New York City COVID-19 Response Review Report

July 2024

Image: Masked Pedestrians in City Park in May 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49901586858/

Image: Healthcare Workers in April 2020
Michael Appleton/Mayoral Photography Office
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Image: NYC COVID-19 Day of Remembrance in March 2021
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Executive Summary

COVID-19, a novel coronavirus disease caused by the SARS-CoV-2 virus, was first identified in Wuhan, China in December 2019. Despite containment efforts undertaken in Asia, the virus quickly spread across the globe. New York City (NYC) reported its first confirmed COVID-19 case on March 2, 2020, and by month's end, became the global epicenter of the pandemic. To address the unprecedented health, social, and economic impacts, the NYC Government (the City) established a number of novel operations with support from local, New York State Government (State), Federal, non-profit, and private-sector entities. The challenging lessons NYC learned in combatting COVID-19 helped inform global knowledge and strategies on pandemic response operations. However, the pandemic also exposed a number of gaps the City should address before the next large-scale emergency to better prepare and protect all New Yorkers.

To evaluate the City's pandemic emergency preparedness and response strategies, the City conducted a thorough review of its COVID-19 response. The NYC COVID-19 Response Review Report covers notable response operations between January 2020 and June 2022 that had a citywide impact, were new or significantly adapted from pre-established plans, and are likely to be considered for future emergencies.

The review identified 74 recommendations for the City to address across the following operational areas: 1) City, State, and Federal Coordination, 2) Health and Medical Operations, 3) Novel Social and Economic Operations, 4) Response Staffing, 5) Data and

Technology, 6) Public Outreach and Communications, and 7) Equity. The recommendations are not exhaustive of all lessons learned but are intended to help strengthen the City's overall preparedness and capacity to respond to future citywide emergencies. The recommendations are included throughout the Operational Areas and Findings section of this Report and consolidated in Appendix A.

City, State, and Federal Coordination

As the pandemic threatened the entire country, local jurisdictions relied on Federal and State guidance to drive response operations. However, Federal agencies were slow to shift from a containment to a mitigation strategy[1], including delays in releasing guidance on masking, personal protective equipment (PPE), testing, and on the safety of everyday activities such as schooling. Therefore, as COVID-19 spread throughout NYC, the City made difficult decisions with limited Federal guidance and resources. Additionally, coordination challenges between Governor Cuomo's and Mayor de Blasio's administrations impeded City-State collaboration and contributed to duplicative work, inconsistent recommendations, and a loss of trust from New Yorkers.

The City also faced internal coordination challenges. The unprecedented scale of the pandemic forced the City to adapt in real time, setting aside the preset response structure for public health emergencies[2] established in the Citywide Incident Management System (CIMS)[3] and developing new structures for an all-of-government response. While this enabled the City to incorporate Mayor's Office leadership and leverage the capacities and skills of many agencies, it also resulted in some inefficiencies, difficulties with coordination, and missed opportunities to leverage existing plans and agency core competencies. Moving forward, the City should more fully utilize CIMS' scalable structure and update associated preparedness plans for responding to an emergency with a large operational scope and scale.

Health and Medical Operations

The City established a number of unprecedented health and medical response operations to compensate for strained medical supply chains, as well as a surge in patients and fatalities. To address PPE shortages, the City began proactively distributing supplies to every hospital and nursing home in NYC on a weekly basis and modified procurement and oversight processes to more quickly execute contracts to source PPE. The supplies were received from a variety of sources, including State and Federal Governments and

[1] Containment strategies aim to minimize the risk of disease transmission from infected to non-infected individuals to stop the outbreak. Mitigation strategies aim to slow disease transmission and reduce the peak in healthcare demand.
[2] A public health emergency is a situation that poses a significant risk of death, disability, or disease to a large number of people.
[3] CIMS establishes roles and responsibilities and designates authority for City, State, and other governmental entities and nonprofit and private-sector organizations performing and supporting emergency response.

private donations. The City also successfully built new partnerships with local manufacturers to make supplies for the NYC healthcare system.

To alleviate patient surge in hospitals, the City partnered with State, Federal, and non-profit partners to establish 11 alternate care sites[4] for the initial COVID-19 wave in spring 2020. These sites were established at a time when it was challenging to accurately forecast peak demand for hospital beds and the associated strain on hospital capacity. Though these sites saw thousands of patients, the creation of separate facilities may ultimately not have been necessary, as patient surge might have been better managed through regional coordination of patients and resources. Internal healthcare facility surge strategies were successfully utilized to manage patient surges later in the pandemic, with mitigation measures in place limiting the impact of subsequent COVID-19 waves.

To address the high number of fatalities, the City expanded its mortuary capacity, death registration and tracking, and decedent[5] processing capabilities. The release of decedents to their families was initially delayed due to volume, as well as administrative and logistical challenges. As a result, the City adapted processes to retrieve decedents more quickly from healthcare facilities. Agencies also had to develop, in real-time, an alternative to pre-established plans for temporary burials to manage the surge in fatalities. Mayoral direction to pivot strategies was borne out of sensitivities to the potential public reaction to a large-scale temporary burial site and in response to religious communities' concerns.

To identify COVID-19 cases and contacts more quickly, the City's public healthcare system launched the NYC Test & Trace Corps (T2), the nation's largest municipal operation for testing, contact tracing[6], and supportive services for COVID-19 positive or exposed individuals. After initial limitations on testing capacity, due to scarcity of testing resources and Federal restrictions, the City gradually expanded testing operations throughout the pandemic response. Testing was opened up to all New Yorkers, with no eligibility restrictions, by June 2020. At peak, the City administered over 257,000 COVID-19 tests per day.

T2 helped identify cases and contacts and limit the spread of COVID-19 through support services to COVID-19 positive or exposed individuals, which included no-cost hoteling, medication delivery, and other services such as dog-walking. By the conclusion of the program, T2 reached a total of 1.7 million New Yorkers with COVID-19, identified 1.8 million of their close contacts, and notified 76% of these contacts of their exposure[i]. A study of the program found that T2 offered access to resources to support isolation and

[4] An alternate care site refers to a building or structure converted to provide additional healthcare capacity outside the walls of a traditional, established healthcare institution.
[5] A decedent is a person who has died.
[6] Contact tracing is the practice of identifying and contacting individuals who have been exposed to an infectious disease to provide them with information to keep themselves and those around them safe.

quarantine[7] to over 1 million cases and contacts between June 2020 and October 2021[ii]. In partnership with T2, the City's health department managed separate testing and contact tracing for congregate settings and other high-risk facilities, such as adult care facilities and nursing homes. The disparate testing and contact tracing efforts led to some confusion and delays. In the future, clear agency roles and responsibilities around citywide testing and contact tracing would reduce duplication and inefficiency.

Once COVID-19 vaccines became available in late 2020, the City established the interagency Vaccine Command Center (VCC), led by the Mayor's Office, to coordinate vaccine administration for all New Yorkers through mass vaccination sites, mobile vaccination buses, in-home vaccination for home-bound individuals, on-site vaccination in congregate settings, and pop-up vaccination events throughout NYC. The City's vaccination efforts were overwhelmingly successful. A March 2022 analysis conducted using modeling created by Yale University concluded that the City's vaccination campaign was instrumental in preventing an estimated 48,000 deaths, 300,000 hospitalizations, and 1.9 million cases between December 2020 and February 2022[iii].

As a new response structure and temporary interagency body, the VCC faced some operational challenges and created confusion around agency roles. Additionally, without the ability to directly contract with vendors, the VCC relied on agency-administered contracts. In some instances, staff outside of these agencies were providing direct vendor oversight, which is not a best practice.

With multiple public-serving operations, agencies repeatedly assessed City-owned properties for use as alternate care sites, testing sites, and vaccination sites. To reduce repetitive site visits and better leverage City-owned space, agencies identified a need to centrally collect information on City-owned property. Additionally, agencies advocated for the City to adapt these properties with needed ventilation, accessibility, and other requirements to make them suitable for public use, rather than continuing to rely on expensive leases for privately-owned facilities.

Novel Social and Economic Operations

As the NYC healthcare system was overwhelmed with a surge of COVID-19 patients early in the pandemic, the City adopted some of the toughest mitigation measures in the nation to combat and control community spread. This included public stay-at-home orders, full closure of schools and non-essential businesses, bans on large gatherings, public transportation restrictions, and cancellation or postponement of public services, such as in-person court hearings.

[7] Isolation separates sick people with a contagious disease from people who are not sick. Quarantine separates and restricts movement of people who were exposed to a contagious disease to see if they become sick.

Researchers eventually concluded that these public health measures were associated with greater than 50% transmission reduction for all age groups, while universal masking was associated with a 7% reduction overall and a 20% reduction for 65+ year olds during the first month of implementation[iv]. Though these interventions were effective at reducing transmission and saving lives, these policies also had lasting social and economic impacts the City continues to address today.

To limit the spread of COVID-19, the City transitioned its 1 million public school students to remote learning in March 2020. In this shift, the City struggled to quickly equip students with the necessary technology, and students faced challenges learning in a remote environment. Following the determination that the benefits of in-person learning outweighed the risks, NYC was the first big city in the United States (U.S.) to transition to hybrid learning in September 2020, and students fully returned to in-person learning in September 2021.

To address food insecurity, the City provided grab-and-go meals for students, their families, and the public at large through public schools across NYC. The City also provided grab-and-go and free food delivery programs for vulnerable New Yorkers, including direct meal delivery to older adults who previously relied on daily meals from Older Adult Centers, which transitioned to remote services. These programs successfully delivered millions of meals throughout the pandemic.

To provide a safe option for New Yorkers to isolate and quarantine, the City launched a number of distinct hoteling programs complemented with wrap-around services, such as food and laundry. Collectively, these programs helped provide isolation or quarantine space for COVID-19 patients discharged from hospitals, close contacts of cases, healthcare workers, individuals in congregate settings, and any member of the public needing a place to isolate or quarantine. While these programs successfully provided isolation and quarantine space for many individuals, some agencies without the appropriate operational structure were tasked to administer and oversee hoteling programs, which, presented significant operational challenges. Moving forward, the City should consider centralizing operations where possible and utilizing agencies with institutional expertise in the use of hoteling as emergency housing.

Acknowledging the severe impact on the economy, the City engaged with businesses to address their varying needs and ensure compliance with COVID-19 requirements, including social distancing, masking, and vaccination. While these inspection and outreach activities were vital for communicating COVID-19 requirements, many agencies diverted significant resources away from routine inspections to execute these initiatives, creating backlogs.

Response Staffing

Operationalizing the City's COVID-19 response placed an enormous strain on staff in NYC healthcare facilities and City agencies. The City sourced thousands of out-of-state, retired, volunteer, and contracted clinical and non-clinical staff to support NYC healthcare facilities and other high-risk settings, such as long-term care facilities and group homes. Though this helped address healthcare staffing gaps, further consideration is needed to improve healthcare surge staffing mechanisms, including processes to request, receive, onboard, and orient staff.

To surge City-run efforts, agencies re-assigned City employees to urgent COVID-19 response operations, including to roles outside of staff's area of expertise or prior experience. As NYC has the largest municipal workforce in the nation, there is an opportunity to document City employee emergency re-assignment processes to better match staff skillsets to appropriate response roles. This will help create a sustainable emergency staffing strategy moving forward.

With new and unfamiliar workplace hazards, City employees raised health and safety concerns. Initial issuance of City employee health and safety guidance was delayed due to limited State and Federal information at the start of the pandemic. Additionally, when the City did release guidance, it was not always tailored to specific settings (e.g., shelters, correctional facilities) or operations already in progress. As the pandemic took a tremendous professional and personal toll on its workforce, the City expanded existing wellness initiatives and created COVID-19 specific offerings. However, additional initiatives and considerations are needed to address staff burnout and the resulting attrition and staffing shortages, which still impact the City workforce today.

Data and Technology

Having accurate and timely data was critical to understand the impact of the COVID-19 pandemic and inform response operations. Though City agencies collected a vast amount of data, they faced technical and legal barriers sharing data with one another, with State and Federal counterparts, and with the NYC healthcare system. In some cases, agencies had to build manual workarounds, which were labor-intensive and inefficient. There were also limitations in staff capacity to meet ever-changing and expanding demands for data analyses, reports, and visualizations.

In addition to data sharing and reporting challenges, the City was not fully equipped with the necessary technology to transition its workforce to remote operations in March 2020. As the City worked through technological, network bandwidth, and administrative challenges to successfully operate virtually, it proved that much of the City's workforce can effectively work remotely moving forward. Agencies recommended that telework be

implemented by the City as an effective Continuity of Operations (COOP)[8] strategy for future emergencies.

Public Outreach and Communications

Given the scale of the COVID-19 pandemic, the City enhanced its public messaging strategy to provide communications in the top 25 languages other than English spoken in NYC, offer opt-in COVID-19 specific messaging, and provide the public access to the City's COVID-19 data for transparency.

Since COVID-19 was caused by a novel virus, public health guidance required frequent adjustments as new information about the virus emerged. However, it was challenging for City agencies to provide timely updates due to rapidly changing information. Out-of-date or conflicting City, State, and Federal public health guidance contributed to confusion and the spread of misinformation and disinformation[9] among the public. In addition, delays around public messaging and lack of awareness about how to find accurate information eroded the public's trust in guidance from government institutions. To address this gap, the City worked with trusted local leaders, organizations, and community healthcare providers to share information about COVID-19 and City services with their communities and combat misinformation and disinformation. This was a successful engagement strategy to reach traditionally underserved communities that the City should strengthen for future emergency responses.

Equity

The City aimed to incorporate equity; accommodations for people with disability, access, and functional needs (DAFN[10]); and language access into the foundation of COVID-19 response operations. Acknowledging that the pandemic had a disproportionate impact on communities of color, the City established the Task Force on Racial Inclusion & Equity (TRIE) to identify impacted neighborhoods that should be prioritized for community engagement and COVID-19 resources. This included prioritization for COVID-19 testing and vaccination, as well as support for economic recovery.

The City was mindful of heightened vulnerability among older New Yorkers during the pandemic and quickly worked to transition many services to be accessible at home. Additionally, to support the language needs of all New Yorkers, the City activated[11] the

[8] COOP refers to agencies ensuring essential functions continue to be performed during a wide range of emergencies.
[9] Misinformation is information that is false, but not created or shared with the intention of causing harm. Disinformation is false information deliberately spread to deceive people.
[10] DAFN includes people with disabilities, along with older adults, children, people with limited or no English proficiency, individuals with health vulnerabilities, and others who may need particular assistance or additional support during an emergency.
[11] To implement an operation/entity or mobilize resources to accomplish a specific objective during emergency operations.

Language Access Task Force to facilitate interagency coordination around reducing language barriers and establishing multilingual communications.

Despite efforts to minimize inequities, gaps remained. There were also missed opportunities to evaluate how pandemic restriction policies and enforcement actions would disproportionately impact some communities. Embedding equity considerations into planning, decision-making, and operationalization of response activities, as well as the City's routine operations, is a key strategy to ensure the City addresses inequities and reaches all New Yorkers in the future.

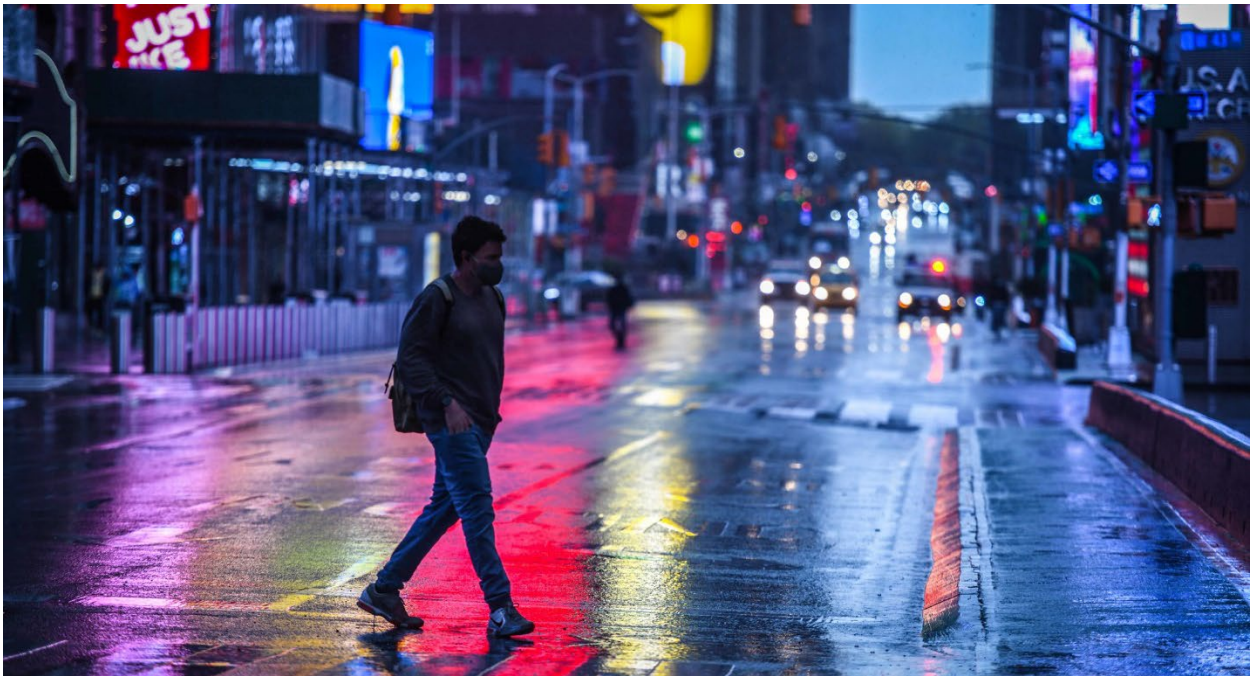

Image: Times Square at Night in May 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49884750682/

Introduction

Overview

The COVID-19 pandemic overwhelmed governments around the world with cascading and simultaneous health, social, and economic impacts. New York City (NYC) faced unprecedented challenges, especially during the initial COVID-19 wave in spring 2020. In response, the NYC Government (the City) set up a number of operations resulting in the most expansive and prolonged emergency response in the City's history. As of June 2022, there have been over 2.2 million cases, 157,000 hospitalizations, and 41,000 deaths from COVID-19 reported in NYC. Due to the wide-ranging scope and scale of the pandemic, the

City conducted a thorough review of its COVID-19 response to evaluate emergency preparedness and response strategies.

The NYC COVID-19 Response Review Report covers City-led pandemic response operations between January 2020 and June 2022 to document best practices and areas for improvement for future citywide emergencies. The Report was developed in coordination with the Response Review Lead Team comprised of the NYC Department of Health and Mental Hygiene (NYC Health Department), NYC Emergency Management, NYC Health and Hospitals (NYC Health + Hospitals), and the Mayor's Office of Operations, with input from 31 additional City agencies and departments that responded to, and continue to respond to, COVID-19. It is important to note that the Report is not inclusive of all City efforts or lessons learned from the COVID-19 pandemic response. Rather, the Report focuses on operations which had a citywide impact; were new or significantly adapted from planned operations; and are likely to be considered for future emergencies.

