NAS) is a disorder among newborn children that results from intrauterine opioid exposure from maternal opioid use.[27] The burden of NAS was highest among low income, rural, and publicly insured individuals in NYS. The 2019 incidence rate of NAS newborn hospitalizations in NYS was 4.6 per 1,000 newborns (944 cases), which was lower than the national incidence rate (6.3 per 1,000 newborns; 22,570 cases).[28] Similarly, the incidence rate of NAS newborn hospitalizations in NYS was 4.6 per 1,000 newborns among males and 4.5 per 1,000 newborns among females, also lower than the national incidence rates (6.6 per 1,000 newborns for males and 6.1 per 1,000 newborns for females) in 2019.[28] Although the incidence rates among males and females have both increased similarly in NYS, there was a large discrepancy in 2018 when the incidence rate among females (4.2 per 1,000 newborns) was much lower than that of males (5.1 per 1,000 newborns).[28] Overall, incidence rates increased from 2009 to 2019 both nationally (117.2% increase) and in NYS (155.6% increase).[28]

Unlike NYS, national incidence rates of NAS infant hospitalizations increased as income quartile decreased.[28] In 2019, the lowest income quartile nationally had the highest incidence rate of NAS infant hospitalizations (8.5 per 1,000 newborns) whereas the highest income quartile had the lowest incidence rate of NAS infant hospitalizations (3.1 per 1,000 newborns).[28] Surprisingly, this correlation of income decrease with NAS infant hospitalizations increase was not reflected in NYS.[28] In 2019, NYS's second lowest quartile had a higher incidence rate of NAS infant hospitalization (6.7 per 1,000 newborns) than the lowest income quartile (5.0 per 1,000 newborns).[28] Like the nation-wide data from 2019, the highest income quartile had the lowest incidence rate of NAS infant hospitalizations (3.4 per 1,000 newborns) in NYS.[28]

NAS infant hospitalization incidence rates decreased in both NYS and the US as population density increased. The geographic prevalence of NAS infant hospitalizations in NYS was highest in rural regions (13.1 per 1,000 newborns), and gradually decreased as metropolitan size increased, as large central metropolitan areas experienced the smallest incidence rate (2.4 per 1,000 newborns) in 2019.[28] Nationally, this same trend was observed, as rural regions experienced the largest incidence rate of NAS infant hospitalizations (9.5 per 1,000 newborns) and large central metropolitan areas experienced the smallest incidence rate (4.0 per 1,000 newborns) in 2019.[28]

For both NYS and the US, NAS incidence rates were highest among those with public insurance and lowest among those with private insurance. In 2019, both national and NYS NAS infant hospitalization incidence rates were highest among those with Medicaid (8.1 per 1,000 newborns for NYS and 11.9 per 1,000 newborns nationally) and lowest among those with private insurance (1.2 per 1,000 newborns for NYS and 1.3 per 1,000 newborns nationally).[28] NYS experienced a large decrease in those with self-paid or no charge for NAS infant hospitalization (64% decrease) as compared to a national decrease of 17.1% from 2009 to 2019.[28]

F. Opioid use and Human Immunodeficiency Virus

Human Immunodeficiency Virus (HIV) transmission due to injection drug use is most common among women, American Indian/Alaska Native people, and older age groups. HIV is an important co-morbidity of OUD due to HIV transmission during injection drug use.[29] In 2019, there were 2,336 new HIV diagnoses in NYS, and 184 of these diagnoses were due to injection drug use (7.9%).[29] This percentage of HIV transmission due to injection drug use was 1.0% higher than the national percentage (6.9%) in 2019.[29]

For both NYS and the US, the incidence of HIV transmission due to injection drug use was lower among men than women. Likely due to differences in transmission modes, men had a lower percentage of HIV transmission due to injection drug use than women in the US (5.3% and 18.0% respectively).[29] These 2019 percentages were higher than the national percentage of HIV transmission due to injection drug use (4.7% among males and 16.6% among females), though the same trend was observed.[29]

Incidence of HIV transmission due to injection drug use across racial groups was different for NYS and the US, particularly among American Indian/Alaska Native populations. In NYS, the percentage of HIV transmission due to injection drug use in 2019 was similar across Black (9.1%), Multiracial (8.5%), White (7.8%), and Hispanic (7.0%) populations, and low among Asian (3.0%), Native Hawaiian/Other Pacific Islander (0.0%), and American Indian/Alaska Native populations (0.0%).[29] Interestingly, the percentage of HIV transmission due to injection drug use was much higher nationally among American Indian/Alaska Native people (16.6%) than in NYS (0.0%) in 2019.[29] In this same year, the national percentage of HIV transmission due to injection drug use was lowest among Native Hawaiian/Other Pacific Islanders (1.5%) and second highest among White people after the American Indian/Alaska Native group (13.0% and 16.7% respectively).[29]

