AJPM FOCUS
INCLUSIVITY IN PEOPLE, METHODS, AND OUTCOMES
PROGRAM EVALUATION

Pivoting COVID-19 Resources for an Equitable Mpox Vaccine Response in Louisiana

Arundhati Bakshi, PhD,[1] John McClure, BS,[1] Theresa Sokol, MPH,[2] Lee Mendoza, PhD,[3] Arun Adhikari, PhD,[3] Nancy Zhao, MPH,[1,#] Suryatapa Kar, MPH,[1,#] Jimmy Gale, BS,[4] Javone Davis Charles, MPH,[1] Kyle Freese, PhD, MPH,[5] Ousswa Kudia, MPH,[5] Sara Brown, MPH[5]

Introduction: The first case of mpox in Louisiana was identified 2 months ahead of Southern Decadence Festival in New Orleans, the largest LGBTQ+ Pride festival in the South. With mpox case numbers reflecting racial disparities, the objective was to mount an equitable vaccination response.

Methods: The Louisiana Department of Health rapidly pivoted its COVID-19 resources and strategies—specifically, using vaccine strike teams and mobile events, in-state vaccine redistribution through centralized warehousing and shipping support, and community partnerships—to now control mpox transmission. Here, the authors have evaluated state-based Immunization Information System data to examine whether the vaccination response was geographically and racially equitable. Geographic equity was measured by taking into account vaccine availability as well as uptake in areas with high Social Vulnerability Index.

Results: A total of 113 providers were enrolled in the vaccination program, and 96 mobile vaccination events were held in locations frequented by at-risk populations. Racial disparities among vaccine recipients decreased over time, and vaccine availability and uptake were equitable in areas with high Social Vulnerability Indices. However, Black, female, and Hispanic/Latinx patients had significantly higher risk of not completing the 2-dose series than their counterparts.

Conclusions: The mpox vaccination response in Louisiana was geographically equitable, though some demographic disparities remained.

INTRODUCTION

On July 7, 2022, the first case of mpox was identified in Louisiana, 2 months prior to the Southern Decadence Festival in New Orleans (September 1−5, 2022), which is the largest Lesbian, Gay, Bisexual, Transgender, and Queer+ (LGBTQ+) Pride festival in the South. The festival included parties, parades, and other gatherings involving potentially high mpox transmission among a group already disproportionately affected by the disease.[1] Consistent with the national landscape, mpox case data from Louisiana also highlighted the

From the [1]Immunization Program, Office of Public Health, Louisiana Department of Health, New Orleans, Louisiana; [2]Infectious Disease Epidemiology, Office of Public Health, Louisiana Department of Health, New Orleans, Louisiana; [3]Bureau of Health Informatics, Office of Public Health, Louisiana Department of Health, New Orleans, Louisiana; [4]STD/HIV Program, Louisiana Department of Health, New Orleans, Louisiana; and [5]STChealth, Phoenix, Arizona

Address correspondence to: Arundhati Bakshi, PhD, Immunization Program, Office of Public Health, Louisiana Department of Health, New Orleans LA. E-mail: arundhati.bakshi@la.gov.

[#]These authors have contributed equally to this work.

2773-0654/$36.00
https://doi.org/10.1016/j.focus.2024.100204

disproportionate impact of mpox on Black Louisianans, mirroring the racial disparities previously observed during the early days of coronavirus disease 2019 (COVID-19).[2−4] Therefore, it was imperative for Louisiana Department of Health (LDH) to take swift action to vaccinate as many potentially at-risk individuals as possible and to do so in an equitable fashion.

Louisiana had considerable success with an equitable rollout of the COVID-19 vaccines by utilizing mobile events, vaccine redistribution, and local partnerships. The last available COVID-19 Vaccination Equity Score from HHS for Louisiana (March 2022) was 942 per 1,000, compared with a nationwide average of 543 per 1,000 and an HHS Region 6 average score of 11 per 1,000.[5] Given the impact of our COVID-19 vaccine strategy, this study's objective was to use the COVID-19 resources and strategies (mobile events, vaccine redistribution, and local partnerships) to serve the needs of the mpox outbreak response. Here, the authors have evaluated whether the strategy was successful from an equity perspective for the height of the mpox vaccination response (July−October 2022).