The Report provides findings from the response review and associated recommendations intended to improve the City's readiness for any type of future citywide emergency. However, the City acknowledges there are resource limitations and competing priorities that may impact agencies' ability to implement recommendations.

NYC COVID-19 Response Review Focus Areas

1. Citywide Command, Coordination, and Decision-making
2. City Coordination with State and Federal Partners
3. Healthcare Facility Surge
4. Healthcare Surge Staffing
5. City Operation Surge Staffing
6. Critical and Scarce Resource Requests
7. COVID-19 Testing
8. Contact Tracing and Support
9. Isolation and Quarantine
10. Fatality Management
11. Operational Vaccine Capacity and Distribution
12. City Transition to and From Remote Operations
13. Continuity of City Operations
14. School Closure and Reopening
15. Food Insecurity
16. Data Management and Reporting
17. Public and Provider Messaging
18. Community Engagement and Outreach
19. Business Coordination

Methodology

To objectively evaluate the City's COVID-19 response operations, the Response Review Lead Team worked with a third-party contractor to conduct a literature review of City-provided documents and materials; review open-source information on the City's COVID-19 response; and analyze feedback from surveys and facilitated discussions on 19 focus areas (see inset box) with over 140 key current and former City employees from 35 City agencies and departments. The findings from these activities informed the NYC COVID-19 Response Review Report, including the 74 recommendations to address across the

following operational areas: 1) City, State, and Federal Coordination, 2) Health and Medical Operations, 3) Novel Social and Economic Operations, 4) Response Staffing, 5) Data and Technology, 6) Public Outreach and Communications, and 7) Equity. The City is already working to implement many of these recommendations to improve both routine and emergency response operations.

Image: Masking on Public Transit in April 2021
Ed Reed/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/51147898277/

Response Overview

Event Summary

In December 2019, an outbreak of a severe respiratory disease with unknown origin was detected in Wuhan, China. In early January 2020, initial guidance from the World Health Organization (WHO) suggested the outbreak was limited to the immediate Wuhan area and there was no clear evidence of person-to-person transmission. However, within days, the first case of COVID-19 was discovered outside of China, suggesting person-to-person transmission.

In January 2020, City, State, and Federal agencies began planning for screening, isolation, and quarantine of travelers arriving from Wuhan at seven designated intake airports across the country – which included John F. Kennedy International Airport (JFK). Similar to the United States (U.S.) response strategy for previous novel diseases, this approach was designed to contain and prevent the spread of COVID-19. On February 1, 2020, the City identified its first traveler requiring quarantine and continued to quarantine travelers throughout the month. However, as the Federal Government continued to focus on containment through February 2020, significant person-to-person COVID-19 transmission was documented in Asia and Europe. Additionally, the limited availability of COVID-19 testing in the U.S. made it difficult for the nation to detect local spread and pivot to disease mitigation. On March 2, 2020, the City confirmed its first case of COVID-19. Also during the first week of March, hospital Emergency Department visits for influenza-like-

illness started increasing in NYC, an early indication of widespread local COVID-19 transmission.

As information about the virus became available, the City prioritized public messaging. In early March 2020, Mayor de Blasio began holding daily press conferences to communicate the most up-to-date COVID-19 information to the public, and the City shared COVID-19 data, including case, hospitalization, and death rates, publicly on the NYC Health Department's website to increase transparency.

As no medical countermeasures[12] were available in early 2020, the only strategy to slow COVID-19 transmission and preserve healthcare capacity in NYC was to implement strict mitigation measures for enforcing social distancing, quarantine, and isolation. In March 2020, the City and State took unprecedented measures including the full closure of schools and non-essential businesses (e.g., restaurants), as well as banning large gatherings. The City also transitioned most of its workforce and Emergency Operations Center (EOC)[13] to remote work in mid-March and public school students to remote learning for the remainder of the 2019–2020 academic year. Throughout the shift to remote operations, the City remained committed to providing essential services to meet the health, safety, and well-being of millions of New Yorkers.

These mitigation measures, while necessary to curb the spread of COVID-19, had lasting health, economic, and social impacts on the public. For example, February 2023 subway ridership was only 67% of February 2019 ridership; the office vacancy rate for the last quarter of 2023 was 14.3%, nearly double the 2019 average of 7.6%; and public-school enrollment for the 2022–2023 academic year was at 93% of the pre-COVID baseline.

As mitigation measures took a few weeks to take effect to slow disease transmission, COVID-19 infections surged in NYC. To address the patient surge, hospitals and other healthcare facilities adopted conservation measures to stretch space, staffing, and resource capacities. By April 2020, the healthcare surge was substantially above normal levels, with NYC hospitals' Intensive Care Unit (ICU) capacity over 100%, leaving insufficient space, staff, and resources for patients needing care. To address these challenges, the City implemented a number of novel strategies to keep the NYC healthcare system functioning. To compensate for the global shortage of medical supplies, including personal protective equipment (PPE), the City proactively distributed available PPE weekly to every NYC hospital and nursing home based on facilities' patient counts, bed capacity, and other factors. The City also explored unique partnerships with local manufacturers to supplement PPE supplies for the NYC healthcare system.

[12] Medical countermeasures are medicines and medical supplies (e.g., such as vaccines and antibiotics) that can be used to diagnose, prevent, or treat diseases.
[13] The City's EOC is the central location for senior officials from City, State, and Federal agencies, as well as other entities, to coordinate response efforts, centralize decision making, gather and disseminate information, and allocate and deploy resources.

To alleviate patient surge in hospitals, the City worked with State, Federal, and non-profit partners to establish 11 alternate care sites in NYC, including the U.S. Naval Ship (USNS) Comfort and a Federal Medical Station at the Jacob Javits Convention Center. To surge healthcare staff, the Mayor issued a call for retired and out-of-state medical practitioners to assist NYC, and City agencies coordinated the deployment of more than 4,000 volunteer and contracted staff to NYC hospitals and nursing homes.

Tragically, a surge in patients gave rise to a surge in fatalities. During the first week of April 2020, NYC reported a peak of more than 800 probable COVID-19 fatalities a day – higher than the entire state of California on its worst day (718 fatalities[v]) during the pandemic. In contrast, NYC normally experiences approximately 150 all-cause fatalities per day. The COVID-19 pandemic was the largest fatality management incident in the City's modern history. To safely and respectfully manage decedents, City, State, and Federal partners worked with fatality management stakeholders to create efficiencies and reduce administrative bottlenecks. Additionally, the City enhanced its systems to electronically report and track deaths and setup long-term freezer storage capability to address the decedent management burden placed on overwhelmed healthcare and funeral industry partners.

To promote both individual and citywide recovery from COVID-19 impacts, the City created several first-of-their-kind initiatives to keep New Yorkers safe and communities functioning. To allow individuals to safely isolate or quarantine, City agencies initiated hoteling programs to provide shelter and wrap-around services for COVID-19 positive and exposed healthcare workers, individuals in congregate settings, individuals recently released from correctional institutions, and members of the general public. The hoteling programs served more than 79,200 New Yorkers and visitors to NYC.

To address food insecurity, the City set up 500 grab-and-go meal sites in schools across NYC, which served 47 million meals to New Yorkers. The City quickly established a direct meal delivery program for older adults, providing over 1.2 million meals in March–April 2020 before merging with the City's emergency meal program, GetFood. The GetFood program ultimately delivered over 200 million meals to anyone who needed food, including those who could not leave home, had no one to get food for them, or could not afford private food delivery. To promote community recovery and support businesses, the City created Open Streets, which transformed streets into public space; established Open Restaurants, which allowed restaurants to use sidewalks and roadways for outdoor dining; and shared masking and social distancing guidelines with businesses to safely reopen the City for outdoor gatherings and limited indoor activities.

To support older adults and reduce negative health impacts and effects of social isolation from COVID-19, the City transitioned Older Adult Centers across NYC to offer many of its services remotely, including free meals, activities, and classes. The City also launched a campaign in summer 2020 to limit the effects of social isolation among older New

Yorkers, including public service announcements asking volunteers to connect remotely with older adults through the Friendly Visiting Program. Acknowledging the potential of social isolation in other vulnerable communities, the City worked to install software to allow video visits so individuals in correctional institutions could continue to connect with family and friends.

To more readily detect COVID-19 in the community, the City led the nation in offering free testing to anyone – regardless of immigration, insurance, or symptomatic status – through the Test & Trace Corps (T2), which launched in June 2020. T2 provided testing, contact tracing, and, through the Take Care program, access to no-cost supportive services for individuals in isolation or quarantine, like hoteling, food deliveries, and dog walking. The NYC Health Department also worked closely with the State to provide testing and contact tracing in congregate settings, such as adult care facilities and nursing homes.

Community partnerships were essential to supporting the City's efforts to reach all New Yorkers, especially the most vulnerable, with messaging and services. City agencies expanded partnerships with community-based organizations (CBO), faith-based organizations (FBO), other non-profit organizations, and community healthcare providers to amplify COVID-19 related messaging, resources, and services, including testing and vaccination information. These partnerships were particularly helpful in combatting misinformation and disinformation, as individuals learned about the City's response and resources from trusted messengers. In addition, T2 established a Community Advisory Board (CAB) to receive feedback on testing and contact tracing efforts in real-time from CBOs and disseminate information in a culturally competent manner.

As the pandemic continued through summer 2020, NYC was the nation's first big city to announce an option for hybrid learning for NYC public schools for the 2020–2021 academic year. Pilot data from in-person learning centers open throughout the first COVID-19 wave showed minimal transmission between students in this setting. The City outfitted schools with precautionary measures and created a school-specific contact tracing strategy. With these safety measures and processes in place, NYC public schools reopened to students and staff for hybrid learning in September 2020.

At the end of 2020, the first COVID-19 vaccines were approved for use in the U.S. To coordinate the citywide vaccine distribution strategy, the City established the interagency Vaccine Command Center (VCC). Starting in January 2021, the VCC coordinated mass vaccination sites, mobile vaccination buses, on-site vaccination in congregate settings, in-home vaccination for home-bound individuals, and community pop-up vaccination events throughout NYC. The City also supported the existing immunization infrastructure (such as hospitals, health centers, and pharmacies) in providing vaccination services. Throughout the campaign, the NYC Health Department managed vaccine ordering, enrollment of providers in the vaccine program and Citywide

Immunization Registry (CIR)[14], and vaccination data collection. To minimize disparities in vaccine uptake across communities, the City prioritized Task Force on Racial Inclusion & Equity (TRIE) neighborhoods in its vaccine distribution strategy, including reserving appointments at mass vaccination sites for individuals from these communities. To encourage vaccinations, the City offered incentives and required proof of vaccination for certain indoor activities (such as indoor dining). As of June 2022, 79% of NYC residents were fully vaccinated[15], and more than 88% received at least one dose.

The City announced a partial return-to-office for City employees in May 2021. Following a vaccine mandate for its workforce in August 2021, the City implemented the full return-to-office in September 2021 – one of the first major NYC sectors to do so. Additionally, the City's success in safely returning NYC public schools to hybrid learning for the 2020–2021 academic year enabled students to return to fully in-person learning for the 2021–2022 academic year.

Though the City continues to respond to COVID-19 and grapple with its lasting impacts, the peak of COVID-19 and City response operations has passed. The City remains committed to supporting New Yorkers as we continue to live with, learn from, and better our approach to COVID-19 management.

Timeline

Below depicts a high-level timeline of key response decisions and activities during the City's COVID-19 response. This timeline is not all inclusive, but rather, highlights the significant citywide milestones, as well as associated total COVID-19 hospitalizations per day, throughout the pandemic from January 2020 to June 2022.

[14] CIR keeps immunization records for all children and adults who live in NYC. CIR consolidates immunization information and shares it with healthcare providers, families, and agencies concerned with public health.
[15] Fully vaccinated individuals are those who received the two-dose series of Moderna, Pfizer, or Novavax primary vaccine, or the single-dose series of the Johnson & Johnson vaccine.

COVID-19 Hospitalized Count and Response Timeline

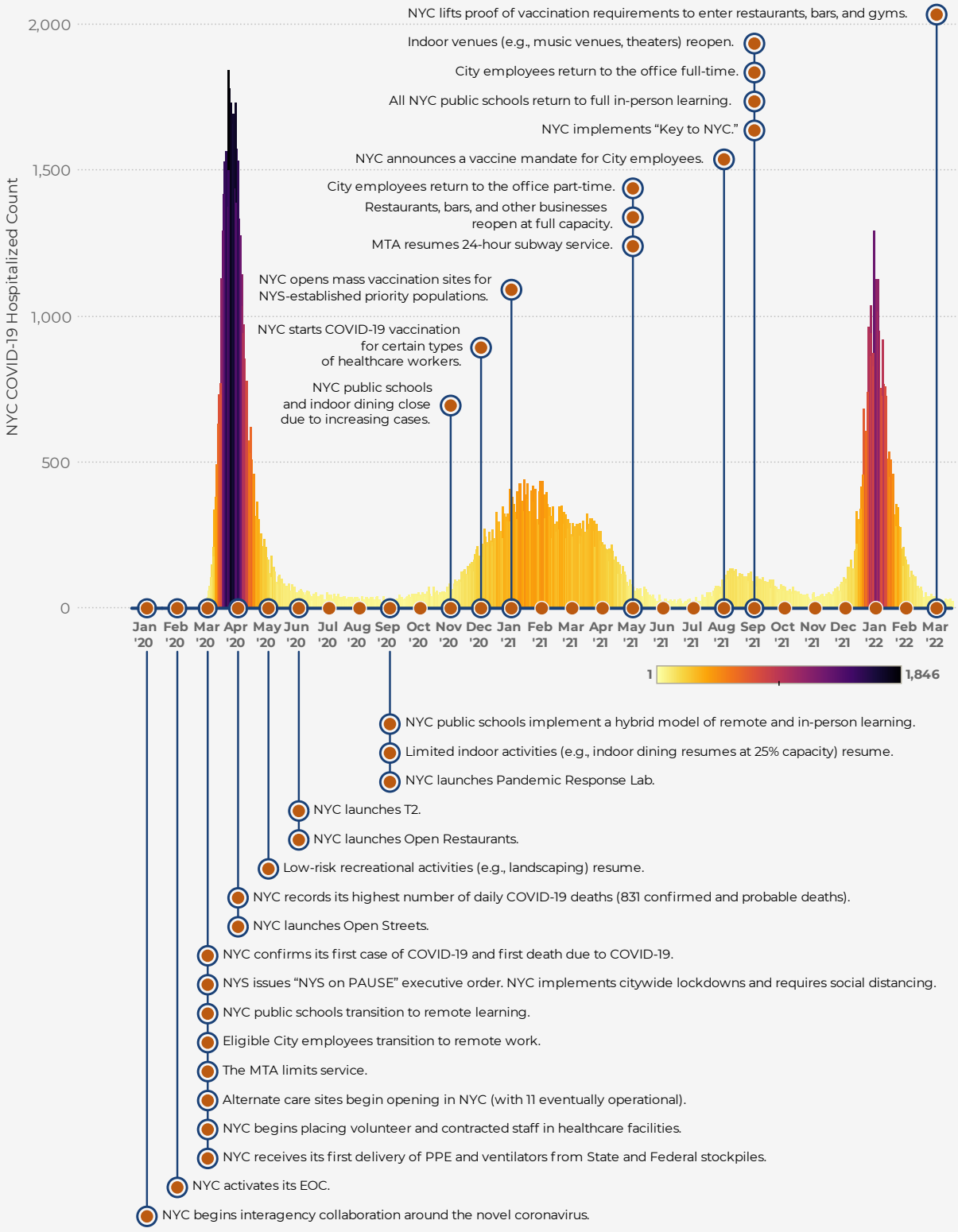

Image: Social Distancing Signage on City Waterfront in April 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49771840127/

Operational Areas and Findings

In response to the COVID-19 pandemic, NYC coordinated a citywide effort to support and protect the health, safety, and security of millions of New Yorkers.

As part of interagency response efforts, the City launched multiple operations and lines of effort with stakeholders from local, State, Federal, healthcare, community, non-profit, and private sector entities. The sections that follow summarize the key findings and recommended improvements identified through the NYC COVID-19 Response Review effort.

Image: USNS Comfort in NYC, March 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49717025786/

City, State, and Federal Coordination

Similar to previous responses to novel diseases, such as H1N1 influenza (2009) and Ebola Virus Disease (2014), the City coordinated with State and Federal agencies in response to the COVID-19 pandemic through new and existing partnerships.

However, the unprecedented scope and scale of the COVID-19 pandemic quickly exposed challenges with established patterns of coordination. As NYC became one of the U.S.'s first and worst hit jurisdictions in early 2020, the Federal Government's initial focus on containment and delays in decision-making encumbered resources that could have been more effectively used to slow the spread of disease. At the State level, political challenges impacted the City's response efforts. In addition, the unprecedented scale of the pandemic forced the City to create new and ad hoc structures for an all-of-government response. There were missed opportunities to leverage existing plans and agency core competencies, which introduced additional coordination and operational challenges for City agencies.

Delayed Federal decision-making

At the beginning of the COVID-19 pandemic, the limited information available suggested the virus was contained to the Wuhan region of China, with little risk for community transmission. Following established practices, per Federal guidance, the City implemented an initial COVID-19 containment strategy that included traveler screening

at JFK Airport; isolation of symptomatic individuals and quarantine of their close contacts; and preparation of the NYC healthcare system to provide care and supportive treatment to COVID-19 positive patients. However, as case trends elsewhere in Asia and Europe showed significant community spread of COVID-19, it became clear that a containment strategy would not be effective at preventing community spread from imported cases in the U.S.

Epidemiologists[16] urged the nation to focus on limiting community spread, knowing jurisdictions could not contain an outbreak given the nature of the virus and lack of available testing. In late February 2020, there was a rise in influenza-like illness in NYC, reflected in both the NYC Health Department's syndromic surveillance system and NYC Fire Department's (FDNY) Emergency Medical Services influenza-like illness calls, an indication of community spread of COVID-19. However, as confirmatory laboratory testing was not yet available, the Federal Government continued to focus on containment and missed opportunities to implement interventions that could have limited the impact of community spread.

In remaining consistent with the Federal Government's focus on containment, the City was delayed in implementing COVID-19 mitigation measures, such as policies to limit person-to-person contact. Other jurisdictions – with fewer COVID-19 cases – implemented stricter mitigation measures ahead of NYC. For example, San Francisco declared a local state of emergency, closed schools, and implemented a regional stay-at-home order on March 17, before NYC established similar measures on March 22. Although there are limitations in comparing these different jurisdictions, San Francisco's rapid response to the threat of COVID-19 likely contributed to its significantly lower case and death rate compared to other large U.S. cities in the initial months of the pandemic.