For both NYS and the US, age increase was positively associated with increased incidence of HIV transmission due to injection drug use. In 2019, the 13 to 24 years old age group had the lowest percentage of HIV transmission due to injection drug use incidence (3.0%) and the 55+ years old age group had the highest percentage (18.2%) in NYS.[29] This trend was observed nationally in 2019, with the 13 to 24 years old age group experiencing the lowest percentage of HIV transmission due to injection drug use (2.8%) and the 55+ years old age group experiencing the largest percentage (10.5%).[29]

IV. Assessment of Community Resources

NYS has many opioid-related resources, with programs at the primary, secondary, and tertiary prevention levels. Key programs include the Prescription Monitoring Program Registry, buprenorphine access initiatives, harm reduction practices through safe syringe use, school education programs, and Drug User Health Hubs.[13] In this section, the Drug Give Back program and naloxone distribution initiatives will be described in detail.

The Drug Give Back program aims to reduce opioid burden in NYS by decreasing access to opioids.[13] Decreasing access to opioids reduces the chance of leftover medications being inappropriately used, which is especially important given that 53.7% of individuals who received opioids through a non-medical prescription gained access to these drugs through a friend or relative.[30] In 2018, former Governor Cuomo signed the Drug Take Back Act into law, which requires that drug manufacturers take responsibility for the opioid crisis by coordinating drug take-back programs in NYS.[13] These programs aim to make drug destruction convenient and accessible to those whom these drugs were prescribed, reducing the prevalence of opioids in the community.[13] More specifically, individuals with leftover opioids from prescriptions can deliver these medications to an approved location for the drugs to be disposed of at no cost to the individual or the participating locations.[13] This intervention has been widely implemented because it is mandatory for drug manufacturers. For example, the NYSDOH's Bureau of Narcotic Enforcement approved 448 applications for drug take-back drop-off locations in October of 2018 alone.[13] Additionally, in 2018, the New York Division of the Drug Enforcement Administration collected 43.3 tons of leftover prescription drugs from participating drop-off locations, highlighting the program's popularity in NYS.[13] Because this program is mandatory for drug manufacturers, its sustainability is maintained as long as opioids are produced.[30] Additionally, the program's design enforces accountability for drug manufacturers while preventing undue burden on public health agencies to manage the opioid crisis.

Although there is no data that correlates Drug Give Back program implementation and opioid-related hospitalizations and deaths, the effectiveness of this intervention may be influenced by where collection sites are located within communities. For example, in 2019 Tompkins County, located in the Finger Lakes region of NYS, had the highest rate of emergency department visits due to opioid overdose in the state.[6,22,23] However, 90% of the county's drug drop-off locations are at police departments or probation offices.[31] Because community members may be afraid of criminalization for their opioid possession due to stigma associated with addiction, people may be dissuaded from using these drop-off sites. This dissuasion may contribute to the county's high overdose rates. It is recommended that approved drop-off locations take into consideration the impact of stigma on behavior by relocating drop-off sites to be in more neutral locations, such as libraries, community centers, or hospitals.

Unlike the Drug Give Back program that aims to prevent the development of OUD, NYS also has naloxone distribution initiatives that aim to prevent OUD mortality.[13] Naloxone distribution initiatives, established as part of the *New York Public Health Law section 3309* and *10 New York Codes, Rules, and Regulations (NYCRR) 80.138*, aim to reduce opioid deaths by educating the public on how to identify opioid overdoses and administer naloxone, an overdose-reversing drug.[13] Since the commencement of this initiative in 2006 to 2020, over 850 formal overdose prevention programs have been implemented in NYS.[32] From these programs, over 700,000 community members have been educated as of 2021.[32] As displayed in **Figure 2**,[32–37] naloxone administrations by community members have increased since 2013, with 2,749 naloxone administrations occurring in 2019 alone.[34] The dip in administrations in 2020 may be due to the COVID-19 pandemic when people spent less time outside home.[32] The administrations reported in **Figure 2** are all conducted by community responders.[32–37] Building a cohort of community responders, as opposed to emergency responders, cultivates a more informed community where community members can not only potentially save someone's life, but also help break down the stigma associated with opioid use in NYS. This program is both accessible and sustainable financially because all registered programs can request free naloxone from the NYSDOH via an online portal.[13] From this portal, over 116,000 naloxone kits were distributed to programs from 2018 to 2019.[13] It is important to note that all naloxone data is self-reported by community members, which can result in incomplete, untimely, and non-representative data from the actual number of naloxone administrations, making the presented data likely an underestimation.[13] Nonetheless, data suggests that a considerable number of lives have been saved from these programs.