METHODS

Study Sample

One of the cornerstones of the program was using Social Vulnerability Index (SVI) to prioritize equitable access to the mpox vaccine. SVI is an aggregated measure that is essentially the percentile rank of a geography relative to all its counterparts at the national or state level. Data regarding 4 themes are aggregated to calculate the overall SVI score: socioeconomic status, household composition, minority population and language, and housing and transportation.[6,7] Publicly available subcounty SVI data is only available from Centers for Disease Control and Prevention (CDC) at the census tract level, where tracts are ranked relative to other tracts in the state.[6] However, an internal calculation was available from HHS/CDC (through Tiberius) that assigned low, medium, and high SVI ranks to each ZIP code, relative to all other ZIP codes in the state. This was derived by calculating a weighted score that took into consideration the percent overlap of residential population between the ZIP code and the census tract (crosswalk available from U.S. Housing and Urban Development) and the original SVI of the tract.[8] ZIP code SVI $\leq$0.333 (indicating SVI score in the lower third for that ZIP code compared with all ZIP codes in the state) was recoded as low, SVI >0.333 and $\leq$0.666 was called medium, and SVI >0.666 was called high.[5]

A cross-departmental team from our Immunization, Infectious Disease Epidemiology, and Sexually Transmitted Diseases (STD) Programs conducted provider outreach to identify both traditional and nontraditional providers interested in receiving the JYNNEOS vaccine, which is a 2-dose series that offers immunity against the mpox virus. Providers were then selected to receive vaccines using processes employed during COVID-19 that prioritized geographic and demographic equity. Providers located in areas with a high SVI were prioritized for enrollment into the mpox vaccination program and receive vaccine allocations. Although the authors could not test its efficacy due to lack of sexual orientation and gender identity data in Louisiana's Immunization Information System (IIS), they also prioritized providers who regularly treated the LGBTQ+ population in an attempt to achieve demographic equity.

Mirroring our process for COVID-19, doses were ordered to regional distribution hubs across the state and redistributed in smaller quantities to selected providers based on need and local expertise. LDH also amended the contracts for 7 providers who staffed mobile COVID-19 vaccination events to include any needed vaccine as long as the COVID-19 vaccine was still offered. Mobile vaccination events were a staple of LDH's COVID-19 vaccination response, and the amended contracts now allowed the strike teams to administer JYNNEOS as well. These mobile strike team partners included hospital systems, ambulatory service providers, and medical schools, who obtained laptops and portable Wi-Fi devices for mobile data logging and IIS reporting and were trained in intradermal administrations. Efforts were also made to integrate the strike teams' Electronic Health Record (EHR) system with the IIS, so that reporting could be complete (including demographic data such as race/ethnicity) and timely (within 24 hours of administration). Events were hosted at select community locations, such as bars and nightclubs, which were strategically identified to reach LGBTQ+ people and persons of color. Second dose events were held in the same locations 4 weeks after the first and communicated during the first event. In addition, a health hub was established at Southern Decadence that offered JYNNEOS, among other health services.[9]

Vaccine eligibility was based on guidelines from CDC, which, in turn, were influenced by vaccine availability. In July 2022, when vaccines were highly limited in the state, the top priority was to vaccinate people with known exposure to mpox based on contact tracing. Individuals with likely high-risk exposures in the last 14 days were also eligible. This group only included people who identified as gay, bisexual, same gender loving, or other men who have sex with men who met at least 1 of the 3 additional eligibility criteria: (1) had intimate or sexual

contact with multiple or anonymous partners in the last 14 days, (2) had given or received money or other goods/services in exchange for sex in the last 14 days, or (3) had intimate or sexual contact with other men in a social or sexual venue in the last 14 days. When more vaccine doses became available, vaccine eligibility was expanded accordingly. Since August 31, 2022, people were eligible to receive JYNNEOS if they met at least one of the following eligibility criteria: (1) gay/bisexual men or transgender people who are sexually active with >1 partner, (2) anyone who is at high risk of mpox exposure due to risk-factors such as homelessness, use of IV drugs, and having intimate or sexual contact with multiple/anonymous people, (3) clinicians or laboratory staff who are at high risk of occupational exposure, or (4) anyone who has been determined to be at high risk by a healthcare provider or public health official.[10]