Jurisdictional Collaboration
Due to the unprecedented nature of the pandemic, the NYC Law Department (Law) **coordinated with other jurisdictions to discuss novel legal issues** related to business closures, executive orders and emergency executive orders on essential businesses and entities, and public access to certain settings based on vaccination status.

As the Federal Government continued to focus on containment, Federal agencies were delayed in providing critical guidance on masking, PPE, testing, and contact tracing to local jurisdictions. These recommendations would have enabled the City to transition from a disease containment to a mitigation strategy more quickly. While waiting for recommendations from the Centers for Disease Control and Prevention (CDC) and other trusted Federal entities, COVID-19 spread through NYC communities, forcing the City to make difficult policy decisions without Federal standards. For example, in April 2020, the City

[16] Epidemiologists are public health workers who investigate patterns and causes of disease and injury.

mandated masking in public spaces before the CDC issued guidance encouraging the public to wear face coverings to limit the spread of COVID-19. By that time, NYC was already the epicenter of the COVID-19 outbreak in the U.S. Without Federal guidance or a national strategy on PPE prioritization, allocation of critical equipment (e.g., ventilators), and other considerations, the City had to address numerous complicated issues on its own, in real-time.

- **Recommendation 1.1**: At the start of a public health emergency, the NYC Health Department should prepare generalized recommendations to guide City decision-making to take independent actions, which may precede State and Federal guidance.

In addition to delays in releasing guidance, City agencies reported a lack of overall direction from the Federal Government on how to respond to a novel virus and a pandemic of this scale. City agencies also reported that it was unclear which Federal agency had responsibility over which aspect of the response and that existing coordination structures were not effectively utilized. This contributed to communication breakdowns, as it became increasingly difficult for City agencies to identify which Federal agency to reach out to for guidance and clarification.

- **Recommendation 1.2**: The City, led by the Mayor's Office, should proactively establish coordination and communication processes and pathways, as well as clearly outline roles and responsibilities, with elected officials at the Federal and State levels ahead of emergencies to increase their resiliency and use during future emergencies.

State and City coordination challenges

Beyond challenges with Federal coordination, City agencies also reported challenges collaborating with State partners, which at times, resulted in duplicative and inefficient response operations. Prior to the change in gubernatorial administration in August 2021, the relationship between the Governor and Mayor was strained. The Cuomo administration was reluctant to share data with the City and often refused to give advance warning of policy changes and new directives. This dynamic hindered the City's ability to plan and respond to the pandemic effectively. For example, in March 2020, the State restricted the City's access to its Health Emergency Response Data System (HERDS), which tracks hospital capacity across New York State (NYS), though the City historically had regular access. This limited the City's insight into hospital impacts and hindered its ability to support the NYC healthcare system. Additionally, the State was slow to release critical pandemic-related guidance, resulting in the City either releasing its own guidance or policy (which would then, at times, be superseded by subsequent State action) or waiting for the State to release guidance or policy, which significantly impacted healthcare operations early in the pandemic.

Challenges with City and State coordination were also felt in public communication. At the beginning of the pandemic, Governor Cuomo and Mayor de Blasio independently held daily press conferences to update New Yorkers on COVID-19 case trends, guidance, and policies. Though the public appreciated routine updates from elected officials, the City often had no prior notice of what the Governor would address during press conferences and learned of new guidance and policies it was tasked with enforcing with the rest of the public. This last-minute release of State guidance impeded the City's ability to plan for the implementation of new policies and mitigation strategies. For example, in October 2020, the State announced "Red, Orange, and Yellow Zones," which required business closures and social distancing enforcement in areas with high COVID-19 community spread. The State shared information with the public, including City agencies, on the boundaries of these zones only days before the City was required to implement these restrictions, leaving agencies with an extremely narrow window to set up enforcement mechanisms. This jeopardized New Yorkers' trust in the Government response.

The City and State also struggled with operational coordination throughout the pandemic. In March 2020, when the NYC healthcare system was overwhelmed with the number of COVID-19 patients, the City requested State assistance to surge healthcare facility space. The City and State initially worked independently to visit, contract, and supply alternate care sites – sometimes for the same location – creating confusion over which entity had the authority to proceed.

City agencies reported that these operational coordination challenges continued into vaccination efforts in early 2021. Consistent with other vaccine operations, NYC received its COVID-19 vaccine supply directly from the CDC. Unlike previous vaccine campaigns, State approval was required for NYC's vaccine allocation and the City's distribution plan each week, which created an additional bureaucratic layer and required the City to quickly adjust planned operations to guarantee its weekly vaccine supply. As a result, the City faced challenges with short- and long-term vaccine operational planning and determining the number of vaccine appointments that could be arranged and scheduled.

State and City Guidance Contradictions

Due to a COVID-19 surge in parts of Brooklyn and Queens in October 2020, the Mayor publicly announced plans to close schools and non-essential businesses. However, the Governor, who had the authority to impose these measures, **rejected this plan and announced new geographical areas and closures for the City to enforce.**

- **Recommendation 1.3**: The NYC Health Department, NYC Emergency Management, and other agencies as appropriate, should foster ongoing, routine

programmatic coordination and emergency planning with State public health and emergency management counterparts to strengthen coordination and communication pathways for future emergencies. This should include keeping political offices at City and State levels engaged in emergency planning and response efforts.

- **Recommendation 1.4**: The City, led by the Mayor's Office, with support from NYC Emergency Management, NYC Health + Hospitals, and the NYC Health Department, should coordinate with the State to review lessons learned through their respective COVID-19 after-action review efforts and jointly plan, train, and exercise on City-State improvement areas and emergency response capabilities for future large-scale citywide emergencies.

Intra-city coordination challenges

In addition to Federal and State coordination challenges, there were similar coordination issues among City agencies. The City created the Citywide Incident Management System (CIMS) after 9/11 to pre-establish roles and responsibilities for agencies during an emergency response and define agency core competencies. CIMS indicates that the NYC Health Department, FDNY, and NYC Police Department (NYPD) should jointly operate a "unified command structure" for a public health emergency, but this largely was not followed during the COVID-19 response.

Interagency Coordination
To respond to COVID-19 impacts, the City activated **over 80 agencies and departments** in the EOC.

CIMS covers how City agencies should coordinate with one another but does not govern how Mayor's Office leadership organizes for emergency response. Given the scale, scope, and nature of the pandemic – a citywide outbreak of a novel infectious disease, prompting mass shutdowns of regular life for an unknown duration – the Mayor's Office determined that an all-of-government response with direct Mayoral leadership was required.

The City was forced to adapt in real-time and create new response structures. This inevitably resulted in some inefficiencies and challenges with intra-City coordination. Additionally, agencies reported that new decision-making and policy-setting processes were not always clear. Agencies also noted that they, along with non-governmental partners, were confused about which agency was leading certain response efforts, who to reach out to for inquiries, and how to refer community members for services. Additionally, significant capacity-building was needed for some agencies that were working on operations outside of their traditional emergency response scope.

- **Recommendation 1.5**: City agencies should routinely review CIMS to incorporate lessons learned and plan for new and emerging threats.

- **Recommendation 1.6**: The Mayor's Office, with support from NYC Emergency Management, the NYC Health Department, and other relevant agencies, should establish a structure for Mayor's Office leadership to plug into and coordinate with Unified Command for a large-scale emergency in the future. This structure should incorporate best practices and lessons learned from the COVID-19 response. Once established, it should be added to existing emergency planning documents.

Additionally, Mayor's Office leadership reported challenges in obtaining information about agency resources available for an all-of-government response, including City-owned spaces that could be retrofitted for alternative uses; emergency response assets such as vehicles, generators, and PPE; human capital, including drivers and City employees willing to serve as volunteers; and resources that could be quickly procured through existing citywide requirements contracts.

- **Recommendation 1.7**: The Mayor's Office should convene a working group of relevant agencies, including Department of Citywide Administrative Services (DCAS), Department of Design and Construction (DDC), and NYC Emergency Management, to assess existing citywide inventories of emergency response assets, recommend creation of new inventories, and ensure briefings on inventories are incorporated into emergency preparedness exercises, including senior leadership tabletops[17].

[17] A tabletop exercise is a facilitated discussion of a scripted scenario in an informal environment that is based on applicable plans, policies, and procedures.

Image: Test & Trace Corps Workers in July 2020
Ed Reed/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/50091950401/

Health and Medical Operations

On March 2, 2020, the first COVID-19 case was confirmed in NYC. Within a month, NYC eclipsed Asian and European cities as the epicenter of the global COVID-19 pandemic. As a result of the rapid disease spread, City agencies and NYC healthcare facilities were faced with the need to respond to simultaneous, unprecedented supply chain challenges and patient and fatality surges.

In March 2020, to address PPE shortages, City agencies centralized all PPE intake and distribution to more strategically allocate and distribute scarce resources. Additionally, the City built new partnerships with non-traditional entities to secure and manufacture PPE. To surge healthcare facility space, the City worked with State, Federal, and non-profit partners to transform large facilities, such as the Jacob Javits Convention Center and Billie Jean King National Tennis Center, into alternate care sites to alleviate the patient burden from overwhelmed healthcare facilities. The alternate care sites were not widely utilized during the first wave of COVID-19 and not used at all for later waves, as healthcare facilities successfully surged internal capacities.

To address the rise in fatalities, the City helped healthcare facilities expand their mortuary capacity through refrigerated trailer deployments and moved to implement plans for temporary burials. The City then pivoted to long-term freezer storage as an alternate decedent management strategy, changing course out of concerns for public reaction to a large-scale temporary burial site and concerns from religious communities. Decedent

management planning should be updated to incorporate alternate options to temporary burial sites for future mass fatality emergencies.

While continuing to closely monitor healthcare and fatality trends, the City established the nation's largest testing and contact tracing operation. On June 1, 2020, NYC Health + Hospitals launched T2 with 1,000 contact tracers to investigate COVID-19 positive cases and identify, assess, and provide guidance to exposed contacts. Through the Take Care program, T2 provided supportive services, treatment, and care to those in isolation and quarantine in-home or at hotels. As testing availability increased, the City encouraged all New Yorkers – not just those with symptoms – to get tested and limit the spread of COVID-19. More complex case and cluster investigations, such as those in congregate care settings, were referred to the NYC Health Department for testing, case management, and contact tracing. Clearly defining agency roles and staffing strategies for large-scale testing and contact tracing efforts would help reduce operational challenges and inefficiencies for future public health emergencies.

Once vaccines became available in late 2020, the City established the VCC to coordinate vaccination opportunities for all New Yorkers through mass vaccination sites, mobile vaccination buses, on-site vaccination in congregate settings, in-home vaccination for home-bound individuals, and pop-up vaccination events throughout NYC. Though PPE distribution, testing, contact tracing, and vaccination efforts were ultimately successful operations, initial organizational challenges led to operational delays that should be remedied before the next public health emergency.

Strategic approach to PPE distribution and manufacturing

At the start of the pandemic, there was a national and global scarcity of critical resources – particularly PPE (such as N95 respirators, face shields, and gowns), ventilators, and other medical equipment. This posed challenges for the NYC healthcare system and first responder agencies, as they requested resources the Government could not provide. The Federal Government maintains the Strategic National Stockpile (SNS) to provide jurisdictions with supplies, medicines, and devices for lifesaving care as a stop-gap when materials may not be widely available. However, the SNS had not been sufficiently funded to replace and maintain inventory levels of critical materials since the 2009 H1N1 influenza pandemic, when the last large-scale nationwide distribution of medical materiel was undertaken.

Though the City has a tested process to centrally intake resource requests through the EOC's Logistics Section and gather, source, and distribute supplies during an emergency, the City adapted its logistics operations due to the overwhelming demand for medical supplies and PPE. The City moved all PPE resource fulfillment (including for NYC healthcare facilities) out of the EOC Logistics Section to the NYC Health Department,

which, in conjunction with the Mayor's Office, developed an allocation matrix to distribute PPE to hospitals and nursing homes based on a complex algorithm that considered facility size, COVID-19 patient load, and other factors. This allowed the City to transition to a "push" model of distribution of supplies, rather than a "pull" or request model, by which the NYC Health Department provided PPE to every NYC hospital and nursing home once a week. Though this meant facilities may have received less PPE than they needed in a given week, it ensured all facilities had some PPE to operate. Of note, the NYC Health Department was able to fulfill emergency life safety PPE requests within hours of request receipt. As the supply chains reopened, PPE distribution expanded to include other high-risk congregate settings (e.g., group homes). In fall 2020, as the supply chain restored, the City established a PPE Service Center with a third-party vendor through which healthcare facilities and other high-risk residential congregate settings could directly place orders from a tailored menu of available PPE. However, by the time the PPE Service Center was operational, the peak of resource scarcity had subsided, and the City ended up with more goods than needed, as was common in jurisdictions around the country.

- **Recommendation 2.1**: The NYC Health Department should maintain a flexible and sustainable local PPE stockpile to support the NYC healthcare system during future public health emergencies.
- **Recommendation 2.2**: The NYC Health Department, with support from the Greater New York Hospital Association (GNYHA) and NYC Health + Hospitals, should work with the NYS Department of Health (NYS DOH) and Federal counterparts to develop recommendations on PPE and medical equipment prioritization and allocation. This should include considerations for healthcare facilities that serve traditionally underserved communities or have fewer resources, as well as high-risk settings, such as long-term care facilities and other residential congregate settings.

To overcome supply chain constraints, the City adopted several approaches. To expedite contracting, the Mayor issued an emergency executive order[18] removing the Comptroller from the emergency procurement process. While effective in helping the City quickly execute contracts and to secure PPE at a time when U.S. cities were competing with one another, the nature of the supply chain crisis required the City to rely on new and untested vendors with less oversight than in prior emergencies. During this time, City agencies were inundated with information on potential sources of PPE, and there was no process or lead agency to vet the validity of these offers. Eventually the Mayor's Office of Contract Services (MOCS) developed a centralized portal to intake and process offers and validate potential vendors.

[18] https://a860-gpp.nyc.gov/concern/nyc_government_publications/r207tq787?locale=en

At the international level, to help verify that vendors had the supply and potential manufacturing capacity to fulfill PPE contracts, the City hired consultants in Asia to visit factories and inspect resources, contracting directly with manufacturers and transport providers to control the end-to-end process for scarce resources. Though this helped filter out an abundance of foreign offers that did not meet national standards, it was undertaken at an enormous expense to the City. Additionally, much of the sourced international product arrived only after the acute PPE shortages began to wane, at least for NYC hospitals and nursing homes. While waiting for supplies from international vendors, the City, led by the NYC Economic Development Corporation (NYCEDC), pursued novel partnerships with local manufacturers to create PPE. Within a matter of weeks, local facilities were producing gowns and face shields and, within months, were creating and shipping test kits made up of 3D-printed COVID-19 test swabs and viral transport media. However, as many agencies were involved in the approval of newly manufactured products, a more centralized approach to design review and approval would facilitate quicker implementation of local manufacturing in the future.

In addition to addressing resource gaps for the City, this local manufacturing helped the NYC economy by keeping businesses open. In fact, a number of local manufacturers that pivoted to creating PPE for NYC healthcare facilities secured contracts with the Federal Government to operate at a larger scale.

- **Recommendation 2.3**: MOCS and the Mayor's Office of Management and Budget (OMB), with support from NYC Emergency Management, should assess the City's emergency procurement policies and processes to identify ways to expedite purchases and contracts of goods and services, as well as maintain vendor oversight during future emergencies.
- **Recommendation 2.4**: NYCEDC, DCAS, and the Department of Small Business Services (SBS) should formalize coordination with local manufacturers, including minority and women-owned vendors, during future emergency response efforts, particularly when resources are scarce.

Varied success of alternate care sites

Though NYC healthcare facilities are regulated by the State, City agencies coordinate with NYC healthcare facilities to plan for healthcare surge operations. However, this planning focused on supporting overwhelmed facilities during a short-term surge through patient load-balancing[19]; it did not account for a citywide, months-long surge in which nearly every healthcare facility was at or over capacity. The State did not utilize a centralized mechanism to coordinate patient load-balancing across NYS. Therefore, Long Island hospitals, which had space and staff for COVID-19 positive patients, went

[19] Patient load-balancing involves pre-hospital distribution of patients and patient transfers to prevent overwhelming a single facility, as well as the secondary re-distribution of patients to unload overwhelmed facilities.

underutilized. Instead, in March 2020, to alleviate patient surge in NYC hospitals, City, State, Federal, and non-profit partners worked together to establish 11 alternate care sites in NYC. A number of City agencies not traditionally involved in healthcare operations, including DDC, NYCEDC, as well as other agencies, such as the NYC Health Department, NYC Health + Hospitals, and NYC Emergency Management, successfully worked together to find, outfit, and supply large convention-like centers to serve as alternate care sites. These partnerships proved useful later in the pandemic response, as the City had to find and outfit space to serve as testing and vaccination sites.

Alternate care sites ultimately provided limited utility during the initial COVID-19 surge. Numerous restrictions on the types of patients that could be transferred from hospitals to alternate care sites limited their utilization. Initially, all COVID-19 positive patients, even those recovering and with no acute symptoms, were not allowed to be transferred to these sites. While these policies began to change later in the first COVID-19 wave, hospital capacity issues began waning around the same time as mitigation measures began taking effect, and alternate care sites continued to go underutilized.

Additionally, patients who might have most benefited from alternate care sites, such as nursing home residents and patients ready for discharge, were not able to use them, as these patients could not meet the physical demands of the convention-like spaces (e.g., walking long distances to shower facilities or using beds without lifts). Further, many alternate care sites were not located close to the most impacted communities and healthcare facilities.

The impact of subsequent COVID-19 waves was limited as there were more disease mitigation measures in place, and healthcare facilities were able to increase their internal capacities to manage patient surge. This was a successful strategy for hospital networks that had a robust patient transportation system between their facilities. (In fact, this internal surge approach was used by NYC hospital networks in response to the Respiratory Syncytial Virus (RSV) patient surge in 2022.) Independent and community hospitals, however, faced challenges with surging internal capacity[vi]. As such, relevant City agencies should continue to work with NYS DOH and NYC healthcare facilities to maintain and update internal surge plans and regularly exercise capabilities.

- **Recommendation 2.5**: The NYC Health Department and NYC Emergency Management should work with FDNY, GNYHA, NYC Health + Hospitals, and NYS DOH to develop statewide patient load-balancing and resource sharing strategies, as well as systems to coordinate movement of patients and resources.
- **Recommendation 2.6**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, NYS DOH, and other NYC and NYS healthcare associations to coordinate with healthcare facilities to revise internal surge plans to incorporate lessons learned from the COVID-19

response, as well as address the needs of community hospitals in implementing surge strategies.

- **Recommendation 2.7**: The NYC Health Department, GNYHA, NYC Emergency Management, NYC Health + Hospitals, and NYS DOH should explore the potential utility of smaller, targeted alternate care sites to serve highly-impacted neighborhoods and special populations, such as infected nursing home patients who can be discharged from hospitals but need to be housed separately to avoid infecting others.