To better understand how these initiatives impact OUD specifically, it is recommended that these programs design better monitoring and evaluation methods to improve knowledge of who is using the programs and that person's relationship to OUD. Monitoring and evaluation can be achieved through a

survey that assesses the association between program participation and characterization of opioid use. This survey can be available at drug drop-off locations and throughout communities through sponsorship by local naloxone distribution initiatives. The resulting data can be used to directly measure the role of OUD among those affected by these interventions.

V. Gaps, Needs, and Recommendations

A. Most impacted populations

The presented data reveals inequities in who is affected most by opioid burden, emergency visits due to opioid overdose, overdose deaths, NAS, and HIV transmission due to injection drug use in NYS. In 2019 for NYS, opioid burden was highest among Non-Hispanic Black males between 25 and 44 years old in NYC.[6] NYS emergency department visits due to opioid overdose was highest among Non-Hispanic White males between 25 and 44 years old in the Finger Lake Region in 2019.[22] Similarly, NYS opioid overdose deaths was highest among Non-Hispanic White males between 25 and 44 years old in Central New York in 2019.[23] Since 2016, the 65 years old and older age group in NYS experienced the largest percent increase in deaths due to opioid overdose likely due to the increasing age of those with existing opioid use.[23] Since 2016, rates of opioid burden, emergency department visits due to opioid overdose, and opioid deaths due to overdose have increased for Hispanic and Non-Hispanic Black people but not Non-Hispanic White people.[6,22,23] There is a need for improved interventions to address these temporal disparities in age and race in NYS. In NYS for 2019, NAS was highest among male newborns with the lowest income quartile in rural areas and with public insurance.[28] HIV transmission due to injection drug use was highest among American Indian/Alaska Native males over 55 years old in NYS in 2019.[29]

B. Recommendations to address gaps and needs

Despite the popularity of the Drug Give Back program and naloxone distribution initiatives in NYS, there are specific recommendations for these programs to implement better monitoring and evaluation and increase the equitable distribution of resources. As mentioned in the *Assessment of Community Resources* section, implementing better monitoring and evaluation programs is necessary because there is currently no accessible data to specifically determine the impact of these initiatives on OUD, particularly for populations most impacted by opioid-related outcomes. As described in the *Data Disease Summary* section, given that rates of opioid burden, non-fatal opioid overdoses, and fatal opioid overdoses have only decreased among Non-Hispanic White people, it is imperative that current interventions evaluate their role in maintaining, or reducing, these disparities.

It is recommended a survey be implemented to address both the impact of initiatives on OUD and the assessment of sociodemographic inequities. This survey will be short, anonymous, and divided into the following three sections: sociodemographic information, initiative participation, and relationship to opioids. Data collected from this survey will inform how the programs can be revised to directly address OUD and the discrepancy of opioid-related improvement among racial and ethnic groups.

To increase the equitable distribution of resources, it is recommended that Drug Give Back program drop-off sites are relocated and offer financial incentives. It is recommended that drop-off sites are relocated to more neutral public spaces such as libraries and grocery stores. It has been revealed in the *Assessment of Community Resources* section that 90% of Drug Give Back drop-off locations in Tompkins County are in police departments or probation offices.[31] These locations may disincentivize people to return drugs, possibly contributing to this county's highest rates of hospitalizations from opioid overdose in the state. Due to stigma associated with the criminalization of addiction—particularly among people of color—it is crucial that better drop-off locations are created such that the program is equally accessible to all community members. Furthermore, because 13.9% of NYS community members live in poverty (2021),[20] it is recommended that NYS and pharmaceutical manufacturers implement financial incentives for drug give back participation. The drop-off locations could be automized, where people can first drop-off the medications, answer the survey previously described, and then receive a small monetary bonus for participation. This new method of dropping off drugs could operate like the recycling reward systems currently found in grocery stores. These recommendations to implement surveys, relocate drop-off sites,

and offer financial incentives for drug disposal can allow for increased monitoring to develop future interventions while also making existing interventions more accessible.