Measures and Statistical Analysis

All JYNNEOS vaccine administration and allocation data were extracted from Louisiana's IIS at the dose, recipient, and provider levels for a point-in-time study (as of October 31, 2022). One of the main metrics used by many jurisdictions during the COVID-19 vaccine initiative was the Vaccination Equity Score, derived by HHS and available on Tiberius.[5,11] The authors have adopted the same methodology here to calculate a mpox Vaccination Equity Score, based on the number of vaccines delivered to providers and administered to patients in high SVI ZIP codes. Vaccines allocated to nontraditional providers (i.e., mobile strike teams) for events held in high SVI ZIP codes were estimated as follows: percentage of events held in high SVI ZIP codes × total number of vaccines allocated to all strike team vendors. This value was then added to the doses allocated to traditional providers located physically in high SVI ZIP codes to yield the total doses delivered to high SVI ZIP codes. SVI for the patient's ZIP code of residence was used to identify percent vaccines administered to residents of high SVI areas. The final equation used was as follows:

> Vaccination Equity Score = ([% of vaccine deliveries to high SVI ZIP codes / % of state population residing in high SVI zip codes] × 0.40) + ([% of vaccines administered to residents of high SVI ZIP codes / % of state population residing in high SVI ZIP codes] × 0.60) × 1000

Vaccine uptake was weighted a little higher in the equation (60%) than vaccine deliveries (40%). These weights take into account that vaccine availability is only partially reflective of access, vaccine accessibility being the key equity objective being measured by the number of vaccines allocated to high SVI areas. For example, if vaccines are technically available but not at locations or during hours when/where it is convenient and comfortable for people to receive them, then the vaccines are not truly accessible to people. Thus, the slightly higher weight assigned to vaccine uptake not only accounts for immunization in the community but also as a secondary measure for indicating access.

Trends in mpox vaccination by race were measured using self-reported data by plotting the percent people identifying as White, Black, and an additional group comprising all other races (including multiracial) who received at least 1 dose of JYNNEOS. In order to count each patient only once, the authors compiled race data for first dose recipients only. Each provider type was also summarized by the distribution of mpox vaccine recipients (first-dose only) by race. Finally, relative risk of not completing the 2-dose series was calculated on SAS Enterprise Guide v8.3 (using RELRISK function in PROC FREQ) to analyze the impact of race, sex, ethnicity, age, and first dose-provider on series completion.[12] Dose administration data for all patients (in state and out of state) is reported in Table 1 as a metric of vaccine operations in Louisiana. However, as complete patient demographic and vaccination data were unavailable for

Table 1. JYNNEOS Doses Administered Between July 1 and October 31, 2022, by Provider Type and Dose Number

Provider type	Total doses (% of total)	Dose 1 (% of total dose 1)	Dose ≥2 (% of total dose 2)
Vaccine strike team	5,263 (37.4%)	4,173 (46.2%)	1,090 (21.7%)
FQHC/rural health-private	2,189 (15.6%)	1,253 (13.9%)	936 (18.6%)
STD/HIV health center	2,104 (15%)	1,049 (11.6%)	1,055 (21%)
University/medical school	1,598 (11.4%)	866 (9.6%)	732 (14.5%)
Pharmacy	1,096 (7.8%)	563 (6.2%)	533 (10.6%)
Public health facility	929 (6.6%)	602 (6.7%)	327 (6.5%)
Private health/urgent care	753 (5.4%)	444 (4.9%)	309 (6.1%)
Hospital	136 (1%)	85 (0.9%)	51 (1%)
All facilities (total)	14,068	9,035	5,033

Note: Numbers in parentheses indicate the percent doses administered by each provider type as a share of the total number of doses administered for its category. Approximately 12% of the doses shown were administered to patients with an out-of-state or unknown address.
FQHC, federally qualified health center; STD, sexually transmitted diseases.

out-of-state patients, all equity assessments were performed on persons in the IIS with a Louisiana address and who had taken a JYNNEOS dose between July 1 and October 31, 2022.

RESULTS

Overview of Vaccine Response

During July–October 2022, a total of 27,983 JYNNEOS doses were distributed to a network of 113 providers that included both traditional facilities and mobile strike teams. The strike teams were used to staff 96 community vaccination events between August and October 2022, half of which (49 events) were held in September 2022 to account for Southern Decadence. A total of 14,068 doses were administered, of which 5,263 were administered at mobile events (Table 1). In terms of percent doses administered by provider type, mobile strike team vendors administered the largest share (37%). The remaining doses were administered at federally qualified health centers and rural health clinics (16%), STD/HIV clinics (15%), universities/medical schools (UMS; 11%), pharmacies (8%), public health facilities (7%), private health and urgent care centers (5%), and hospitals (1%) (Table 1). A total of 1,618 doses (11.5%) were administered to patients with an out-of-state or unknown address; these records were omitted from the equity assessments that follow.