Fatalities exceeded planning assumptions

City Coordination with Funeral Industry
Though under the regulatory authority of the State, OCME proactively coordinated **with 400+ NYC funeral homes** to identify needs and address areas of concern.

Since 2008, the NYC Office of Chief Medical Examiner (OCME), in collaboration with the NYC Health Department, NYC hospitals, and funeral industry partners, have planned, trained, and exercised on mass fatality management operations for a pandemic-like event. Despite these preparedness efforts, the initial surge in fatalities due to COVID-19 presented significant challenges for many healthcare facilities and funeral homes.

Hospitals, already overwhelmed with COVID-19 positive patients, were responsible for managing an ever-increasing number of decedents, with limited mortuary resources. Hospitals' success in managing the fatality surge varied – while some implemented pre-established fatality surge plans, many struggled to manage the increase in fatalities. To support hospitals, the City deployed body collection points (BCPs), which are refrigerated units used to temporarily store decedents until transportation can be arranged. Additionally, the City provided guidance to expand capacity and ensure the appropriate storage of decedents. At peak, the City deployed 145 BCPs to NYC hospitals and alternate care sites.

Funeral homes also experienced capacity issues. Social distancing restrictions created bottlenecks and delayed the normal pace of completing funeral services. As funeral homes faced these challenges and workflow changes, some were unable to retrieve decedents in a timely manner. OCME established four disaster portable morgue units across NYC to intake and store decedents to alleviate the burden on funeral homes. These units included long-term storage, providing families the time needed to make final arrangements. Additionally, due to overwhelming demand on funeral homes and healthcare facilities, OCME reduced documentation requirements in order to retrieve decedents more efficiently.

Beginning in March 2020, there was an exponential increase in fatalities in NYC. The number of deaths peaked in the first week of April 2020, when there were over 200

deaths per day occurring outside of healthcare settings (e.g., deaths in residences). This was an approximately eight-fold increase from pre-pandemic conditions. As the increase in fatalities was initially observed, the City established an interagency and multidisciplinary group composed of OCME, the NYC Health Department, GNYHA, the Mayor's Office, NYC Emergency Management, and NYC Health + Hospitals to maintain situational awareness, address necessary operational adjustments, coordinate resources and requests, and advocate for policy modifications. Additionally, this group discussed and developed efficiencies, such as requiring electronic (instead of paper-based) death certificates to support expedited decedent recovery and storage. Conference calls were regularly held with NYC hospitals, long-term care facilities and nursing homes, and funeral homes to support industry-wide situational awareness and to communicate operational strategies. Despite the interagency coordination and efforts made to streamline processes, several issues were observed which could be improved for future mass fatality incidents. For example, physicians are not currently mandated to sign death certificates. This caused significant delays in decedent disposition (e.g., burial or cremation) during the pandemic. In addition, the lack of regulation regarding appropriate decedent storage conditions led to health and safety concerns. In a few cases, inadequate storage conditions also raised concerns about the accurate identification of decedents. The City intervened to retrieve and store decedents appropriately to address these concerns.

- **Recommendation 2.8**: OCME should advocate for regulation and requirements (including State legislation) concerning the appropriate storage of human remains, healthcare facility fatality management planning, and establishing a requirement for physicians to sign death certificates for patients regularly under their professional care.

At the onset of the pandemic, the City's established strategy for decedent disposition during a mass fatality incident was the use of temporary burials. While the City began planning to implement this strategy in spring 2020, the Mayor directed agencies to pivot to long-term freezer storage due to concerns over potential public reaction to a large-scale temporary burial site. Feedback from religious communities, which were concerned about preserving traditional faith-based burial practices, also influenced this decision-making. Despite the challenges of moving away from the established strategy, the City quickly developed a plan, procured space and supplies, and operationalized long-term freezer storage as a new decedent management strategy.

- **Recommendation 2.9**: Upon notification of the potential for a fatality surge, NYC Emergency Management should establish an interagency working group to

conduct incident-specific planning and coordination, including the determination of decedent management options.

To fill staffing gaps presented by the fatality surge and operational demand, the City requested and utilized various sources of personnel from City, State, and Federal agencies. Disaster Mortuary Operational Response Teams (DMORT) and the New York National Guard supported citywide operations in the field and at the disaster morgue portable units. OCME integrated external staff into fatality management operations, effectively doubling the size of the agency. Despite this success, OCME observed that the tracking of internal personnel actions (hiring, onboarding, and departures), which was done mostly through manual processes (i.e., spreadsheets) could benefit from being updated into a more advanced human resource management system.

- **Recommendation 2.10**: OCME should continue to assess its human resources management system and make updates to streamline personnel data.

Testing, contact tracing, and support

Early in the pandemic, there was a scarcity of testing resources compared to the surge of probable cases in NYC, including a massive market shortage of validated testing supplies. The City was forced by Federal restrictions to reserve tests for symptomatic persons with a travel nexus to countries most impacted by COVID-19. The City pursued efforts to create and procure supplies utilizing Emergency Use Authorizations (EUA) issued by the U.S. Food and Drug Administration (FDA). As the City pursued these efforts and as Federal restrictions loosened, the City was able to plan for large-scale testing operations.

The NYC Health Department began planning contact tracing operations in March 2020. In May 2020, however, the Mayor directed NYC Health + Hospitals to lead citywide testing and contact tracing efforts, recognizing the need to quickly stand up these operations. This decision was informed by several factors, including NYC Health + Hospitals's overall operational capacities, its institutional advantages as a public corporation to hire staff more quickly, and to more quickly contract with high-volume laboratories to expand COVID-19 testing capacity. The Test &Trace Corps (T2) launched on June 1, 2020, with the mission of providing COVID-19 testing to all New Yorkers, as well as identifying, tracking, assessing, and recommending isolation to COVID-19 positive individuals or quarantine to exposed contacts. T2 rapidly became the largest municipal testing and contact tracing effort in the country.

In parallel, the NYC Health Department, in collaboration with City and State agency partners, led COVID-19 testing, case investigation, and contact tracing for high-risk residential congregate settings, such as adult care facilities. The NYC Health Department also investigated and responded to COVID-19 outbreaks in schools, businesses, and other locations. In addition, the NYC Health Department and NYC Department of Social Services (DSS) worked collaboratively to conduct testing and contact tracing in homeless

shelters. While NYC Health + Hospitals and the NYC Health Department partnered to leverage the capabilities of both organizations, due to the novelty and urgency of the efforts, City agencies reported ambiguity on roles and responsibilities, which led to operational duplication and inefficiency. Both the NYC Health Department and NYC Health + Hospitals indicated the need to set clear expectations and establish goals related to the utility of citywide contact tracing during a future large-scale disease outbreak. Additionally, agencies recommended that congregate settings be integrated into a citywide testing and contact tracing strategy so that there are not disparate operations.

Early testing efforts suffered from low demand and confusion over ever-changing eligibility requirements. On June 2, 2020, the Mayor announced testing would be available to all New Yorkers, without any eligibility restrictions. This was a significant financial investment, as the Federal Emergency Management Agency (FEMA) had not agreed to reimburse costs for widescale testing. Loosening testing eligibility requirements successfully led to increased testing demand and utilization. In support of T2, DDC, the NYC Health Department, DSS, NYC Health + Hospitals, the School Construction Authority (SCA), and other City agencies found and outfitted space to serve as fixed "brick-and-mortar" testing sites and, eventually, developed a mobile testing fleet, held pop-up testing events, conducted in-home testing, and established at-home test kit distribution sites. The City also contracted with vendors to provide routine and exposure-based on-site testing in residential congregate settings, such as nursing homes. To increase testing capacity, NYCEDC, NYC Health + Hospitals, and a third-party partner created the Pandemic Response Lab (PRL), which opened in September 2020 with the capacity to locally process 45,000 COVID-19 tests per day, with a results turnaround time of under 24 hours. At its peak, PRL processed more than 80,000 tests per day. Starting in early 2021, PRL, along with the NYC Health Department, also provided weekly testing data that was used to identify and track emerging variants of the virus. In addition to increasing testing capacity, the City established the Testing Innovation Council, comprised of experts from the healthcare sector and academia, to find innovative ways to expedite testing operations. NYCEDC also held a rapid testing competition to identify new solutions to address COVID-19 testing challenges.

Testing Capacity
The City **administered 257,334 COVID-19 tests daily**, at peak.

Through testing and case investigation, T2 identified COVID-19 positive individuals and through contact tracing, identified and notified close contacts who were exposed to

COVID-19. T2 also provided access to resources needed to safely isolate or quarantine through the Take Care program, including hoteling (see Novel Social and Economic Operations for more information). T2 contact tracing and the Take Care program proved valuable in reaching individuals directly and offering resources to support their ability to follow public health recommendations.

Take Care Resource Navigation Program
The Mayor's Office of Housing Recovery Operations (HRO) contracted with **ten CBOs,** which served as resource navigators to ensure individuals **isolating or quarantining at home had necessary items**, such as food or medication.

The scale of contact tracing for COVID-19 was much larger than anything the City had done or planned for before. T2 sourced and trained thousands of case investigators and contact tracers to operate remotely through phone calls and on-the-ground through community outreach. To share COVID-19 information and resources with particularly impacted communities, the City focused contact tracer recruitment from areas hardest hit by the virus. Though challenging, more than half of T2's contact tracers hailed from communities most impacted by COVID-19. This approach to recruit staff from areas of need is recommended in the future for outreach and support programs, as it successfully built trust with communities that the City may not have otherwise reached.

- **Recommendation 2.11**: The NYC Health Department, with support from the Mayor's Office and NYC Health + Hospitals, should formalize a scalable citywide testing strategy for future respiratory virus surges that pre-establishes agency roles and responsibilities. The strategy should include a plan for how to adapt when testing resources are limited, as well as a plan to integrate congregate settings and prioritize traditionally underserved communities.
- **Recommendation 2.12**: The NYC Health Department, with support from the Mayor's Office and NYC Health + Hospitals, should formalize a scalable citywide contact tracing strategy that pre-establishes agency roles and responsibilities. The strategy should include a plan to integrate congregate settings and prioritize traditionally underserved communities.
- **Recommendation 2.13**: NYC Health + Hospitals, with support from DSS, the Mayor's Office, and the NYC Health Department, should formalize a scalable outreach and support program for individuals with, exposed to, or otherwise impacted by a disease, modeled after the T2 Take Care program, that pre-establishes agency roles and responsibilities. The strategy should include a plan to integrate congregate settings and prioritize traditionally underserved communities.

T2 Outreach
To ensure T2 met the diverse needs of New Yorkers, contact tracers spoke **40 distinct languages**.

To track case investigation and contact tracing activities, the NYC Health Department and NYC Health + Hospitals worked with the Office of Technology and Innovation (OTI) to create – in less than three weeks – a comprehensive software platform that attempted to balance the need to collect demographic data and health information from individuals and minimize the amount of time spent on contact tracing interviews. However, there were challenges with the usability, adaptability, and overall effectiveness of the platform. For example, staff reported inefficiencies due to duplicate data that needed to be cleaned, a complicated survey instrument that took time to fill out, and difficulties exchanging data with other existing surveillance systems (e.g., NYC Health Department systems), which led to delays in making operational decisions. Despite the technology challenges, T2 completed 76% of case investigations and identified 1.8 million contacts over its period of operation[vii].

- **Recommendation 2.14**: The NYC Health Department, with support from OTI, should improve data systems that support case investigation and contact tracing, so they are more scalable and easily integrated with other data systems.

In addition to contact tracing, the City used testing data to identify and target interventions in neighborhoods with increased COVID-19 transmission. For example, the City closed businesses and restaurants and deployed mobile testing vans based on neighborhood case rates. In the future, the City should continue to use real-time surveillance data to direct resources, including effective targeted messaging, to neighborhoods with increased disease transmission.

To supplement existing systems to monitor disease spread, the City piloted wastewater surveillance to detect the presence of virus shed by people with and without symptoms. This was a particularly useful disease surveillance approach as it did not rely on clinical testing, which began fluctuating greatly with the availability of at-home test kits. After initiating this program during the COVID-19 response, the City was equipped to rapidly deploy this surveillance method to monitor for poliovirus in 2022.

- **Recommendation 2.15**: The Department of Environmental Protection (DEP) and the NYC Health Department should continue to expand wastewater surveillance efforts using current best practices as appropriate, for future public health emergencies.

Unprecedented City-led vaccination campaign

In fall 2020, the City began to plan for a citywide COVID-19 vaccination campaign. To utilize the full scope of City resources, the Mayor's Office created the interagency Vaccine Command Center (VCC). In initial planning, the VCC was tasked with developing vaccine

policy recommendations while vaccine distribution would be left to the existing healthcare infrastructure (e.g., hospitals, health centers, and pharmacies). As COVID-19 vaccines were approved by the Federal Government, and as the City moved toward implementation of a citywide vaccine campaign, the City found a need for additional capacity to rapidly distribute vaccines and provide sufficient geographic coverage to ensure equitable vaccine distribution.

City Vaccination Capacity
The City **administered around 122,000 vaccine doses daily**, at peak.

The Mayor's Office directed the VCC to adjust its mission to include establishing and running vaccination operations. The VCC coordinated vaccination efforts via fixed mass vaccination sites, mobile vaccination buses, on-site vaccination in congregate settings, in-home vaccination for home-bound individuals, and community pop-up vaccination events throughout NYC.

The VCC was led by the Mayor's Office with support from DDC, the NYC Health Department, NYCEDC, NYC Health + Hospitals, NYC Emergency Management, the Office of Labor Relations (OLR), and SCA. Creating a new interagency structure to coordinate the vaccine campaign allowed the City to leverage the skills and capacities of many City agencies. VCC leadership reported directly to the Mayor, which helped expedite decision-making and set priorities. While the interagency approach aimed to unite efforts to vaccinate nearly the entire NYC population as quickly as possible, it led to some confusion around agency roles.

The City's vaccination efforts were overwhelmingly successful. Shortly after vaccine supply became available, the City launched 22 large-scale fixed vaccination sites (including in Times Square and at the American Museum of Natural History, Citi Field, and Yankee Stadium), 20 mobile vaccination buses, and an in-home vaccination program for home-bound individuals. Across all City-run vaccination sites, the City directly delivered more than 17.95 million vaccine doses to New Yorkers by June 2022.

Congregate Setting Vaccination
The VCC worked with DSS to hold vaccination events in the NYC shelter system, which administered **18,000 vaccine doses in more than 350 shelters.**

The VCC faced some operational challenges. As a temporary interagency body, the VCC did not have the ability to contract with vendors directly. Rather, City agency and Mayor's Office staff assigned to the VCC coordinated with the NYC Health Department, NYC Health + Hospitals, and NYC Emergency Management to develop contracts and monitor vendor performance. While this structure was workable, agencies caution against this approach in future vaccine operations, as it is not a best practice and can lead to non-subject matter experts functioning as primary contract oversight.

The City also received repeated requests from local elected officials to hold pop-up vaccination events in their districts. The City maximized every opportunity to be responsive to these requests while advancing equitable vaccine distribution. The VCC took many proactive steps to reserve vaccination resources for communities hit hardest by the pandemic and communities with high vaccine hesitancy.

Though the VCC was tasked with coordinating citywide vaccine operations, congregate settings (such as shelters, long-term care facilities, and correctional institutions) were not folded into VCC efforts. Instead, the NYC Health Department instituted independent vaccination operations, working with agencies such as DSS. In the future, the City should consider integrating congregate settings into broader vaccine campaign strategy and planning.

- **Recommendation 2.16**: The NYC Health Department, with support from the Mayor's Office, NYC Emergency Management, and NYC Health + Hospitals should formalize a scalable citywide strategy for large-scale vaccination efforts that require vaccine operations outside of the existing healthcare infrastructure that pre-establishes agency roles and responsibilities, including vendor oversight. The strategy should include a plan to integrate congregate settings and prioritize undeserved communities, as well as structures and processes to intake and vet requests for mobile vaccination buses or pop-up vaccination events.

Vaccine for All Corps (V4AC)

The VCC and partner agencies established the V4AC emergency jobs program in January 2021 to **hire 2,000 staff to support vaccine distribution**. V4AC supported efforts to increase vaccine confidence and provided economic support via community hiring practices and providing good wages.

For the COVID-19 vaccination campaign, the NYC Health Department developed a new platform that allowed vaccine appointment scheduling for the public and vaccination tracking for City agencies and providers. A few weeks into the program, OTI built upon the NYC Health Department platform to launch the VaxApp, which provided improved user experience and functionality. Given the number of City-run vaccination sites, the VaxApp proved to be an effective and reliable tool that centralized vaccine operations data reporting. However, the VaxApp's public website portal required a user to complete the entire intake form before seeing available vaccine appointments and would crash when user traffic was high (which it often was).

Additionally, the initial version of the VaxApp platform was rigid and did not allow for rapid modifications, which delayed improvements and implementation of changing vaccine policy. The City worked diligently to fix these technological issues and eventually launched a more user-friendly version. However, in addition to software challenges, technological barriers made it difficult for older New Yorkers, those with limited internet

or device access, and those whose primary language was not English to schedule appointments. The City worked to rectify these equity and accessibility issues by increasing the availability of appointments that could be scheduled over the phone or in-person (e.g., walk-ins), designating authorized schedulers (e.g., CBOs) to make appointments on behalf of vulnerable populations, and offering ZIP-code based appointments to target underserved communities. Despite improvements in the VaxApp platform, there is still work to be done to make it more robust and flexible, as there were delays in reconfiguring the platform for use during the City's 2022 Monkeypox (mpox) virus outbreak response.

The City also launched the NYC COVID-19 Vaccine Finder website to help the public locate where vaccines were being offered, including City-run sites, pharmacies, and other healthcare delivery sites. The website was linked to the VaxApp and other appointment scheduling platforms to facilitate one-stop vaccination scheduling.

- **Recommendation 2.17**: The NYC Health Department, with support from OTI, should update and revise the VaxApp platform so it can be more readily deployed for future vaccination and other medical countermeasure campaigns.

The VCC coordinated with agencies not traditionally involved in vaccine operations to identify, outfit, and operate facilities as fixed vaccination sites. This work built upon siting work done for other components of the COVID-19 response, including identifying and establishing alternate care and testing sites. The City has more recently undergone similar siting work to source and deploy emergency shelters in response to the asylum seeker crisis that began in 2022. Through these siting efforts, agencies have identified areas for improvement to more efficiently find and outfit facilities for public-serving response operations. First, there is not a comprehensive database or list of City-owned properties with site photos and logistical information. As a result, agencies conducted time-intensive, in-person visits to properties (sometimes to the same property for testing and then vaccination site assessment) that photos could have shown were not viable. Second, many available City properties need construction to be ready for public use. Ultimately, the City paid for one-time leases for privately-owned facilities instead of investing to adapt City-owned space for repeated future public use.