VI. Data Sources Summary

Non-OUD population data for NYS and the US is from the Decennial US Census and ACS. Because the ACS estimates are from 2021 and the Decennial US Census data was collected only one year earlier in 2020, the ACS has been determined as a relevant and representative source for 2022 socioeconomic factors. Wherever possible—such as for the total population, race, and ethnicity counts—Decennial US Census data was used due to its generalizability to all people since it captures the full population. Because ACS data is from surveys, it only provides estimates and may not be representative of actual counts. It is also important to note that COVID-19 has impacted data from both the Decennial US Census and the ACS data and thus may have unique generalizability issues due to the pandemic.

NYS data on opioid burden, emergency department visits due to opioid overdoses, and fatal opioid overdoses is sourced from the Statewide Planning and Research Cooperative System (SPARCS), which gathers administrative data from local hospitals.[6,22,23] Because the data uses ICD-10 codes, it is well standardized across the state and thus geographic discrepancies in reporting are unlikely. However, because ICD-10 codes are collected from hospitals, geographic trends for opioid prevalence may not represent where individuals reside and rather where they are hospitalized.

National data on opioid overdoses is gathered from the CDC's Drug Overdose Surveillance and Epidemiology (DOSE) system and State Unintentional Drug Overdose Reporting (SUDORS) system.[24,25] The syndromic, administrative data that DOSE compiles may not be accurate for making state-to-state comparisons due to differences in diagnostic codes, and therefore DOSE data is restricted to national interpretations.[24] The national data presented by SUDORS is derived from vital records and thus likely accurately represents drug overdose deaths due to the specificity of information required to complete death certificates.[25] It is important to note that this national data only includes the 29 participating jurisdictions and thus is an underrepresentation of actual national overdose death counts.[25]

Data on NAS is collected from the Agency of Healthcare Research and Quality State Inpatient Databases (AHRQSID) and State Emergency Department Databases (SEDD). This clinical and administrative data is collected on a voluntary basis and thus is an underrepresentation of actual NAS counts due to participation among only 41 states.[38] Furthermore, these counts only consider infants who are born in hospitals and thus may underrepresent infants in institutions or on reservations in NYS.

HIV data is collected from the National Center for HIV, Viral Hepatitis, STD, and TB Prevention AtlasPlus.[29] Because this source's data is collected from surveillance, its accuracy is dependent on the specific surveillance infrastructure of individual communities and thus the counts among certain socioeconomic groups may not be accurate, particularly groups from historically under-resourced communities.[29] Although more recent data is available, 2019 data was selected for this Epidemiological Profile because the COVID-19 pandemic disrupted surveillance testing for HIV and thus recent data is likely to be under representative of actual HIV transmission from injection drug use. For all data presented, rates may be misleading for counts that are low, as low counts have an increased sensitivity to rate and percent changes over time.

Data for the Drug Give Back Program and naloxone distribution initiatives in NYS is from the 2021 annual report published by the NYSDOH, an authoritative source of reliable and relevant information gathered systematically from local departments. These reports are published with the goal of communicating the state's progress on opioid use and thus are not likely influenced by outside factors. Data from these reports are accurate, as it is gathered from vital records, CDC Wide-Ranging Online Data for Epidemiologic Research, Statewide Planning and Research Cooperative System, Youth Behavior Risk Surveillance System, and NYS-run datasets.[13] As previously mentioned, naloxone administrations are likely an underestimation of the true value due to the use of self-reporting.[13]

VII. Appendices

Table 1. Population Distribution in New York State by Age and Sex, 2021

Age Group (Years)	Population (%)	
	Male	Female
0-9	1,131,155 (12)	1,068,567 (11)
10-19	1,228,064 (13)	1,180,946 (12)
20-29	1,298,549 (13)	1,309,258 (13)
30-39	1,383,060 (14)	1,361,161 (13)
40-49	1,181,156 (12)	1,221,869 (12)
50-59	1,291,680 (13)	1,337,019 (13)
60-69	1,179,915 (12)	1,292,480 (13)
70-79	694,156 (7)	859,156 (9)
80+	308,838 (3)	508,884 (5)
Total	9,696,573 (99)*	10,139,340 (101)*

Data Source: American Community Survey, 2021[18]
*Percentage totals round to 99% and 101% and not 100% due to rounding errors.