Mpox Vaccine Equity

ZIP code data, available for 7,783 of 7,785 Louisiana patients, was used to compute geographic equity based on vaccine allocation and uptake. Relative to the 58% population who live in high SVI ZIP codes in Louisiana, 72% of doses were allocated to providers located in those areas, and 72% of administered doses were given to people residing there. This yielded an mpox Vaccination Equity Score of 1,238 of 1,000 (Table 2), indicating an over-representation of high SVI areas in terms of vaccine access and uptake.

Racial disparities among JYNNEOS recipients, prevalent early in the vaccine response, decreased with time (Figure 1A). As of October 31, 2022, 24% of JYNNEOS recipients residing in Louisiana identified as Black, ~52% as White, and 18% as a race other than Black or White. Race was unknown for 5% of patients. Relative to Louisiana's population—33% Black, 62% White, and 5% all other races—the additional group comprising all races other than Black and White were overrepresented in the IIS among JYNNEOS recipients.

Nearly all provider types vaccinated a racially diverse patient population, with UMS vaccinating the most diverse population; ~32% people vaccinated at UMS were Black and 42% were White. In contrast, only 11% of people vaccinated in hospitals identified as Black and 68% as White (Figure 1B).

Table 2. Mpox Vaccination Equity Score

Measure	Value
Doses allocated to providers in high SVI ZIP codes	20,267
Total allocated doses	27,983
% Doses allocated to high SVI ZIP codes	72.4%
Doses administered to residents of high SVI ZIP codes	8,914
Total doses administered	12,450
% Doses administered to residents of high SVI ZIP codes	71.6%
Total population of high SVI ZIP codes[a]	2,706,743
Total population (all ZIP codes)[a]	4,660,003
% High SVI population	58.1%
Ratio of doses allocated to the population in high SVI ZIP codes	1.247
Ratio of doses administered to residents of high SVI ZIP codes to the overall population of high SVI ZIP codes	1.233
Equity score (out of 1,000)	1,238

Note: Following the COVID-19 Vaccination Equity Score model developed by HHS, Louisiana scored 1238/1000, indicating that high SVI ZIP codes were over-represented in terms of both allocation and administration of JYNNEOS. Analysis included Louisiana residents only.
[a]Populations derived for ZIP Code Tabulation Areas from American Community Survey (2021).
SVI, Social Vulnerability Index.

Disparities Among Second Dose Recipients

Some disparities remained that have implications for public health practice and prioritization of future outreach efforts. Risk of the 2-dose JYNNEOS series being incomplete was significantly higher for Black individuals than for White (by 23%), for female than male (by 48%), Hispanic than non-Hispanic (by 23%), and among younger individuals (by 13%–53%) (Table 3). Examining series completion rates by provider type where the first dose was received, UMS and pharmacies had the highest rates of series completion overall. Compared with people who received their first dose at a UMS, people who received their first dose through a vaccine strike team at a mobile event had 2.8 times the risk of not completing their series. Other facility types whose patients had more than twice the risk of not completing the series, compared with that of UMS, were hospitals (2.8 times) and public health facilities (2.4 times).

DISCUSSION

When the first mpox case was identified in Louisiana 2 months before Southern Decadence, a large LGBTQ+

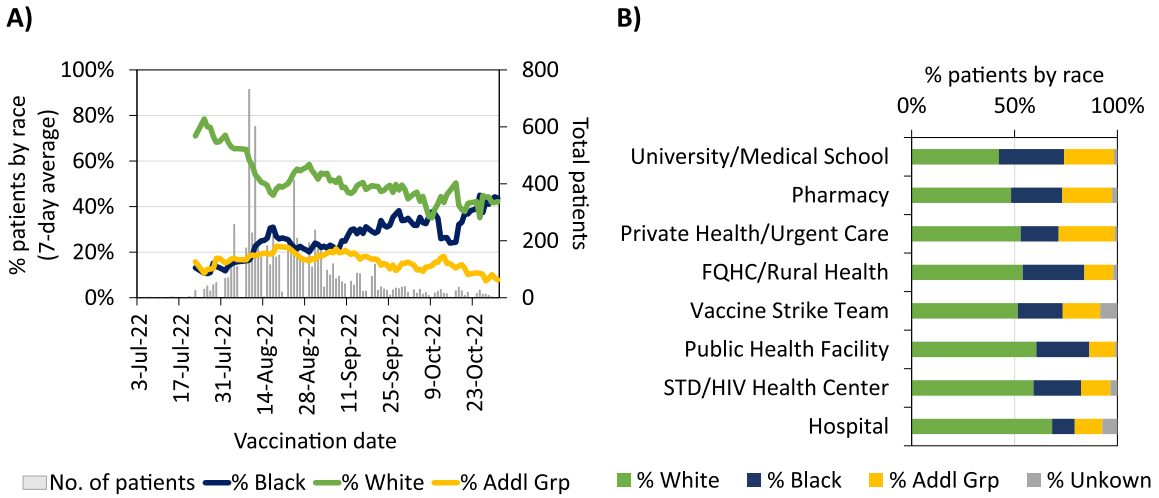

Figure 1. Racial equity among JYNNEOS recipients.