- **Recommendation 2.18**: DDC, with support from DCAS, NYCEDC, and NYC Emergency Management, should develop a centralized database of City-owned properties with site information to more quickly assess the viability and accessibility of potential facilities for public-serving response operations during future emergencies. This includes standardizing the criteria for site selection, conducting site assessments to gather the needed information, and implementing a process for keeping data current.
- **Recommendation 2.19**: The Mayor's Office, with support from DCAS and DDC, should chair an interagency task force to prioritize, assess, and, if possible, equip

City-owned properties with necessary updates to serve as public-serving facilities, such as a testing site, service center, or other site for the public to access City services during an emergency. This includes incorporating improvements to maintenance, ventilation, accessibility, and other components into existing development or retrofit plans.

Pop-up Vaccination Events
The City **held hundreds of pop-up vaccination events** at parks, tourist attractions, houses of worship, retail locations, and other high-density locations.

After the initial roll-out of COVID-19 vaccines, as demand and uptake among New Yorkers began to wane, the City took several steps to overcome vaccine hesitancy and increase vaccination rates. The VCC coordinated with agencies to host information campaigns, such as virtual information sessions for non-profit service providers. In addition, the City launched COVID-19 vaccine promotion commercials during summer 2021 for target populations. For example, the NYC Health Department and the Department for the Aging (NYC Aging) Commissioners delivered messages targeted to older adults.

In summer 2021, the City introduced vaccine incentive programs. The City analyzed survey data to determine appropriate offerings, which included free event tickets and $100 gift cards. However, the vaccine incentive announcement was made with short notice, and the VCC faced challenges adjusting operations to implement the incentives, such as making appointments available to meet the spike in demand.

In addition to incentives, the City mandated that all City employees be vaccinated in August 2021. In September, members of the public were required to show proof of vaccination to visit indoor entertainment, recreation, dining, and fitness settings as part of the launch of the Key to NYC program[20] and reopening efforts. While the vaccine incentives and mandates increased vaccination rates, the City is working to understand the long-term impact of the incentives and mandates and any associated unintended consequences.

- **Recommendation 2.20**: The NYC Health Department, with support from relevant City agencies, should evaluate the effectiveness and potential drawbacks of vaccine mandates and incentive programs. This should include developing a plan to operationalize vaccine mandates and incentives if the strategies are to be used.

[20] The Key to NYC program was the first-in-nation vaccination mandate for workers and customers at indoor dining, fitness, entertainment, and performance venues.

Image: School Grab-and-Go Meal Pick-up in April 2020
Ed Reed/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49747125697/in/photostream/

Novel Social and Economic Operations

In alignment with State orders, the City adopted some of the toughest measures in the nation to limit community spread of COVID-19. This included banning gatherings, transitioning schools to remote learning, closing non-essential businesses, reducing public transportation, and mandating social distancing and masking when in public. These public health measures saved lives and mitigated illness. However, the City continues to address the long-term impacts of these measures on New Yorkers.

To limit the spread of COVID-19 in schools during the first wave, the City transitioned its one million public school students to remote learning in March 2020. In this transition, the City struggled to equip students with needed technology, and students faced challenges learning in a remote environment for the first time. NYC was the first big city to return to hybrid learning in September 2020 and returned to fully in-person learning in September 2021.

As school meals are free for all NYC public school students, NYC Public Schools (formerly Department of Education [DOE]) adjusted its model to provide take-home grab-and-go meals to students and the public at large through schools across NYC. To support COVID-19-vulnerable, food-insecure New Yorkers, the City also developed a free food delivery program, including direct meal delivery to older adults who previously relied on daily meals from Older Adult Centers. Though these initiatives were successful, there are

opportunities to coordinate more closely with local restaurants and offer culturally appropriate meals in the future.

To safely isolate and quarantine individuals, the City established several hoteling programs with wrap-around services for healthcare workers, individuals in congregate settings, and the general public. City hoteling efforts would benefit from centralized coordination and specific planning for individuals with more complex medical and behavioral / mental health needs.

To combat the severe impact on the economy, the City engaged with businesses across NYC to address their varying needs during the pandemic and ensure compliance with COVID-19 requirements. However, the City lacked a comprehensive database of all businesses and their operational status, which made coordination and outreach to businesses challenging.

Challenges with transition to remote learning

Although the City had processes to close schools for an emergency, such as a snow day or building issue, prior to the COVID-19 pandemic there was no consideration or preparation for remote learning. As a result of increasing cases, the City closed public schools the week of March 15, 2020, with the plan to transition to remote learning. The City struggled to ensure teachers, students, and parents were able to rapidly transition to remote learning. In the week schools closed, teachers were meant to report in-person to train on remote teaching operations and set up their virtual classrooms, and students were meant to pick up their mobile devices. However, due to the concern of COVID-19 spread, the timeline was accelerated, and schools were closed to both teachers and students later that same week. This delayed virtual classroom set-up and device distribution. Though the transition was rocky, NYC Public Schools worked to respond to emerging student needs. As schools reported that internet access at home was an issue for some students, NYC Public Schools prioritized distributing internet-enabled iPads to students in need, such as students living in shelters, students in foster care, students with disabilities, or English language learners. However, as many families moved during the pandemic, there was inconsistency in device delivery, resulting in learning gaps for some students.

Remote Learning Technology
In March 2020, the City purchased **more than 300,000 iPads** – nearly every iPad available for purchase in the country – to provide students with mobile devices for remote learning.

- **Recommendation 3.1**: NYC Public Schools should continue to provide mobile devices to school staff and students for remote learning during routine school closures to maintain this capability for longer-term school closures. Allocation

efforts should prioritize vulnerable students, including those who may have limited access to adequate technology and high-speed internet.

- **Recommendation 3.2**: NYC Public Schools should continue to improve and exercise remote learning capabilities with school staff.

After a few months of remote learning, NYC Public Schools and the NYC Health Department began assessing data to inform planning for the 2020–2021 academic year. At the time, NYC Public Schools found that although approximately 75% of students were participating daily in remote learning, engagement could be as little as one hour online per day. As younger elementary school students especially benefit from visual and physical instructional techniques, many students fell behind grade-level expectations. Additionally, several challenges were documented for vulnerable students, including those in temporary housing who did not have sufficient space for learning or those with physical needs (e.g., occupational or physical therapy) who did not have adequate support in a virtual environment.

Based on limited transmission of COVID-19 in Regional Enrichment Centers (see inset box), the NYC Health Department determined that the benefits of in-person learning likely outweighed the risks, particularly as student and staff safety could be accommodated by social distancing, masking, and increased ventilation. NYC Public Schools also surveyed parents to gauge their attitudes towards returning to in-person learning, finding that approximately 70% of parents were supportive of students returning to in-person learning for the 2020–2021 academic year. As a result of the data and parental interest, the City offered hybrid learning in September 2020, where students could be fully remote or in-person one to three days a week.

Regional Enrichment Centers
In March 2020, the City established 178 **Regional Enrichment Centers** for in-person learning for children of essential workers when schools were closed. This was an important pilot as there was **little to no transmission of COVID-19 in these classrooms** at a time prior to COVID-19 vaccine availability.

In summer 2020, to prepare for the return to in-person learning as part of the hybrid approach, the City set up the NYC Public Schools Situation Room to track COVID-19 positive test results in schools, conduct contact tracing, and notify schools within three hours of a confirmed case. The NYC Public Schools Situation Room's processes and protocols were developed by Department of Buildings (DOB) leadership, NYC Public Schools, the NYC Health Department, T2, and school staff labor unions and centralized expertise from across the City regarding the impact of COVID-19 on children and schools. Having a single point for all schools helped the City develop policies, coordinate information, disseminate protocols, and simplify reporting.

Outdoor Learning
In fall 2020, NYC Public Schools and the Department of Transportation (DOT) launched Outdoor Learning to use **street space for classes and activities for nearly 800 schools.** This helped students develop socialization skills and promote physical health.

However, there were challenges accommodating in-person learning for the 2020–2021 school year. First, due to logistical issues outfitting facilities in time, the school year start was delayed by ten days. The NYC Public Schools Situation Room tracked cases and clusters, and individual schools were closed as cases were identified, which led to repeated school closures that disrupted in-person learning despite not necessarily indicating transmission was occurring in the building.

Additionally, the Mayor announced plans to close all schools for in-person learning if the rolling seven-day average COVID-19 positivity rate in NYC reached 3%. In November 2020, due to a COVID-19 surge where the citywide 3% threshold was met, all schools were closed and returned to fully remote learning. Due to backlash from this policy, the City moved away from the 3% threshold and prioritized re-opening elementary schools in late November 2020, then middle schools in February 2021, and finally high schools in March 2021, for hybrid learning.

Throughout the 2020–2021 academic year, schools were found not to be a large source of COVID-19 transmission. As a result, the NYC Health Department recommended the return to fully in-person learning in September 2021. As principals reported a number of concerns from staff and parents, NYC Public Schools collaborated with school staff labor unions, held town hall meetings for staff and parents to ask questions, and hosted "open school" events for parents to see precautionary measures in place first-hand. Involving principals was a successful strategy to acclimate school staff and parents to the transition back to fully in-person learning.

- **Recommendation 3.3**: NYC Public Schools should incorporate principals and other school executives into policy development discussions to help inform decisions based on the insight of those responsible for executing and enforcing policy during future emergencies.

Addressing food insecurity

Since schools were closed, the City began planning alternate food distribution strategies to ensure that students still had access to three healthy meals a day. However, as the pandemic upended the supply chain and economy, many more New Yorkers faced food insecurity. To address this, the City set up the COVID-19 Emergency Food Distribution Program, composed of NYC Public Schools grab-and-go meal sites and the GetFood NYC Program.

Drawing on existing contracts with food service providers and the U.S. Department of Agriculture (USDA), NYC Public Schools operated 500 grab-and-go meal sites in school facilities to provide over 47 million meals to students, their families, and anyone else in need of food. These sites operated Monday through Friday, offered three meals per bag, allowed individuals to collect multiple bags for their family, and did not require any documentation or application to access. The program was a vital resource to communities.

Food Distribution for Older New Yorkers

NYC Aging quickly worked with private vendors to set up a meal delivery system for older adults that distributed **more than 1.2 million meals from mid-March to April 2020**. As the demand for emergency meals grew, the meal service merged with GetFoodNYC.

Additionally, the City set up the GetFood NYC Program, which distributed over 200 million meals to New Yorkers in need. This program aimed to serve vulnerable populations, including older adults or those who have health conditions that made them susceptible to COVID-19; New Yorkers with disabilities who may have relied on caregivers; non-citizens who may not be eligible for Federal benefits; communities of color; low-income populations, including NYC Housing Authority (NYCHA) residents and those served by DSS; and hundreds of thousands of newly food-insecure New Yorkers impacted by the economic downturn. Given the transmissible nature of COVID-19, the City pivoted from a pick-up strategy where clients congregated at a central location to a delivery model where Taxi and Limousine Commission (TLC)-licensed drivers delivered meals to clients' home addresses.

Though successful in distributing millions of meals, the GetFood NYC Program relied on food companies that had the means to quickly bid and negotiate contracts with the City and the capacity to produce food at a large-scale. While expedient, some struggling local businesses were unable to participate, and culturally appropriate food (e.g., halal or kosher options) was not always available.

Many New Yorkers also relied on non-governmental support systems for food, such as local organizations and community mutual aid groups, which emerged out of an urgent and expanding need that City-led initiatives were not initially equipped to fill.

- **Recommendation 3.4**: The Mayor's Office of Food Policy (MOFP), DSS, and NYC Aging should explore development of an emergency food voucher program that allows individuals experiencing food insecurity to purchase food or meals from local, culturally appropriate establishments, grocers, and restaurants to promote community recovery during future emergencies.
- **Recommendation 3.5**: MOFP, in collaboration with MOCS and SBS, should develop pre-vetted lists of culturally appropriate food vendors (i.e., minority and women-

owned, kosher- and halal-certified) that meet the City's food quality standards to be leveraged during future emergencies.

In addition to helping individuals experiencing food insecurity, the City also worked to support grocery stores and food pantries grappling with supply chain constraints. NYCEDC created a WhatsApp group for grocery store owners to share information and resources with one another and connected restaurant suppliers to grocers, which contributed to businesses restocking their shelves. Additionally, the City supported food pantries with millions of dollars in funding and set up the Pandemic Food Reserve Emergency Distribution program through a third-party vendor, which brought high-quality fresh produce and shelf-stable food to food pantries throughout NYC.

- **Recommendation 3.6**: NYCEDC, MOFP, NYC Emergency Management, and SBS should formalize supply chain monitoring and information sharing pathways to support grocery stores during future emergencies with similar disruptions.

Disparate isolation and quarantine hoteling programs

The City offered free hoteling for individuals who could not safely isolate or quarantine at home or their current residence (e.g., shelter). These included individuals discharged from hospitals, transferred from congregate settings, those testing positive for COVID-19 but without symptoms serious enough to merit hospitalization, and close contacts of COVID-19 positive individuals. It also included frontline workers and surge healthcare staff brought into the City from across the country.

As the need to establish isolation and quarantine programs for multiple populations unfolded, the City established several disparate hoteling programs run by different City agencies, serving distinct populations. This approach had advantages in that different facilities and levels of care were provided based on population needs. Frontline workers and surge healthcare staff, for example, did not require the same level of care or wrap-around services as those testing positive for COVID-19 or transferred from a congregate setting. However, this approach also led to some inefficiencies, confusion over disparate standards for hoteling eligibility, and, most importantly, resulted in agencies operating outside of their area of expertise. In future emergency responses, City leadership should prioritize directing agencies with experience in housing contracts, such as DSS and NYC Department of Housing Preservation and Development (HPD), to lead emergency hoteling operations.

Department of Correction (DOC) Quarantine Housing
To reduce COVID-19 transmission in correctional facilities, **DOC successfully implemented quarantine housing**, where COVID-19 positive inmates were transferred to a designated facility.

- **Recommendation 3.7**: The Mayor's Office, with support from DSS, HPD, NYC Emergency Management, NYC Health + Hospitals, and the NYC Health

Department, should formalize a scalable unified isolation and quarantine strategy that pre-establishes agency roles and responsibilities.

DSS developed the City's first COVID-19 isolation and quarantine hoteling programs to transfer COVID-19 positive clients out of shelters. With support from NYCEDC, DSS identified and opened isolation facilities at multiple hotels and contracted with medical providers to monitor COVID-19 positive clients at these sites. In addition to hoteling for individuals in isolation or quarantine, DSS successfully leveraged existing plans and relationships with hotel vendors to de-densify its single adult shelter population living in congregate settings to more effectively implement social distancing and disease mitigation measures. Between April and June 2020, DSS expanded its hotel capacity to provide shelter to approximately 10,000 clients, allowing relocation of a significant portion of the individual shelter population into hotels. DSS continued to provide its standard services at these hotels, including social services and meals.

The Mayor's Office directed NYC Emergency Management to establish a hoteling program for stable patients discharged from hospitals, frontline workers, healthcare professionals who were brought into NYC for surge staffing, and other individuals needing a place to isolate. While NYC Health + Hospitals was also beginning to plan hoteling operations during this time, NYC Emergency Management was selected to launch a hoteling program out of concerns for NYC Health + Hospitals' capacity.

In April 2020, at the start of the NYC Emergency Management isolation hoteling program, hospitals began sending discharged patients to NYC Emergency Management-contracted hotels, including patients who were recovering from COVID-19 but judged by hospital staff to no longer need medical care. Although the NYC Emergency Management program did include twice daily phone calls to check in on isolating individuals, these checks were not completed by medical staff. Shortly after the program launched, three patients discharged from hospitals died of COVID-19 related causes during their isolation at NYC Emergency Management-contracted hotels. The Mayor's Office and NYC Emergency Management swiftly moved to halt transfer of patients discharged from hospitals or COVID-19 positive individuals into the NYC Emergency Management isolation hoteling program. T2's Take Care program, which included hoteling, launched shortly thereafter and began receiving patients discharged from hospitals, individuals testing positive for COVID-19, or anyone else screened to need a higher standard of monitoring and care during isolation.

- **Recommendation 3.8**: The NYC Health Department, DSS, HPD, NYC Emergency Management, NYC Health + Hospitals, and other agencies should update isolation and quarantine plans to include screening mechanisms to ensure individuals who are sick or at risk of becoming sick are only accepted into hoteling programs administered with medical oversight. Screening should include efforts to identify

people with mental health needs warranting services to prevent worsening of illness or crisis or those in need of other mental health care.

The NYC Emergency Management hoteling program pivoted to serve only COVID-19 negative frontline workers, healthcare surge staff, and other individuals needing a place to quarantine. In partnership with the Mayor's Office of Criminal Justice (MOCJ), NYC Emergency Management expanded its program to provide hoteling for COVID-19 negative individuals released from incarceration. Though these hoteling programs served over 36,200 clients and provided crucial services to those in need, NYC Emergency Management faced many challenges as it carried out operations it had never undertaken before. NYC Emergency Management's experience in providing emergency hoteling was limited and did not include contracting with the hotel industry. Administering this hoteling program led to several legal and audit challenges for the agency later in the pandemic and in years to follow.

Once operational, T2's Take Care program assisted individuals to get through their isolation or quarantine period emotionally, financially, and medically well. As part of this program, eight CBOs across NYC helped New Yorkers with wrap-around services such as food, medication refills, laundry, and dog-walking. Take Care offered hoteling to any COVID-19 positive or exposed individual who was unable to safely isolate or quarantine in their home. As New Yorkers became aware that the City was offering free resources through the Take Care program, individuals were more likely to respond to contact tracing calls from T2, enabling individuals to safely quarantine and help limit COVID-19 spread.

In addition to providing hoteling for the general public, the Take Care program had several other aims. The program was intended to alleviate crowding in inpatient units from NYC Health + Hospitals facilities. Additionally, the program served a limited number of DSS clients with complex needs, those experiencing homelessness but were unknown to DSS, and/or those living in other congregate settings. While this partnership with DSS was ultimately successful, with thousands of clients served by Take Care and transferred back into DSS care, there were operational challenges. Case workers reported that referral of DSS clients to Take Care hotels was complicated and required extensive client advocacy. At times, clients did not meet the threshold for the level of care provided at Take Care hotels, forcing DSS to either accept the client into one of its hotels or send the client to a hospital.

The Take Care hoteling program provided clinical monitoring and support, case management, and wrap-around services. Upon identifying barriers to participation by some clients, NYC Health + Hospitals adjusted policies to allow for caregiver and emotional accompaniment (e.g., home health aide, personal aide), provided wheelchairs and other assistive devices, and offered recreational therapy for individuals with developmental and intellectual disabilities. In total, the Take Care hoteling program

served over 33,000 clients. However, many congregate settings were left to manage isolation and quarantine services on-site without adequate staff or space to do so. These facilities cared for high-risk patients who could not be moved to hotels due to the level of care required, and included adult care facilities, nursing homes, group homes for individuals with intellectual and developmental disabilities, and residential substance use treatment facilities, among others.