Table 2. Population Distribution in New York State by Age and Sex, 2016

Age Group (Years)	Population (%)	
	Male	Female
0-9	1,188,174 (12)	1,126,993 (11)
10-19	1,207,338 (13)	1,177,758 (12)
20-29	1,446,890 (15)	1,441,738 (14)
30-39	1,322,323 (14)	1,350,360 (13)
40-49	1,216,920 (13)	1,269,136 (13)
50-59	1,322,323 (14)	1,421,432 (14)
60-69	1,044,443 (11)	1,177,758 (12)
70-79	536,595 (6)	680,257 (7)
80+	297,044 (3)	517,807 (5)
Total	9,582,050 (101)*	10,163,239 (101%)*

Data Source: American Community Survey, 2016[20]
Percentage totals round to 101% and not 100% due to rounding errors.

Table 3. Population Distribution in New York State by Race and Ethnicity, 2020 and 2010

	Year	
	2020	2010
Race*		
White	55%	66%
African American	15%	16%
Asian	10%	7%
American Indian/Alaska Native	1%	1%
Native Hawaiian/Other Pacific Islander	<1%	<1%
Two or More Races	9%	3%
Ethnicity*		
Hispanic (of any race)	20%	18%
Not Hispanic (of any race)	81%	82%

Data Source: Decennial Census, 2020 and 2010[14]
*Exact counts not available.

Table 4. Geographic breakdown of opioid burden, emergency department visits due to opioid overdose, and opioid overdose mortality rates in New York State, 2019. Rates are reported per 100,000 people.

Region	Crude burden rate*	Crude emergency department visits due to opioid overdose incidence rate	Crude mortality rate
Long Island	222.6	59.3	16.6
New York City (NYC)	273.9	44.1	13.8
Mid-Hudson	259.0	50.6	15.3
Capital Region	247.1	56.0	14.9
Mohawk Valley	148.1	45.3	8.6
North Country	101.2	26.8	7.0
Tug Hill Seaway	167.0	29.1	8.5
Central New York	224.6	74.7	20.7
Southern Tier	197.8	55.4	13.3
Finger Lakes	241.1	100.3	19.8
Western New York	253.6	65.5	16.0
Total (excluding NYC)	231.6	62.1	16.1
Total (including NYC)	249.8	54.4	15.1

Data Source: New York Opioid Dashboard 2019. New York State Department of Health.[6,22,23]
*Crude burden is defined as a cumulative measure of opioid abuse prevalence rates, dependence prevalence rates, overdose mortality rates, outpatient visits to emergency departments incidence rates, and hospital discharges for overdose incidence rates.[6]