Note: Racial disparity among first-dose recipients reduced steadily over time among Louisiana residents. A) By October 31, 2022, Black and White patients both received 40-45% of the vaccines administered each day. Trend lines for % recipients by race only shown July 22, 2022 onwards; data were unstable prior to that due to low daily vaccination counts. B) The following provider types had the largest contribution towards eliminating the Black/White disparity over time with regards to vaccines: University/Medical Schools, FQHC/Rural Health Centers, and public health facilities. Over a quarter of the patients they vaccinated (26-31%) identified as Black. Addl Grp includes all people who did not identify their race as Black or White. This included people whose self-reported race was American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, Asian, and other.
FQHC, Federally Qualified Health Centers; Addl Grp, Additional Groups; STD, Sexually Transmitted Diseases.

festival in New Orleans, LDH rapidly pivoted pandemic resources to address the needs of the mpox outbreak. JYNNEOS administration data by race and location from Louisiana's IIS revealed that the mpox vaccination response was equitable based on SVI, as demonstrated by the Vaccination Equity Score (Table 2). This was achieved using strategies employed during COVID-19, such as prioritizing the most vulnerable populations (based on parameters such as SVI, race/ethnicity, sexual orientation, and gender identity), and leveraging partnerships established during the COVID-19 pandemic (e.g., with the mobile strike team vendors). Another COVID-19 strategy successfully employed during the mpox response was using local redistribution hubs to supply vaccines to providers in small amounts based on need, which helped to maximize the effective use of limited vaccine supplies. A major cornerstone of the mpox outbreak response was mobile vaccination programs, which have also been successfully used in other jurisdictions to vaccinate a larger number of people than would be possible through traditional providers alone.[13] In fact, of all provider types analyzed, the largest share of doses were given at mobile vaccination events. Furthermore, the integration of multiple EHR systems with the IIS may have helped providers meet the program's guidelines for timely and complete reporting of immunization data, as was previously observed in other jurisdictions.[14,15] Such integration may have contributed toward Louisiana's race/ethnicity data being 94% complete, which, in turn, lent confidence to the equity assessments described herein.

Despite the geographic equity achieved (Table 2), the demographic equity data was more nuanced (Figure 1). Early in the outbreak, White Louisianans were overrepresented among vaccinated individuals compared with Black Louisianans, consistent with national reports.[16] The IIS data allowed for us to monitor this trend and rapidly institute greater outreach in communities of color, which is reflected in a steady closing of the gap. Despite the progress made (Figure 1A), disparities that were noted nationally among second dose recipients were also noted in Louisiana (Table 3), which has implications for optimum protection against mpox.[17,18] Some of these disparities may be a continuation of the disparities seen early during the outbreak (Figure 1A); if a person received their first dose during the first few weeks of the outbreak, new cases would have remained high by the time they were eligible for their second dose, possibly influencing their decision to complete the series. But if the first dose was taken later during the course of the outbreak, as was the case for many Black persons (Figure 1A), they may not have perceived sufficient risk toward the tail end of the outbreak to have taken the second dose. The lower risk perception may have been an