- **Recommendation 3.9**: The Mayor's Office, in coordination with NYC Emergency Management, NYC Health + Hospitals, and the NYC Health Department, with support from the Administration for Children's Services (ACS) and DSS, should formalize coordination and contracting with trusted CBOs who are best positioned to provide wrap-around services to individuals in isolation or quarantine within their communities as part of the City's unified isolation and quarantine strategy.
- **Recommendation 3.10**: The Mayor's Office of Community Mental Health (MOCMH), with support from DSS, NYC Health + Hospitals, the NYC Health Department, and relevant State partners, should specifically plan for supporting individuals in isolation or quarantine who have a higher level of medical and mental / behavioral health needs, but who do not require hospitalization as part of the City's unified isolation and quarantine strategy.

Expanded business coordination and engagement

City Cleanup Corps (CCC)
To beautify NYC and revitalize the economy, the City created the **CCC which employed more than 13,000 people** predominantly from TRIE neighborhoods to **clean 135,000 NYC blocks and remove 1.7 million bags of litter**.

The City established several operations and efforts to promote economic development and to provide new ways for New Yorkers to enjoy cultural programming and build community. To support businesses, especially local restaurants, reopening safely before COVID-19 vaccines became available, the Department of Transportation (DOT) worked with agency partners to create the Open Restaurants program which allowed dining establishments to use the sidewalk or roadway adjacent to their business for outdoor dining. Within the first few months of the program, over 10,000 restaurants had self-certified to participate, saving approximately 100,000 jobs across NYC and generating much-needed economic activity and tax revenue. This became such a vital economic recovery initiative that the City moved to make outdoor dining a permanent fixture in NYC, launching Dining Out NYC in March 2024.

To encourage communities to follow social distancing guidelines, the Mayor's Office and the Department of Parks and Recreation (Parks) created the Social Distancing Ambassador Program to educate the public about the importance of masking and social distancing and to distribute PPE. To support this effort, City employees were re-assigned from scaled-back programs or positions that were primarily public-facing and had been

underutilized due to the shift to remote work. In summer 2020, after COVID-19 cases stabilized, the City began to reopen non-essential businesses. City agencies conducted targeted outreach to businesses to ensure they received the appropriate information and resources to remain open and in compliance with the State's COVID-19 requirements. For example, SBS repurposed its mobile unit to provide information on COVID-19 requirements to the City's various commercial corridors, and T2 repurposed contact tracers to distribute information to businesses door-to-door.

Small Business Restart Hotline
In June 2020, SBS **launched the Small Business Restart Hotline to share information** about COVID-19 related guidelines and available resources with business owners. The hotline **staffed workers proficient in English, Spanish, and Mandarin and received 19,000 calls within the first month** of operation.

To promote compliance with COVID-19 requirements, MOCJ's Office of Special Enforcement and the Mayor's Office of Operations led an interagency effort to train City inspectors on business reopening requirements and deploy them to conduct outreach and enforcement activities. While some agencies, such as FDNY, simultaneously conducted their routine inspections with COVID-19 business reopening inspections, other agencies, such as the NYC Health Department, were directed to put routine inspections on hold to prioritize COVID-19 business reopening inspections. While these efforts served as a critical way to disseminate information to businesses, the State's industry- and location-specific COVID-19 requirements were constantly changing and made the City's implementation efforts challenging.

In addition to inspections, the Mayor's Office of Nightlife (ONL) coordinated closely with the Sheriff's Office and NYPD to address complaints for venues believed to be non-compliant with COVID-19 requirements. By acting as a non-enforcement entity, ONL provided guidance to the non-compliant businesses and allowed them an opportunity to course-correct without penalty. Given the increased onus placed on businesses to enforce masking and social distancing in their facilities, ONL, in collaboration with the Office of Administrative Trials and Hearings's (OATH) Center for Conflict Resolution, established the Mediating Establishment and Neighborhood Disputes (MEND) NYC program to provide neutral and professional mediators to resolve disputes between businesses and neighboring residents.

- **Recommendation 3.11**: The Mayor's Office should design future emergency-related inspections to minimize disruption of routine inspections as much as possible. The City should limit the amount of the inspection workforce diverted and should prioritize incorporating emergency-related inspection questions into existing business inspections.

Once COVID-19 vaccines became available, the City required proof of vaccination to visit indoor entertainment, recreation, dining, and fitness settings. The City created the Key to NYC Program, which required certain establishments to verify that staff and patrons were vaccinated against COVID-19. As part of this program, SBS, ONL, and other partners held webinars for businesses subject to vaccine mandates to share information on verifying proof of vaccination and identification; required signs and documents; reasonable accommodations; and enforcement strategies. Agencies reported that this program placed the enforcement burden on a struggling sector and that the varying requirements for different business types was challenging. Despite these challenges, the business community assisted the City in its vaccination efforts by providing their own incentives to workers, such as free movie tickets for those who showed proof of vaccination.

- **Recommendation 3.12**: SBS and NYCEDC should continue to engage the business sector on a regular basis to foster coordination and outreach during emergencies.

The City had long recognized the need for a centralized database of NYC storefront businesses, and in the years prior to the pandemic, began exploring methods to develop a database by leveraging private sector partners. As COVID-19 business outreach and enforcement programs began, the need to develop such a database, with key information like business type and operational status, became even clearer.

SBS and the Mayor's Office of Operations sourced a storefront business dataset from a private company, developed through a combination of in-person canvassing and web scraping. This dataset was vital for the City to determine where to send outreach and inspection teams to ensure businesses' compliance with COVID-19 requirements. Recognizing the value of this data for the City, not just during COVID-19 response but in routine operations, SBS completed a procurement with this vendor in late 2022. The City now receives regularly updated versions of this database, which has been made available to all agencies.

- **Recommendation 3.13**: SBS should continue to maintain and support interagency use of the NYC storefront businesses database for routine and emergency operations.

Image: Healthcare Workers at NYC Hospital in May 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/49925081957/

Response Staffing

The COVID-19 pandemic response required the City to stand up many operations, task forces, and lines of effort, which placed a strain on healthcare facility and City staff.

Healthcare facilities were forced to manage increased patient load with a diminished workforce due to staff illness, which posed significant challenges. To help provide surge staff, the City created the Healthcare Staffing Cell, which sourced thousands of out-of-state, retired, volunteer, and contracted clinical and non-clinical staff to work at NYC healthcare facilities. While hiring temporary contracted staff was a helpful approach, they were paid at a higher rate than permanent staff, which created discord, particularly in public healthcare facilities. In addition, there were challenges in requesting, receiving, and onboarding surge staff at healthcare facilities. Further improvements are needed to better coordinate and manage healthcare surge staffing for future emergencies, including developing mechanisms for healthcare facilities to source their own surge staff.

To support City-led operations, agencies re-assigned City employees to urgent COVID-19 response operations, including to roles outside of employees' area of expertise or prior experience – an approach that the City is also using in response to the asylum seeker crisis. There is an opportunity to document the processes for City employee emergency re-assignment, including matching skillsets to response roles and developing administrative and logistical policies, to support a more sustainable response staffing strategy.

Acknowledging the toll the COVID-19 pandemic had professionally and personally on its workforce, the City worked to provide support for staff health, safety, and well-being through expansion of existing wellness initiatives and creation of COVID-19 specific offerings. However, agencies reported that health and safety guidance for staff was delayed, and the prolonged nature of the pandemic led to widely reported staff burnout, contributing to substantial attrition. Further consideration is needed to promote staff health and wellness.

Evolving healthcare surge staffing approach

Although NYC healthcare facilities had surge staffing plans in place prior to the COVID-19 pandemic, there was limited planning for system-wide staffing shortages. In addition, the COVID-19 pandemic introduced uniquely expansive and systemic needs for staffing, especially in hospitals and nursing homes. Healthcare staff were simultaneously tasked with caring for large numbers of COVID-19 positive patients while also covering for staff who were absent due to COVID-19 exposure or illness. Unlike other sectors of the City's response where staff could be re-assigned to support work in other disciplines, healthcare facilities have more constraints. For example, pediatric nurses could not be re-assigned to radiology areas. In March 2020, NYC healthcare facilities made extensive efforts to source their own staff as part of routine operations. At the same time, the City established the Healthcare Staffing Cell, led by the NYC Health Department and NYC Emergency Management, to address healthcare staffing gaps.

In-hospital Surge Staffing

As graduate trainings were on pause, GNYHA worked with Graduate Medical Education programs and advocated with the State to **permit graduate and fellow re-assignment** to address critical healthcare facility staffing needs.

Initially, the Healthcare Staffing Cell worked to deploy members of the NYC Medical Reserve Corps (MRC) – a network of 15,000 medical and non-medical volunteers – to hospitals and nursing homes as supplemental healthcare staffing support. Though a critical resource, the volunteer aspect meant that some facilities, especially those most in need like nursing homes, did not receive as many volunteers as others. Recognizing that NYC MRC volunteers alone were insufficient to meet the growing demands, the Healthcare Staffing Cell expanded its strategy by coordinating with the U.S. Department of Defense (DoD) to source 1,500 medical personnel; executing staffing contracts; providing paid medical staff to nursing homes, hospitals, and alternate care sites; and sourcing non-clinical staff, such as mortuary labor support. The City bore the cost of contracted staff for NYC healthcare facilities.

With a limited pool of healthcare surge staff available in the country and high regional competition for these resources, the City had to contract temporary staff at high pay rates

to avoid being outbid by other entities. This led staff working at public and lower-resourced healthcare facilities to leave for other higher-paid opportunities.

- **Recommendation 4.1**: NYC Health + Hospitals should investigate strategies to reduce disparities in permanent and temporary contracted public healthcare staff benefits, where possible.

Onboarding and orienting volunteer and contracted healthcare staff was also challenging. Since NYC healthcare facilities had not used volunteer and contract staff at this scale previously, the City had to educate facilities on how to request, onboard, and use these healthcare surge staff in real-time. For example, some receiving healthcare facilities did not have a designated point-of-contact to onboard incoming staff and provide response assignments. As a result, some volunteers became frustrated and declined the placement while waiting to serve. Despite these challenges, for the initial COVID-19 wave in spring 2020, the Healthcare Staffing Cell secured over 2,000 contracted staff and over 2,000 volunteers for NYC healthcare facilities.

- **Recommendation 4.2**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH, with support from healthcare partners, to create a transparent, streamlined process for healthcare facilities to request and receive healthcare surge staff (e.g., MRC and other volunteers, State and Federal staffing assets, contracted staff).
- **Recommendation 4.3**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH, with support from healthcare partners, to formalize a centralized coordination mechanism to fulfill and manage healthcare surge staff requests for future citywide emergencies.
- **Recommendation 4.4**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH to coordinate with healthcare facilities to develop plans and processes to receive and rapidly onboard and orient healthcare surge staff.

In summer 2020, as an alternative to volunteers and City-funded and managed contracted healthcare staff, NYC Emergency Management created two linked programs, the first of which was the Medical Surge Staffing Group Purchasing Organization (GPO). The GPO established master agreements[21] with staffing vendors from which NYC healthcare facilities could execute contracts for clinical and non-clinical staff. The GPO was most effective for smaller healthcare facilities that previously struggled to compete with larger facilities for staffing contracts. Additionally, the Loan Provider Program provided hospitals serving traditionally underserved communities with funding for surge

[21] General legal contract outlining the basic terms between two or more parties for transactions or agreements, including conditions for current and future services and responsibilities.

staff, which was eligible for FEMA reimbursement. Together, these programs provided NYC healthcare facilities with less costly surge staff and the funding to procure needed surge staff.

- **Recommendation 4.5**: The NYC Health Department, with support from OMB, should develop specifications and requirements for a future GPO and Loan Provider Program for healthcare surge staff, including considerations for healthcare facilities that serve traditionally underserved communities.

City employee emergency re-assignment needs formalization

Tasked with responding to the City's worst public health crisis in a century, City agencies and employees demonstrated immense flexibility in fulfilling and functioning in roles outside of their normal scope of work. City employees were re-assigned within and across agencies, as well as in support of large-scale citywide operations to respond to emerging needs throughout the pandemic. Examples of these re-assignments included NYC Public Schools nurses re-assigned to support fatality management next-of-kin notification; Parks employees redirected to conduct community outreach to encourage social distancing; NYC Health Department school health staff redeployed to support NYC Health + Hospitals facilities; and FDNY staff re-assigned to facilitate in-home vaccination for home-bound individuals.

The City asked for volunteers for certain large-scale operations, such as City-run vaccination sites, and in some cases, re-assigned City employees for special initiatives like the Social Distancing Ambassadors Program. Additionally, various City agencies worked with DCAS to match employee skillsets, titles, and licenses for other assignments, including using employees with a Commercial Driver's License for deliveries. OLR liaised with labor unions to manage expectations and avoid legal challenges with re-assigning City employees to the pandemic response.

NYC Health Department Response Staffing

More than 4,400 NYC Health Department staff, representing over 50% of its workforce, **collectively worked approximately 3.5 million hours** on the COVID-19 response.

While these efforts helped support the City's response operations, some agencies did not allow or release their employees to be re-assigned for COVID-19 response work. Additionally, with many operations running remotely, the City struggled to address the technology needs, identify timekeeping procedures, and implement other administrative functions for re-assigned City employees, which were determined ad hoc. These challenges included difficulty quickly creating and sharing guidance with City agencies

on best practices in timekeeping for employees supporting emergency response operations, which was necessary to secure FEMA reimbursements.

The City should review and formalize City employee emergency re-assignment processes, including large-scale re-assignment to support high-priority operations, such as mass vaccination. For large-scale citywide emergencies, requests for volunteers and mandates for staff to support response operations should be made to City agencies by the Mayor's Office.

More recently, City employee volunteers were engaged to support asylum seeker response operations. Though thousands of City employee volunteers were successfully deployed, the City dealt with similar challenges faced during the COVID-19 response, such as creating time-of administrative, human resources and timekeeping policies, which delayed securing adequate City employee support.

- **Recommendation 4.6**: The Mayor's Office should encourage City agencies to review and revise job descriptions and annual tasks and standards documents to include the potential for City employees to support emergency response operations, where appropriate.
- **Recommendation 4.7**: NYC Emergency Management, with support from DCAS, the NYC Health Department, OLR, and other agencies, should document administrative, legal, and technological policies and considerations for City employee emergency re-assignment. This should include identifying titles excluded from emergency re-assignment and actions agencies should take during an emergency to formalize City employee re-assignment. This guidance should also include a process for notifying agencies to begin documenting hours City employees work on emergency response in agency timekeeping systems to facilitate potential FEMA reimbursements.
- **Recommendation 4.8**: NYC Emergency Management, with support from DCAS, the NYC Health Department, and OLR should develop guidance on how agencies should match employee titles and skillsets to pre-identified response roles (e.g., canvassers, outreach workers).
- **Recommendation 4.9**: NYC Emergency Management, with support from the NYC Health Department, OLR, and other agencies as appropriate, should identify technological solutions to more effectively coordinate and track City employee volunteers and re-assignments for response operations.

Delayed health and safety guidance

As the City focused on surging healthcare staff and City employees for response operations, significant health and safety concerns were raised. At the start of the pandemic, with limited information or guidance from the State and Federal Government, the City struggled to provide timely health and safety recommendations to its employees.

As a result, agencies waited to announce or implement policies until the NYC Health Department released guidance. Additionally, while the NYC Health Department did provide guidance tailored to different types of City employees early in the pandemic, the agency did not have the resources to customize guidance to the various, complex operations underway. For example, those working in congregate settings (such as shelters or correctional facilities) were left to implement what they thought were best practices while waiting for explicit guidance from City, State, or Federal authorities. In the future, the City should provide health and safety guidance more quickly, and agencies should tailor it to address specific settings and operations.

- **Recommendation 4.10**: The Mayor's Office, in collaboration with DCAS, the NYC Health Department, OLR, and other agencies as appropriate, should centrally develop and release City employee health and safety guidance and resources for City agencies during future emergencies.
- **Recommendation 4.11**: City agencies should identify staff that are responsible for interpreting and applying citywide employee health and safety guidance to specific agency sites and operations.

Following stabilization of COVID-19 cases and the availability of vaccines, the Mayor's Office, DCAS, the NYC Health Department, and the NYC Law Department (Law), began planning for return to office work for City employees. The Mayor's Office convened a Restart Task Force in early spring 2021 for oversight of citywide planning. As part of the task force, DCAS completed assessments of workspaces and deployed new air ventilation equipment, as needed. In May 2021, the Mayor announced a partial return to office for City employees. This announcement came with months-long advanced notice. The initial return to office policy featured a phased, hybrid approach. City employees were required to work in the office at least one day a week initially; this later increased to three days a week. To promote health and safety, the City released information on updated office occupancy thresholds, ventilation improvements, increased cleaning schedules, and masking, social distancing, and vaccination requirements.

The Restart Task Force continued to plan for full return to office work throughout summer 2021 and met with agency leadership periodically to confirm preparations were underway. On September 1, 2021, the Mayor announced a full return to office for City employees. While a full return to office was broadly expected at some point, the official announcement was given with only two weeks' notice. City employees reported that this timeline felt sudden and did not afford them adequate time to plan. They expressed a preference for more advance notice for work location policy changes moving forward.

- **Recommendation 4.12**: The Mayor's Office, with support from DCAS-Citywide Occupational Safety and Health, Law, the NYC Health Department, and OLR, should review available guidance from Federal, State, and City authorities

regarding City employee health and safety in the event of an emergency and how to effectively roll out changes during future emergencies.

Staff burnout and wellness challenges

NYC Emergency Management Response Staffing

From March 2020 to March 2021, approximately 250 NYC Emergency Management staff (its entire workforce) **worked over 104,000 extra hours, the equivalent of 57 additional full-time staff** working at the agency.

With such a massive, multifaceted, and years-long response, agencies overwhelmingly reported staff burnout from the COVID-19 pandemic. City employees worked six or seven days a week and long hours for months (and in some cases, for years) to support evolving response operations, in addition to responding to simultaneous emergencies such as Tropical Storm Isaias (2020) and Post-tropical Cyclone Ida (2021). City agencies reported that staff burnout contributed to attrition and staffing shortages they are still addressing years later.

Staff burnout was further compounded by the City's budget crisis, which prompted hiring freezes and a mandatory furlough in summer 2020 for City employees in certain titles, including those that were leading and supporting critical response operations. Unfortunately, these actions were necessary to shore up the City's finances prior to the passage of supplemental Federal support in January 2021. These actions presented significant challenges for the City. Hiring restrictions hampered the City's ability to recruit and onboard new employees at a time when agencies were already experiencing increased attrition and needed a stable workforce to execute emergency response operations.

Acknowledging the toll the COVID-19 response had on first responders, healthcare staff, and other City employees, the City implemented and expanded a number of wellness initiatives to promote staff mental health and well-being.

For healthcare staff, NYC Health + Hospitals and GNYHA revamped existing wellness initiatives and created new ones specifically to address the impacts of COVID-19. For example, NYC Health + Hospitals's Helping Healers Heal (H3) program (created in 2018), placed teams in each of its facilities to support staff. Upon a review of how COVID-19 was impacting the NYC Health + Hospitals workforce, the H3 program developed a just-in-time training platform with over 80 offerings to address trauma, stress, and grief. The H3 program was proactive and responsive in addressing staff needs, implementing wellness / mourning rooms, offering support through philanthropic outreach efforts, and creating an anonymous support hotline for staff. Similarly, GNYHA worked with hospitals to install re-charge rooms, providing a safe space for staff to step away from the hospital floor.