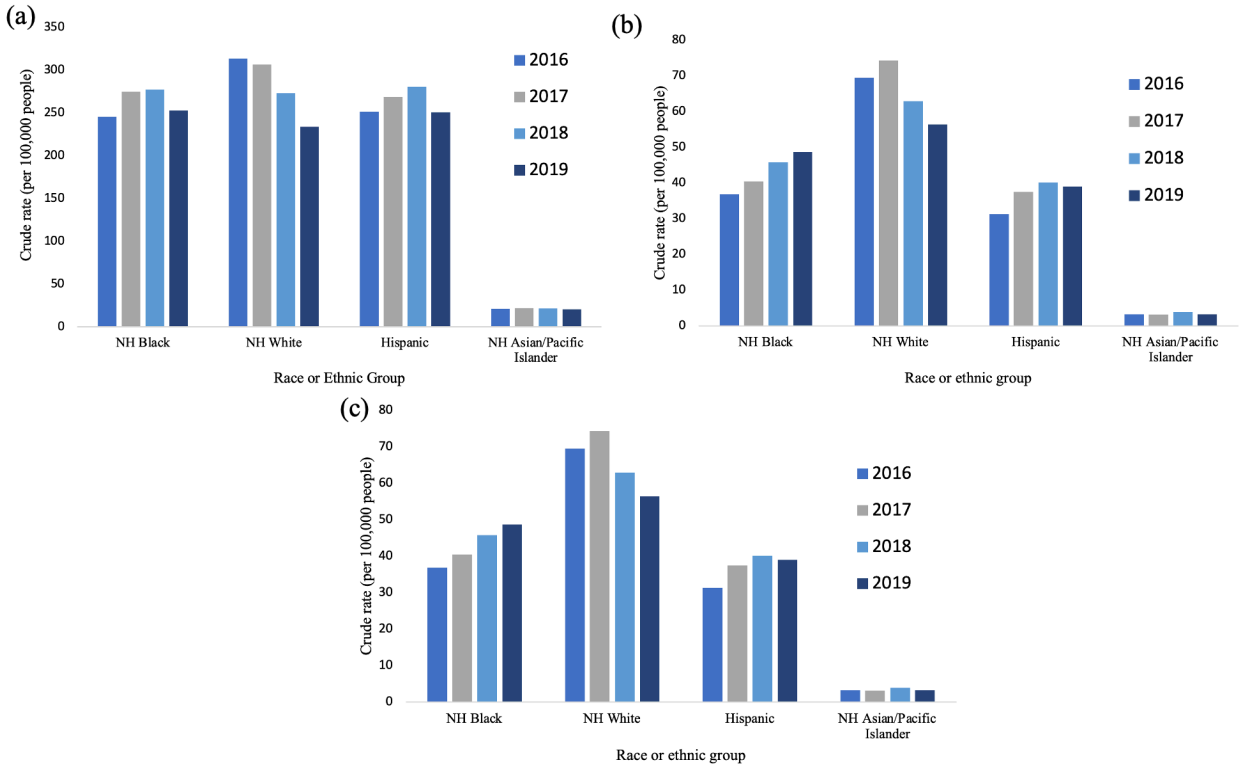

Figure 1. (a) Crude rate of opioid burden (b) crude incidence rate of emergency department visits due to opioid overdoes and (c) crude mortality rate of opioid overdose deaths from 2016-2019 in New York State across different racial and ethnic groups. NH: Non-Hispanic. Adapted from the New York Department of Health.[6,22,23]

Table 5. Comparisons drug overdose mortality rate for the United States (US) versus New York State (NYS) in 2020 and 2019 respectively. Rates are presented per 100,000 people.

Race or ethnic group	US mortality rate of drug overdose*	NYS mortality rate of drug overdose**
Non-Hispanic Black	38.6	14.7
Non-Hispanic White	32.8	16.5
Hispanic	22.3	16.2
Non-Hispanic Asian/Pacific Islander	3.5	1.9

Data Source: Centers for Disease Control and Prevention[26] and New York State Department of Health.[24]
* Reported by the Centers for Disease Control and Prevention, 2020
**Reported by the New York State Department of Health, 2019

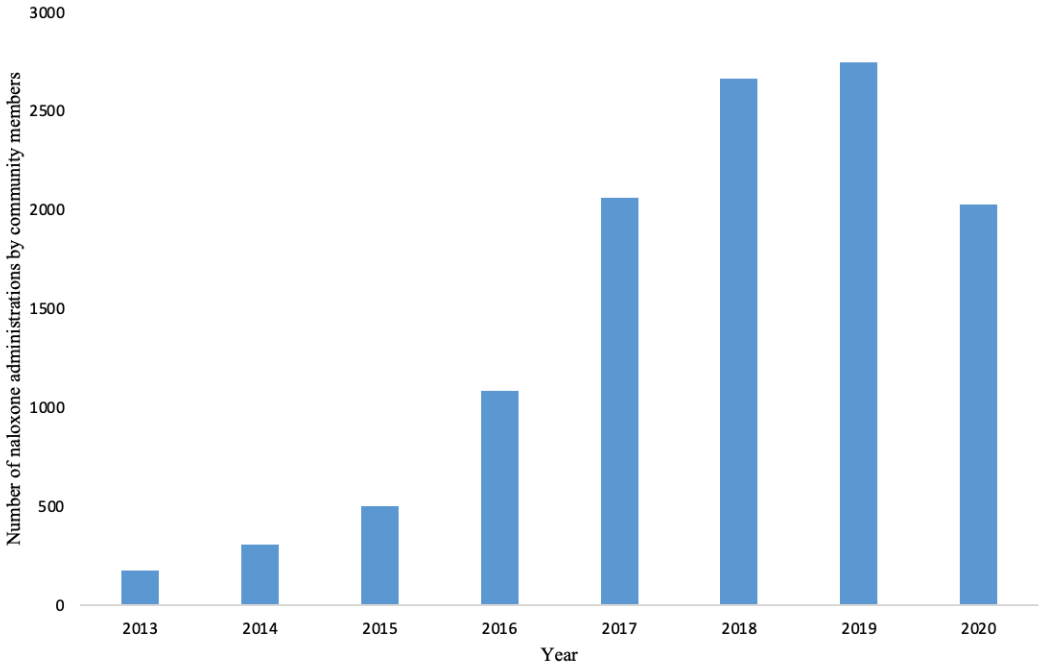

Figure 2. Number of naloxone administrations by community members in New York State from 2013 to 2020. Adapted from the New York State Department of Health.[32–37]

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