Table 3. Disparities Among Second JYNNEOS Dose Recipients

	Series initiated	Eligible for 2nd dose as of October 31, 2022	Series completed[a]	Risk of series being incomplete	Series incomplete - risk ratio (95% CI)[b]
Total[c]	7,785	7,380 (94.8%)	4,662 (63.2%)	36.8%	—
Age group					
<30 years	1,428	1,351 (94.6%)	698 (51.7%)	48.33%	**1.53 (1.41, 1.66)**
30–49 years	3,898	3,717(95.4%)	2,384 (64.1%)	35.86%	**1.13 (1.05, 1.22)**
>49 years	2,459	2,312 (94.0 %)	1,580 (68.3%)	31.66%	Ref
Ethnicity					
Hispanic	566	533 (94.2%)	305 (57.2%)	42.8%	**1.23 (1.11, 1.36)**
Non-Hispanic	6,746	6,407 (95.0 %)	4,178 (65.2%)	34.8%	Ref
Race					
Black	1,905	1,769 (92.4%)	1,036 (58.9%)	41.1%	**1.25 (1.16, 1.34)**
Additional group[d]	1,415	1,366 (96.5%)	882 (64.6%)	35.4%	1.08 (0.99, 1.17)
White	4,095	3,927 (95.9%)	2,633 (67.0%)	33.0%	Ref
Sex					
Female	1,306	1,213 (92.9%)	602 (49.6%)	50.4%	**1.48 (1.39, 1.58)**
Male	6,437	6,125 (95.2%)	4,044 (66.0%)	34.0%	Ref
First dose location					
Pharmacy	546	533 (97.6%)	422 (79.2%)	20.8%	1.08 (0.87, 1.36)
Private health/urgent care	424	420 (99.1%)	315 (75.0%)	25.0%	**1.30 (1.05, 1.63)**
FQHC/rural health center	1,122	1,052 (93.8%)	787 (74.8%)	25.2%	**1.31 (1.10, 1.57)**
Vaccine strike team	1,283	1,249 (97.3%)	581 (46.5%)	53.5%	**2.79 (2.40, 3.26)**
Public health facility	1,866	1,746 (93.6%)	946 (54.2%)	45.9%	**2.39 (2.05, 2.79)**
STD/HIV center	1,010	877 (86.8%)	642 (73.2%)	26.9%	**1.40 (1.17, 1.68)**
Hospital	728	676 (92.9%)	307 (45.4%)	54.6%	**2.84 (2.43, 3.35)**
University/medical school	806	771 (95.7%)	625 (81.8%)	19.2%	Ref

Note: Despite notable equity metrics, some disparities remained with regards to series completion among Louisiana residents. Risk of the 2-dose series being incomplete was significantly higher for Black patients compared to White, females compared to males, Hispanic compared to non-Hispanic, and younger individuals. It also higher based on location where the first dose was received, with the risk of incomplete series being the highest for vaccine strike teams.

[a]Denominator included only patients who were eligible for the second dose.

[b]Risk ratios and 95% CI in boldface indicates statistical significance (P<0.05).

[c]Only people with Louisiana addresses included, as reliable series completion data is unavailable for patients with out-of-state or unknown addresses.

[d]Additional Group includes all people who did not identify their race as Black or White. This included people whose self-reported race was American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, Asian, and other. Persons with unknown race were not included.

FQHC, Federally Qualified Health Center; STD, sexually transmitted diseases.

unintended consequence of the successful public messaging early during the outbreak and vaccinations that resulted in a rapid decrease in case counts. Other factors that may have contributed to the disparities observed include socioeconomic issues, messaging based on initial cases observed among men who have sex with men, vaccine eligibility constraints during the first few weeks of the outbreak, limited number of providers offering JYNNEOS, and cultural sensitivity issues.[16] Interestingly, people's risk of not completing the series also differed based on where they got their first dose. Vaccine strike teams were the most successful provider type in terms of administering the greatest number of doses overall, but patients who received their first dose at mobile events had one of the poorest rates of series completion (Table 3). With the ongoing threat of mpox outbreaks, future endeavors should concentrate on identifying effective strategies to improve series completion rates, especially among people who receive their first doses at mobile events, such that populations that were disproportionately affected during the first outbreak are adequately protected in case of another.[19,20] These might include confidential reminder/recall strategies, such as through text messages or notifications via consumer access portals for immunizations. Direct patient outreach through providers who vaccinated a highly diverse population may also be beneficial.

Limitations

The findings in this report are subject to at least 6 limitations. First, total vaccines delivered to mobile strike teams could only be estimated because they are not associated with a physical clinic location in a particular ZIP code; instead, we used the ZIP codes where they conducted the vaccination events and multiplied the total doses allocated to them by the number events held in 'high SVI' ZIP codes. This method assumes that every event was allocated the same number of doses, whereas in reality, some events likely had a greater number of doses allocated to them than others. However, the data for number of doses allocated by event is not available to the study team. Second, due to the lack of a reliable denominator estimate for people eligible for JYNNEOS, we could not provide any coverage estimates in this study. Third, the unknown racial distribution of the population at risk for mpox also makes it difficult to evaluate the racial equity aspect of the vaccination data. Fourth, lack of sufficient data collection mechanisms and small populations limited our ability make comparisons or draw conclusions regarding equity across multiple races, sexual orientations, and gender identities. Fifth, due to limitations associated with a state-based IIS, we could only conduct equity assessments for in-state patients. However, 10% of patients vaccinated in Louisiana were associated with an out-of-state address, about half of whom were vaccinated at the Southern Decadence festival. Equity considerations have been discussed regarding this subpopulation vaccinated at Southern Decadence in a separate study.[9] Finally, all data are subject to the native limitations of any large-scale surveillance system that are stochastic in nature and difficult to estimate the scope of impact (e.g., data quality issues such as missing information, erroneous data entry, and misreporting).