For first responders, the U.S. DoD, U.S. Department of Veterans Affairs (VA), FDNY, and GNYHA established the Cure New York collaborative to promote healing, education, and resilience among frontline healthcare workers. The collaborative established a training course to help participants understand stress and trauma, which is now available in 37 countries.

For City employees, OLR's Employee Assistance Program (EAP), designed to assist staff and their families in resolving personal problems that may be adversely affecting their personal lives and professional performance, adapted its services. The program saw a significant uptick in utilization, as many agencies strongly encouraged their employees to take advantage of EAP services.

Additionally, WorkWell NYC, OLR's worksite wellness program for all City employees, pivoted from a worksite-based program to a digital platform, offering modules on mental and physical health that engaged thousands of daily visitors. WorkWell NYC also partnered with the NYC Health Department to provide weekly COVID-19 briefing calls that focused on staff mental health and well-being.

WorkWell NYC
Approximately 10,000 City employees participated in virtual WorkWell NYC programming at peak, with a majority of participants being City employees working remotely.

However, the scale and severity of the COVID-19 pandemic overwhelmed agency staff mental health and wellness programs. Agencies struggled to commit needed resources to these programs with critical response operations ongoing. This was exacerbated by the breadth of concerns from staff who were isolated, unable to get PPE, or impacted in other ways by the pandemic. Agencies stressed that City employees assigned to fatality management-related operations especially found themselves working in situations that posed mental health and physical safety issues for which there was not sufficient support.

- **Recommendation 4.13**: OLR should promote and distribute information about EAP and WorkWell NYC to City agencies to increase awareness of these programs to support City employee mental health and wellness.
- **Recommendation 4.14**: The Mayor's Office, with support from DCAS, MOCMH, OLR, and OMB, should review existing leave policies and associated guidance to effectively address employee mental health issues, particularly for City employees working on emergency response operations.

Despite mental health and wellness initiatives, staff burnout and attrition have led to high vacancy rates at agencies post-pandemic. Agencies highlighted that due to current staffing shortages, they would not have the same capacity to respond to the pandemic today as they did in March 2020. In fact, in 2022, the City's vacancy rate was 8%, a nearly four-fold increase from the pre-pandemic vacancy rate. Four years after the start of the

pandemic, staff continue to feel burnout because of inadequate staffing levels and having to fill more than one role.

Equity was also a major consideration and source of frustration for City employees, particularly with the City's transition to remote work. In March 2020, when the City moved a large portion of its workforce to remote operations, agencies were left to determine which employees needed to work in-person and which could work remotely. This created an issue, as there was no additional compensation for employees who had to work in-person, and staff reported that agencies were not equipped to adequately protect employees working in-person. Additionally, agencies found that those working in-person were often lower paid staff and people of color, which exacerbated equity concerns.

In June 2023, Mayor Adams announced the launch of a flexible work pilot with the District Council 37 (DC37) labor union. After the success of the pilot over summer 2023, the program was expanded to include City employees represented by additional labor unions, as well as non-unionized employees. In January 2024, the administration announced the launch of a compressed workweek pilot with DC37, for employees who are ineligible for remote work.

- **Recommendation 4.15**: The Mayor's Office should continue to consider expansion of flexible work arrangements and compressed schedules for all City employees. This consideration should include review of diversity and inclusion policies to ensure best practices.

Image: COVID-19 Mobile Testing in City Park in August 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/50230279757/

Data and Technology

For the COVID-19 response, accurate and timely data was essential to establish an accurate representation of community spread and assess the success of response operations and mitigation measures. However, agencies faced redundant reporting requirements from City, State, and Federal entities and faced data sharing limitations with these counterparts, which led to manual workarounds. This contributed to data gaps, notably related to real-time healthcare facility capacity, which impeded operational decision-making. To address gaps, the City invested in resources to strengthen its data infrastructure and bolster its interagency data management capabilities, which should be memorialized and expanded for future emergencies.

Data sharing limitations and redundant reporting requirements

The City regularly collects and analyzes a wide range of data to assess government operations and public-facing services. Prior to the COVID-19 pandemic, City agencies had some interagency agreements and Memoranda of Understanding (MOU)[22] established for limited data sharing; however, data sharing was not standardized citywide or permitted with every City agency that might benefit from the data, particularly during an

[22] An MOU is an agreement, which may or may not be legally binding, between at least two parties.

emergency. As a result, existing agreements required time-of negotiation to address data sharing needs for COVID-19 response operations, which hampered the City's ability to act quickly. For example, though healthcare facility-level data – such as ICU capacity, COVID-19 positive patient counts, and fatalities – was vital for operational planning, legal, regulatory, and compliance requirements limited the City's ability to quickly share this critical data among City agencies that needed it. As a result, some operations relied on assumptions or outdated data. As an outcome of COVID-19 data operations, NYC Emergency Management and OTI established the Data Governance Workgroup in April 2023, bringing together data subject matter experts (SMEs) across City agencies to collaborate in developing citywide data governance standards.

- **Recommendation 5.1**: OTI and NYC Emergency Management should continue to mature the Data Governance Workgroup to manage progressively complex issues, including identifying and negotiating data sharing agreements (with considerations for sharing personally identifiable information [PII]) and implementing scalable software and technologies before the next large-scale emergency.
- **Recommendation 5.2**: OTI and the Mayor's Office of Operations, with support from NYC Emergency Management, should establish an emergency data lead for future emergencies, responsible for coordinating interagency data sharing, management, and reporting needs to streamline data pipelines and prioritize and consolidate reporting.

GNYHA Sit Stat System
In response to data needs during the pandemic, GNYHA **expanded the available datasets in Sit Stat** (a web-based survey tool that collects information from member hospitals immediately ahead of an expected event and/or during emergencies) **to allow for better situational awareness for all NYC hospitals** and launched a **Hospital Surge Indicator Tool,** which provided twice-daily updates on Emergency Department status, helping inform capacity-based decisions.

In addition to data sharing limitations, agencies reported challenges keeping up with redundant reporting requirements from City, State, and Federal entities which were submitted through different, disconnected reporting systems. This caused both the potential for human error and reporting fatigue. This was noted as especially burdensome for overworked healthcare staff who, while responding to a surge in patients, had to complete static reports for government oversight entities. For example, similar to data reported to the Federal Government, hospitals were required by the State to manually complete the HERDS survey daily, reporting on hospital bed and ICU bed availability, COVID-19 positive patients, and other data points to assess healthcare facility capacity. However, during the pandemic, these numbers were constantly changing and difficult to track down. Additionally, the data was only accurate at the time staff completed the

HERDS survey – when patients were discharged or admitted later that day, submitted data was already outdated. As a result, City agencies faced challenges making operational decisions based on the HERDS data. Given that it was a burden on hospital staff to collect the data and it was challenging to use the data for decision-making, agencies questioned whether these reporting requirements were needed and how they could be improved.

- **Recommendation 5.3**: The NYC Health Department, with support from GNYHA, NYC Emergency Management, and NYC Health + Hospitals, should work with NYS DOH to review and streamline healthcare data reporting requirements and automate data collection to improve accuracy and produce near real-time reporting.

Without standardized data sharing agreements or real-time access to healthcare data, City agencies used data from a multitude of sources to meet reporting requirements. With no centralized source of data or established data leads, validating healthcare data was challenging and led to inconsistencies in reports from different City agencies. The absence of a shared understanding of data points was particularly prominent with nuanced healthcare facility data, such as what defined "bed type" and "beds available." For example, depending on the facility, beds added to accommodate patient surge without the equipment needed to support a COVID-19 positive patient may be counted as a "bed available," or not count at all. Already known to be an area of confusion prior to the COVID-19 response, agencies reported that because there is no formalized understanding of these metrics and how they relate to hospital capacity, the City struggled to use available data to direct patients to less affected hospitals.

- **Recommendation 5.4**: The NYC Health Department, FDNY, GNYHA, NYC Emergency Management, and NYC Health + Hospitals should work with NYS DOH to standardize definitions for healthcare facility data to create a shared understanding of terms and consistent data use to inform decision-making.

City analytical improvements

Before the pandemic, the City did not have enterprise-wide (or citywide) data analytics technology available to agencies. As a result, City agencies independently contracted with vendors for data collection, analysis, and visualization software. During the COVID-19 response, this meant agencies had to manually pull reports or copy and paste data from their systems to share information with another agency. For example, the City attempted to centralize information on N95 respirator use at the beginning of the pandemic to better lobby the State and Federal Government and prioritize N95 distribution across agencies. Though agencies individually used software to track their N95 use, they had to email their numbers to one another daily to manually consolidate citywide data.

In addition, existing software solutions available to City agencies were not powerful enough to effectively process the massive amounts of COVID-19 related data needed for

analytic insights. This led City staff to develop inefficient and labor-intensive workarounds to meet analytical needs. NYC Health + Hospitals procured an enterprise-wide data storage and visualization software that supported automated interagency data sharing. As a result of this new tool, NYC Emergency Management transitioned from text-heavy, static Citywide Situation Report updates within Microsoft Word to high-impact data visualizations through its daily COVID-19 Senior Leadership Briefing Dashboard, which provided near real-time operational data to decision-makers across the City. Based off its success, NYC Emergency Management transitioned the City's all-hazard situation reporting to visually appealing dashboards. Although the software was an invaluable interagency tool, its funding was linked to expiring COVID-19 response grants, which will lead to similar data storage, analysis, and sharing challenges during future emergencies.

- **Recommendation 5.5**: OTI should hold and support enterprise-wide flexible, easy-to-use data storage, analysis, and visualization software with real-time interagency data sharing and reporting functionality for City agencies to support routine and emergency operations. The enterprise-wide software should have sufficient processing and analytic power to handle large quantities of data, have automation capabilities, and be flexible and interoperable to maximize reporting efficiency.

In addition to limitations in software / tools, agencies did not have enough staff with data analysis, visualization, and geospatial skills to address and manage increasing reporting requirements. For example, a small number of NYC Health Department staff worked for months on end to meet demands and compensate for inadequate systems and unreasonable turnaround times for reporting. The NYC Health Department trained additional staff (including temporary staff) to support its Integrated Data Team to centralize data management, reporting, and visualization. To support development of the COVID-19 Senior Leadership Briefing Dashboard, NYC Emergency Management brought on contract staff. To memorialize the lessons learned from the COVID-19 response, agencies have since worked to develop data skillsets in their staff. However, turnover to the private sector is particularly high for these skilled positions.

- **Recommendation 5.6**: OTI, DCAS, the Mayor's Office, and OMB should support agency efforts to prioritize hiring and training staff with skills to support data collection, analysis, and visualization and offer expanded professional development opportunities to recruit and retain staff with needed data-related skillsets.

Remote technology gaps

Prior to the COVID-19 pandemic, there was no citywide remote work policy for City employees. As a result, when the City transitioned most of its workforce to remote operations in March 2020, many City agencies were logistically and technologically unprepared for the shift.

The City transitioned to partial remote work on March 13, 2020, going fully remote for all operations that could function virtually the following week. In shifting the City's workforce en-masse to remote work, agencies reported challenges sourcing and distributing enough equipment (such as laptops) to staff, particularly with supply chain constraints. Agencies also expressed issues ensuring the City network had sufficient bandwidth and computing abilities to support remote work. OTI and agency information technology staff worked around the clock to address the legal, budget, and technology considerations to enable successful remote work for the City. Since the transition to remote work, OTI has focused on routinely deploying technology that enables staff to work out of multiple locations and communication pathways that can withstand increased traffic patterns. The City's continued investment in remote technology has proved useful for other emergencies. For example, during Post-tropical Cyclone Ida in 2021, which coincided with the full return to office mandate for City employees, DEP's headquarters lost power for two weeks. Without an operational facility available, DEP staff successfully worked remotely until power could be restored.

- **Recommendation 5.7**: The Mayor's Office, DCAS, and NYC Emergency Management should formalize a citywide emergency remote work policy to implement during large-scale emergencies, as necessary.
- **Recommendation 5.8**: The Mayor's Office, DCAS, and NYC Emergency Management should develop guidance for remote work as a continuity strategy and require City agencies to incorporate into their Continuity of Operations (COOP) plans. Additionally, City agencies should more holistically evaluate how to continue providing essential services in a remote environment, including plans for operationalizing the field-based workforce.
- **Recommendation 5.9**: City agencies, in coordination with OTI, should routinely assess the ability of staff to work remotely, such as testing the functionality of devices and network bandwidth, to ensure agency routine and emergency operations can continue in the event of another large-scale emergency requiring transition to remote work.

Image: COVID-19 Testing Outreach Workers in August 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/50222498098/

Public Outreach and Communications

Throughout the COVID-19 response, it was essential for the City to not only coordinate response activities in a unified manner, but to provide the public with information on those activities. Given the novel nature of the pandemic, public health guidance and recommendations required timely adjustments as new information about the virus emerged. However, in early 2020, during the height of the pandemic in NYC, multiple layers of review – including by the Mayor – were required before City agencies could issue or update guidance, which often delayed or prevented the release of recommendations to the public. As a result, City guidance documents were sometimes outdated, which may have eroded public trust in the City's recommendations.

The challenges in adapting guidance made it particularly important to preempt and respond to rumors, misinformation, and disinformation about COVID-19 in a timely manner. The City worked with trusted local organizations and community healthcare providers to share COVID-19 information and City resources with their communities. This was a successful engagement strategy to access traditionally underserved communities that the City should strengthen. Through these organizations and other feedback loops, the City worked to disseminate validated information, while also combatting misinformation and disinformation.

Enhanced public messaging strategy

From the start of the pandemic, even with limited information available, the City implemented an aggressive public messaging strategy to share updates with New Yorkers in a language or format they understood and trusted. For example, while Local Law 30 mandates the City translate messaging into 13 of the most commonly spoken languages in NYC, the NYC Health Department provided all COVID-19 information in the 25 most commonly spoken languages other than English. American Sign Language (ASL) interpreters and Certified Deaf Interpreters (CDI) were utilized in daily Mayoral press conferences to provide interpretation and ensure accessibility when providing public messaging. To keep the public informed in a streamlined fashion, the Mayor highlighted signing up for Notify NYC, the City's emergency alert system, in his daily press conferences. Additionally, the City issued a Wireless Emergency Alert (WEA), which reached all U.S.-carrier phones in the NYC area, prompting the public to text "COVID" to 692-692 (NYC-NYC) to enroll in COVID-19-specific text alerts in English or – for the first time in City history – Spanish. This was also the first time the City used a WEA to encourage subscribership for a specific emergency. For over two years, the text alerts were used to update nearly 1 million subscribers with business closure, testing, and vaccination information.

To ensure equitable access to information, the NYC Health Department shared COVID-19 data publicly on its website (see inset box). T2 set up the COVID-19 Call Line that the public could access through 311 or by calling 212-COVID-19, which provided callers with information in multiple languages on testing, contact tracing, isolation and quarantine support, food services, and later, vaccination and treatment. This was highly effective in getting information to the public and, notably, the majority of callers were from disproportionately impacted neighborhoods. The COVID-19 Call Line also consolidated access to multiple City-run call lines.

Public COVID-19 Data
The NYC Health Department **shared COVID-19 data, including cases, hospitalizations, deaths, and vaccinations with geographic and demographic breakdowns** on its website via public-friendly visualizations. The NYC Health Department also **provided the public access to source data via GitHub**. This provided significant transparency to New Yorkers and allowed residents to use data to support their individual decision-making.

Paid media was an additional tool for the City's public messaging strategy, allowing the relay of critical information through advertisements and public service announcements on TV, billboards, the transit system, radio, streaming and digital platforms, as well as via LinkNYC. This was particularly critical in 2021 to increase awareness and uptake of COVID-19 vaccines.

However, the City experienced challenges in reaching healthcare providers without a feedback loop to know if they were receiving information, what they were doing with it, or if it was meeting their needs. The NYC Health Department established a COVID-19 Provider Hotline as an "offshoot" to its existing Provider Access Line to enable providers to contact the NYC Health Department directly for tailored guidance and answers to questions. Recognizing that healthcare providers would benefit from individualized guidance and coaching on how to educate patients on COVID-19 vaccines, the NYC Health Department launched a public health detailing campaign to provide hands-on training to providers. The City also provided dedicated resources, community engagement, and technical assistance to ensure clinicians had the support to build patient confidence and administer the vaccines when they became available.

Despite the success of these strategies for public messaging, at times, the City struggled to disseminate information in a timely manner. This occurred especially when the City shifted guidance as more information about COVID-19 became available. With so much information circulating, there were numerous sources competing for the public's attention, and the City lost the ability to be the initial trusted source due to time lags in sharing information with the public. Unlike past emergencies, all agency COVID-19 public messaging, including urgent updates for healthcare providers, required approval from the Mayor's Office before being released. This requirement, combined with delayed release of guidance from State and Federal counterparts, hindered the City's ability to expeditiously release information to the public and providers. Agencies reported the need for improved unified messaging across agencies to ensure consistency, reduce contradictions, and improve timeliness.

- **Recommendation 6.1**: The Mayor's Office should develop a mechanism to expedite review of agency public messaging during future emergencies. This should include triggers for the Mayor's Office review and methods to align City agency messaging related to public health emergencies to be consistent with NYC Health Department messaging. This should also include an exemption or a further streamlined process for messaging to healthcare providers.

Leveraging trusted groups for public information

There is often a lack of trust in information and recommendations from the government, particularly in traditionally underserved communities. Though the City prioritized engaging with CBOs and recruiting outreach staff from disproportionately impacted communities, limitations remained as individuals were wary of responding and providing information to a government entity. This was particularly true regarding their residential address or health status, which was needed for COVID-19 contact tracing.

To address this gap, the City leveraged community healthcare providers and contracted with local CBOs and FBOs, who New Yorkers trust, to deliver COVID-19 information

through in-person canvassing and community virtual events. These were crucial components of the vaccine outreach campaign, which included virtual and in-person events connecting doctors with community groups, a massive canvassing campaign led by T2 and the Vaccine for All Corps (V4AC), and peer-to-peer outreach conducted by the Mayor's Office Public Engagement Unit (PEU) and T2 call centers.

To connect with community organizations, the City held recurring community engagement calls to provide the most up-to-date COVID-19 information to share with their communities. The City also leveraged cultural organizations, religious institutions, libraries, and other entities to increase the City's geographic reach in distributing information and resources (e.g., at-home test kits and PPE) and to eventually become vaccination sites themselves. These locations were seen as trusted physical spaces. Similarly, as community healthcare providers are known to be one of the most trusted sources of health information for the general public, the NYC Health Department regularly shared information with the provider community through evidence-based Health Alerts, Dear Colleague letters, provider letters, webinars, and a provider-facing website. These activities helped facilitate consistency of content and messaging.