CONCLUSIONS

Unlike the COVID-19 pandemic, the mpox vaccination literature is relatively sparse. Previous reports on JYNNEOS uptake have described recipient demographic characteristics in many states, but they have not examined the continued utility and impact of pandemic-era partnerships to mount equitable responses against other outbreaks.[4,16–18] To our knowledge, this is the first report to demonstrate the equity impact of utilizing COVID-19 strategies and partnerships to address other outbreaks. As such, it has important public health implications by serving as a blueprint for other jurisdictions. It further highlights the importance of sustainable and flexible outbreak response funding for jurisdictions, which enable them to deploy resources where needed.

ACKNOWLEDGMENTS

The results presented in this manuscript represent the collaborative efforts across the entire Office of Public Health, Louisiana Department of Health and the Louisiana's IIS technology partner, STChealth. In particular, the authors thank Dr. DeAnn Gruber, Dr. Chaquetta Johnson, Quan Le, Robert Johannessen, Kevin Bonton, Sam Burgess, Sawyer Koops, and countless other state, contract, federal (CDC) and STChealth staff who contributed to this effort with their skills, leadership and vision. This work could also not have been accomplished without Louisiana's extensive network of providers and community partners, all of whom were critical to the outbreak response.

This study was supported by funds from the CDC (NH23IP922621). All authors contributed to design of the mpox vaccination program (JM, TC, JG, JDC), equity impact study design (AB, JM, KF, OK, SB), data analysis (AB, LM, AA, NZ, SK, KF), writing the manuscript (AB, JM, KF), and reviewing the manuscript (JM, TS, LM, AA, KF, OK).

Declaration of interest: none.

CREDIT AUTHOR STATEMENT

Arundhati Bakshi: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing — original draft, Writing — review & editing, Visualization, Supervision, Project administration. John McClure: Conceptualization, Methodology, Writing — original draft, Writing — review & editing, Project administration. Theresa Sokol: Methodology, Writing — review & editing, Resources, Supervision, Funding acquisition, Project administration. Lee Mendoza: Methodology, Software, Validation, Writing — review & editing, Resources, Data curation, Visualization, Supervision, Funding acquisition, Project administration. Arun Adhikari: Methodology, Software, Validation, Writing — review & editing, Data curation, Visualization, Supervision. Nancy Zhao: Software, Validation, Data curation. Suryatapa Kar: Software, Validation, Data curation. Jimmy Gale: Methodology, Resources, Supervision, Project administration. Javone Davis Charles: Methodology, Resources, Supervision, Project administration. Kyle Freese: Writing — review & editing, Data curation, Visualization, Resources, Supervision, Funding acquisition. Ousswa Kudia: Writing — review & editing, Data curation, Visualization, Resources. Sara Brown: Writing — review & editing, Data curation, Visualization, Resources.

REFERENCES

1. Philpott D, Hughes CM, Alroy KA, et al. Epidemiologic and clinical characteristics of monkeypox cases - United States, May 17–July 22, 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(32):1018–1022. https://doi.org/10.15585/mmwr.mm7132e3.
2. Louisiana Department of Health. Early data show racial disparities in Louisiana monkeypox cases. Baton Rouge, LA: Louisiana Department of Health. https://ldh.la.gov/news/monkeypox-dashboard. Published August 18, 2022. Accessed November 24, 2023.
3. Mackey K, Ayers CK, Kondo KK, et al. Racial and ethnic disparities in Covid-19-related infections, hospitalizations, and deaths : a systematic review. *Ann Intern Med.* 2021;174(3):362–373. https://doi.org/10.7326/M20-6306.
4. Kota KK, Hong J, Zelaya C, et al. Racial and ethnic disparities in mpox cases and vaccination among adult males — United States, May

−December 2022. *MMWR Morb Mortal Wkly Rep.* 2023;72(15):398–403. https://doi.org/10.15585/mmwr.mm7215a4.
5. Tiberius; Louisiana Awardee Data Hub Website. HHS. https://protectows.hhs.gov. Accessed June 27, 2023.
6. CDC SVI documentation 2020. Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention. https://www.atsdr.cdc.gov/placeandhealth/svi/documentation/SVI_documentation_2020.html. Updated October 22, 2022. Accessed November 24, 2023.
7. Flanagan BE, Gregory EW, Hallisey EJ, Heitgerd JL, Lewis B. A social vulnerability index for disaster management. *J Homel Secur Emerg Manag.* 2011;8(1). Article 3. https://doi.org/10.2202/1547-7355.1792..
8. HUD USPS ZIP code crosswalk files. Office of Policy Development and Research, U.S. Housing and Urban Development. https://www.huduser.gov/portal/datasets/usps_crosswalk.html. Updated August 2022. Accessed November 24, 2023.
9. Soelaeman RH, Mendoza L, McDonald R, Hand J, Sokol TM. Southern Decadence Preparedness and Response Team. Characteristics of JYNNEOS vaccine recipients before and during a large multiday LGBTQIA+ festival — Louisiana, August 9−September 5, 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(43):1379–1381. https://doi.org/10.15585/mmwr.mm7143e3.
10. Louisiana Department of Health. Louisiana Department of Health expands monkeypox vaccine eligibility criteria. Baton Rouge, LA: Louisiana Department of Health; 2022. https://ldh.la.gov/news/6740. Published August 31. Accessed November 24, 2023.
11. McClure J, Mendoza L, Sokol T, et al. Advancing health equity: the role of a community-academic-public health-practice (CAPP) partnership in addressing COVID-19 disparities in Louisiana. *Am J Public Health.* 2024;114(suppl 1):S55–S58. https://doi.org/10.2105/AJPH.2023.307509.
12. SAS Institute Inc. SAS/STAT® 14.3 user's guide the FREQ procedure. Cary, NC: SAS Institute Inc; 2017. https://support.sas.com/documentation/onlinedoc/stat/143/freq.pdf. Published September. Accessed February 20, 2024.
13. Millman AJ, Denson DJ, Allen ML, et al. A health equity approach for implementation of JYNNEOS vaccination at large, community-based LGBTQIA+ events — Georgia, August 27−September 5, 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(43):1382–1883. https://doi.org/10.15585/mmwr.mm7143e4.
14. Metroka AE, Papadouka V, Ternier A, Zucker JR. Effects of Health Level 7 messaging on data quality in New York City's immunization information system, 2014. *Public Health Rep.* 2016;131(4):583–587. https://doi.org/10.1177/0033354916662217.
15. Hills RA, Revere D, Altamore R, Abernethy NF, Lober WB. Timeliness and data element completeness of immunization data in Washington State in 2010: a comparison of data exchange methods. *AMIA Annu Symp Proc.* 2012;2012:340–349.
16. Kota KK, Chesson H, Hong J, et al. Progress toward equitable mpox vaccination coverage: a shortfall analysis — United States, May 2022 −April 2023. *MMWR Morb Mortal Wkly Rep.* 2023;72(23):627–632. https://doi.org/10.15585/mmwr.mm7223a3.
17. Kriss JL, Boersma PM, Martin E, et al. Receipt of first and second doses of JYNNEOS vaccine for prevention of monkeypox - United States, May 22−October 10, 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(43):1374–1378. https://doi.org/10.15585/mmwr.mm7143e2.
18. Payne AB, Ray LC, Cole MM, et al. Reduced risk for mpox after receipt of 1 or 2 doses of JYNNEOS vaccine compared with risk among unvaccinated persons — 43 U.S. jurisdictions, July 31−October 1, 2022. *MMWR Morb Mortal Wkly Rep.* 2022;71(49):1560–1564. https://doi.org/10.15585/mmwr.mm7149a5.
19. Potential risk for new mpox cases (CDCHAN-00490). Centers for Disease Control and Prevention (CDC); 2023. https://emergency.cdc.gov/han/2023/han00490.asp. Updated May 15. Accessed June 27, 2023.
20. Owens LE, Currie DW, Kramarow EA, et al. JYNNEOS vaccination coverage among persons at risk for mpox − United States, May 22, 2022−January 31, 2023. *MMWR Morb Mortal Wkly Rep.* 2023;72(13):342–347. https://doi.org/10.15585/mmwr.mm7213a4.