Targeted Stakeholder Engagement

The City prioritized targeted outreach with stakeholders to offer support. For example, following a community outbreak, the NYC Health Department partnered with trusted members to promote **tailored messaging to the Orthodox Jewish community**. Additionally, NYC Health + Hospitals worked with a group of **sex workers to promote vaccine outreach** as part of a larger holistic care effort.

- **Recommendation 6.2**: The Mayor's Office of Engagement, with support from NYC Emergency Management and the NYC Health Department, should formalize a scalable citywide community engagement strategy that pre-establishes agency roles and responsibilities for future emergencies. The strategy should include a plan to prioritize communities of color and traditionally underserved communities. This includes sustained investment in and collaboration with these communities and partners, beyond contacting local organizations to provide information.
- **Recommendation 6.3**: The NYC Health Department, the Mayor's Office of Engagement, and NYC Emergency Management should continue contracting with local organizations and coordinating with healthcare providers and medical practices to provide public health information and City resources through trusted channels and to develop relationships with entities vital to community resiliency and recovery.

As the spread of COVID-19 misinformation and disinformation became apparent, the City implemented feedback loops to help tailor future messaging to counter falsehoods. For example, the NYC Health Department established a unit focused solely on COVID-19 misinformation and disinformation to utilize social media monitoring and feedback from CBOs and healthcare providers to adjust messaging. In keeping with the best practice of not repeating misinformation or disinformation to prevent inadvertently providing a platform for those narratives, the NYC Health Department carefully crafted myth / fact guidance documents and media campaigns to address COVID-19 misinformation and disinformation. While effective, agencies reported that increased engagement with the press would also be beneficial to address misinformation and disinformation in the future.

- **Recommendation 6.4**: The NYC Health Department, with support from relevant agencies, should formalize a misinformation and disinformation feedback loop strategy to track and assess sources and develop messages that fact check any false information. The strategy should explore additional methods to collect community feedback and address misinformation and disinformation during future public health emergencies.

Image: Mobile COVID-19 Testing Site in July 2020
Michael Appleton/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/50141264793/

Equity

The City worked to incorporate equity, disability, access, and functional needs (DAFN), and language access considerations into the foundation of COVID-19 response operations. Acknowledging that the pandemic had a disproportionate impact on communities of color, the City established the Task Force on Racial Inclusion & Equity (TRIE) in April 2020 to identify issue areas in the COVID-19 response and recommend solutions to deliver immediate and long-term relief. TRIE helped to identify the neighborhoods most impacted by COVID-19, which also had a high percentage of other health and socioeconomic disparities, and prioritized them for enhanced community outreach and resources.

The City developed new approaches to support DAFN populations, including children and older adults, to promote access to healthy meals, educational opportunities, critical services, and reduce the impacts of social isolation. To keep older New Yorkers safe, healthy, and engaged, NYC Aging transitioned many of its Older Adult Centers' services to be accessible at home, including meal delivery, virtual classes (e.g., fitness, nutrition, art), and community outreach (e.g., wellness calls and remote visiting programs). The City also activated the Language Access Task Force, led by NYC Emergency Management and the Mayor's Office of Immigrant Affairs (MOIA), to facilitate interagency coordination around reducing language barriers and establishing multilingual communications throughout the pandemic response.

However, the City faced challenges in centering equity in decision-making and made adjustments over time. Despite the many operational considerations that attempted to ensure equitable access to services, disparities and equity gaps remained.

Due to the quickly progressing nature of the pandemic, there were missed opportunities to evaluate the disparate impacts of some policies and enforcement initiatives. Some communities experienced multiple, compounding vulnerabilities, including bias, stigmatization, and lack of trust in government. For example, the decision to ban social gatherings contributed to increased social isolation among some individuals. Enforcement of social distancing guidelines led to disproportionate arrests of New Yorkers of color[viii]. Policies that forced businesses to close or limit their capacity contributed to layoffs and the permanent closures of many local businesses, which increased economic insecurity. Access to certain resources, such as the Federal Government's direct stimulus payments, was limited based on immigration status.

Embedding additional considerations and feedback loops for both equity and accessibility into the City's routine operations, as well as at the outset of emergency response operations, is key to addressing equity during future emergencies.

Addressing racial disparities

Although all New Yorkers were impacted by COVID-19, the pandemic disproportionately impacted communities of color due to systemic racism and historic under-investment, resulting in conditions that increased the likelihood of both exposure to the virus and severe outcomes from infection, as well as heightened economic and social impacts. For example, when the NYC Health Department launched its public-facing COVID-19 data website in May 2020, the reported data revealed the disproportionate impact the pandemic had on communities of color, with Black and Latino New Yorkers dying around twice the rate of their white counterparts when adjusted for age.

In response to the disproportionate impact of the pandemic on communities of color, TRIE was established in April 2020 with the mission of identifying priority neighborhoods and issue areas, monitoring the COVID-19 response, and implementing solutions to deliver immediate and long-term relief to the most impacted communities. TRIE identified 33 priority neighborhoods particularly hard-hit by the pandemic and worked to ensure COVID-19 resources were made available and prioritized specifically for these communities. Government messaging, outreach, and services were directed to these areas, including increased access to COVID-19 testing, and eventually, vaccinations. The City also established COVID-19 Centers of Excellence in three of the hardest hit TRIE neighborhoods to provide comprehensive care to individuals recovering from COVID-19, including radiologic and diagnostic services, mental health services, and access to medication.

Following significant job loss and local business closures in these communities, TRIE neighborhoods also received targeted City support to promote economic recovery. The task force also focused on longer-term recovery for these neighborhoods, surveying community leaders to understand their top concerns. TRIE organized 11 topical subcommittees – including housing, youth food access, and immigrant communities – and developed over 30 long-term recovery initiatives.

Due to lagging testing uptake in traditionally underserved communities, the City adapted its strategy and deployed mobile testing vans and buses. These sites were more accessible for communities, particularly those with limited access to fixed testing sites. The NYC Health Department provided testing at its public health clinics located in targeted neighborhoods, and DSS provided free on-site testing (and subsequently vaccination) to individuals in congregate settings regardless of their financial status.

NYCHA COVID-19 Testing
NYCHA partnered with T2 to **open testing sites throughout NYCHA housing** locations in the five boroughs. NYCHA also **distributed at-home test kits to its residents**.

To strengthen equitable access to vaccines, the City used the NYC Health Department's Equity Metrics Report to assess vaccine distribution and better target underserved communities. Agencies identified the need to continue to collect and use data to inform decisions, policies, and operations during an emergency, especially to identify disparities and determine how City policies and operations impact underserved populations.

- **Recommendation 7.1**: The Mayor's Office of Equity and Racial Justice (MOERJ), NYC Emergency Management, the NYC Health Department, and OTI should work with equity experts to assess the emergency data the City collects to better inform response operations. This should include identifying trends, gaps, and how collecting additional data (including, but not limited to, standardized disability, race, ethnicity, gender, and preferred language) can enhance the City's understanding of disparate impacts during emergencies to improve outcomes.

The City established over 70% of its vaccination sites in TRIE neighborhoods and created set-aside vaccine appointments for underserved communities through the Authorized Scheduler program. This program served residents of TRIE neighborhoods, older New Yorkers and their caregivers, Holocaust survivors, and undocumented individuals, among others. To ensure these opportunities were reserved for local residents, appointments were limited to individuals living in specific ZIP codes.

Vaccine Outreach
91% of VCC outreach events were held in TRIE neighborhoods.

Additionally, mobile vaccination buses administered around 300 vaccinations a day (at peak) in dense neighborhoods where there was inadequate access to healthcare.

Throughout the vaccine campaign, the TRIE vaccine subcommittee provided feedback and suggested strategies for improving outreach and uptake in communities of color.

Despite these efforts, the City still faced challenges in administering vaccinations in underserved communities for various reasons, including vaccine hesitancy. Some New Yorkers reported challenges navigating the VaxApp and making vaccine appointments, due to the system's electronic, multi-step process. The Authorized Scheduler program was largely successful, serving over 16,600 participants from March to May 2021, but reportedly faced challenges with missed appointments and low uptake for a variety of factors, including initial eligibility restrictions (e.g., age, lack of provision for caregivers), distance to vaccine locations, available appointment times, and timing of appointment releases.

Some agencies, such as the NYC Health Department and ACS, designated an Equity Officer as part of their response structure, which helped ensure equity was considered in operations. All City agencies involved in emergency response should emulate this best practice as is practical. To further address structural inequities, agencies recognized that equity considerations should be incorporated into routine City decision-and policy-making processes, initiatives, programs, and systems, not just during an emergency.

- **Recommendation 7.2**: MOERJ should coordinate with MOIA, NYC Emergency Management, the NYC Health Department, and other agencies with established equity programs to develop citywide standards and guidance for City agencies to incorporate equity frameworks and designated Equity Officers into their emergency plans and response structures.
- **Recommendation 7.3**: MOERJ should be included as agency liaisons to the City's EOC to better engage with leadership to promote an equity-focused response during future emergencies.

DAFN and language access considerations

In addition to communities of color, other vulnerable and traditionally underserved communities faced disproportionate and distinct social, financial, and health impacts from both the virus itself and the mitigation measures implemented during the pandemic. To address these disparities, the City made a concerted effort to factor DAFN and language access considerations into planning and decision-making across response operations.

For example, NYC Public Schools analyzed student data and took recommendations from community members when determining locations for grab-and-go meal pick-up to open facilities in areas that could serve the highest number of children with the greatest need. NYC Public Schools also increased resources to its Medically Necessary Instruction program with 60 new teachers and expanded application eligibility to provide one-on-

one teaching and tutoring for students with medical needs that keep them out of school for multiple weeks at a time.

> **Connecting with Older New Yorkers**
> From March 2020 to June 2021, NYC Aging staff, contracted providers, and volunteers **made over 4.5 million wellness calls to older adults** to mitigate the negative impacts of social isolation and communicate critical health information.

COVID-19 had substantial health and social impacts on older adults, with higher fatality rates and harmful effects from social isolation, including increased risk for depression, cognitive decline, and heart disease. NYC Aging sought to provide opportunities for older New Yorkers to stay safe inside while continuing to engage in the community and receive critical services. To promote positive outcomes, NYC Aging transitioned Older Adult Centers from in-person to remote programming and services, including social engagement, virtual offerings, social isolation-related outreach, support groups, and referrals to essential resources. Despite the City's efforts to support older adults, endemic ageism hampered access to services. For example, technology-based issues such as reduced access to smartphones, computers, and Wi-Fi made it more difficult for older New Yorkers to gain access to medical care, critical information, and community support on virtual platforms. The City should prioritize dedicated planning for the specific needs of older adults, including reducing the effects of social isolation and enhancing outreach and communications, to improve outcomes in future emergencies.

- **Recommendation 7.4**: NYC Aging should coordinate with NYC Emergency Management, the NYC Health Department, and other organizations such as the NYC Cabinet for Older New Yorkers[23] and those in direct service with older adults to develop citywide standards and guidance to better address older adult needs in emergency plans and response structures.

[23] The Cabinet for Older New Yorkers is an interagency collaborative established to realize and institutionalize an age-inclusive New York City through structural, legislative, and systemic solutions.

The City also undertook efforts to incorporate DAFN and language access considerations in its vaccine operations. For example, the City launched a novel in-home vaccination effort for home-bound individuals; offered free rides to vaccination sites for individuals with mobility challenges; provided on-site testing and vaccination for individuals in congregate settings (e.g., long-term care facilities and group homes); and provided in-person interpretation services and access to the City's telephonic interpretation and video remote interpretation resources at vaccination sites.

Caregiver Vaccinations
NYC Aging observed that many of their clients were hesitant when vaccines were first available partly because their caregivers and immediate family were not initially eligible. **NYC Aging worked with the City to ensure caregivers were eligible at the same time**.

The NYC Health Department also established a process by which the public could submit accommodation requests to address accessibility concerns at vaccination sites (e.g., ramp access, assistance reading documents, and verbal guidance). To further broaden the reach of the mobile vaccination efforts, MOIA also completed translations of outreach materials into more than 40 languages.

Despite the many operational considerations that improved equitable access to services, some gaps remained. DAFN and language access SMEs were not fully integrated into all COVID-19 response structures and were instead called upon to support as issues arose. For example, while MOIA and NYC Emergency Management activated the Language Access Task Force to facilitate coordination on language accessibility, there was no language access lead within the VCC. This resulted in ad hoc approaches that resulted in delays and inefficiencies in ensuring language accessibility for vaccine operations. For example, the VaxApp initially launched with limited language accessibility options. There were also instances where the City engaged vendors for public-facing services without consideration for required language access components, such as telephonic interpretation during transportation to vaccination sites. In future emergencies, the City should more fully incorporate DAFN and language access SMEs into response leadership structures.

- **Recommendation 7.5**: City agencies should comply with Local Law 12 / 2023, Local Law 13 / 2023, and Local Law 30 / 2017[24] and regularly assess their routine operations and emergency plans to ensure DAFN and language access considerations are addressed during emergencies. Agencies should regularly update standard communications materials for emergency response to reflect changing demographics and emerging language needs.

[24] https://intro.nyc/local-laws/2023

- **Recommendation 7.6**: MOIA, NYC Emergency Management, and OTI should work with agencies to support development of a more robust, scalable infrastructure for multilingual communications during emergency response. This should include enhancing interagency coordination mechanisms; building up contracted and in-house capacity for translation, interpretation, audio-visual, and social media production; expanding partnerships with immigrant-serving community organizations; and exploring the use of language technologies as components of delivering culturally and linguistically appropriate engagement.

Image: American Museum of Natural History Vaccination Site in April 2021
Ed Reed/Mayoral Photography Office
Source: https://www.flickr.com/photos/nycmayorsoffice/51134059291/

Conclusion

The COVID-19 pandemic has impacted all New Yorkers in lasting ways. The response to the pandemic was the longest emergency response in the City's modern history. It was marked by significant successes for the City to replicate, as well as challenges for the City to address before the next citywide emergency. As a novel virus and pandemic, COVID-19 challenged the City to be responsive to myriad new challenges. Through creation of this Report, the City is demonstrating its continued commitment to emergency preparedness across various threats and hazards, known and unknown, and promoting future readiness citywide.

As of 2024, although the City's COVID-19 response has significantly downsized, several ongoing operations continue to play an integral role in supporting New Yorkers. The NYC Health Department continues to conduct ongoing surveillance for COVID-19 cases, hospitalizations, and deaths, and the NYC Health + Hospitals 212-COVID-19 hotline remains operational for New Yorkers to receive information on treatment and resources for long COVID-19. DSS continues congregate setting-specific testing and vaccination efforts, as the NYC Health Department continues to ensure COVID-19 vaccines are available and the latest recommendations and guidance are shared with healthcare providers and the general public.

In addition to ongoing COVID-19 management, the City has already begun taking steps to better prepare for and respond to future large-scale emergencies. An interagency

working group is developing an overview of the City's preparedness and response operations for a potential, imminent, or occurring pandemic. This includes outlining stakeholder roles and responsibilities, as well as communication and coordination processes, among City, State, and Federal agencies. The City is also working with healthcare and funeral industry partners to create a Biological Incident Fatality Surge Field Operating Guide to memorialize lessons learned from the COVID-19 response.

The City and State are exploring opportunities to improve coordination and communication, including healthcare data sharing. Open Streets and outdoor dining continue to provide New Yorkers a new way to interact with their communities. To expand on the work initiated by TRIE during the COVID-19 response, the City established MOERJ in 2022 to help foster fairer City policies, practices, and programs that deliver for all New Yorkers.

Though we are learning to live with COVID-19, we remember the many lives lost to the virus and the ongoing impacts communities are facing. We also acknowledge the tireless efforts of thousands of City employees and healthcare workers that helped mitigate the pandemic's impact on NYC and save countless lives. The lessons learned from this Report will be incorporated into the City's ongoing emergency planning. As we continue to recover, we will work to address gaps, build on our strengths, and foster a more equitable and resilient New York City that is better prepared for future emergencies.

Appendix A: Recommendations

NYC COVID-19 Response Review Report recommendations are included by Operational Area below:

City, State, and Federal Coordination

- **Recommendation 1.1**: At the start of a public health emergency, the NYC Health Department should prepare generalized recommendations to guide City decision-making to take independent actions, which may precede State and Federal guidance.
- **Recommendation 1.2**: The City, led by the Mayor's Office, should proactively establish coordination and communication processes and pathways, as well as clearly outline roles and responsibilities, with elected officials at the Federal and State levels ahead of emergencies to increase their resiliency and use during future emergencies.
- **Recommendation 1.3**: The NYC Health Department, NYC Emergency Management, and other agencies as appropriate, should foster ongoing, routine programmatic coordination and emergency planning with State public health and emergency management counterparts to strengthen coordination and communication pathways for future emergencies. This should include keeping political offices at City and State levels engaged in emergency planning and response efforts.
- **Recommendation 1.4**: The City, led by the Mayor's Office, with support from NYC Emergency Management, NYC Health + Hospitals, and the NYC Health Department, should coordinate with the State to review lessons learned through their respective COVID-19 after-action review efforts and jointly plan, train, and exercise on City-State improvement areas and emergency response capabilities for future large-scale citywide emergencies.
- **Recommendation 1.5**: City agencies should routinely review CIMS to incorporate lessons learned and plan for new and emerging threats.
- **Recommendation 1.6**: The Mayor's Office, with support from NYC Emergency Management, the NYC Health Department, and other relevant agencies, should establish a structure for Mayor's Office leadership to plug into and coordinate with Unified Command for a large-scale emergency in the future. This structure should incorporate best practices and lessons learned from the COVID-19 response. Once established, it should be added to existing emergency planning documents.
- **Recommendation 1.7**: The Mayor's Office should convene a working group of relevant agencies, including Department of Citywide Administrative Services (DCAS), Department of Design and Construction (DDC), and NYC Emergency Management, to assess existing citywide inventories of emergency response

assets, recommend creation of new inventories, and ensure briefings on inventories are incorporated into emergency preparedness exercises, including senior leadership tabletops.

Health and Medical Operations

- **Recommendation 2.1**: The NYC Health Department should maintain a flexible and sustainable local PPE stockpile to support the NYC healthcare system during future public health emergencies.
- **Recommendation 2.2**: The NYC Health Department, with support from the Greater New York Hospital Association (GNYHA) and NYC Health + Hospitals, should work with the NYS Department of Health (NYS DOH) and Federal counterparts to develop recommendations on PPE and medical equipment prioritization and allocation. This should include considerations for healthcare facilities that serve traditionally underserved communities or have fewer resources, as well as high-risk settings, such as long-term care facilities and other residential congregate settings.
- **Recommendation 2.3**: MOCS and the Mayor's Office of Management and Budget (OMB), with support from NYC Emergency Management, should assess the City's emergency procurement policies and processes to identify ways to expedite purchases and contracts of goods and services, as well as maintain vendor oversight during future emergencies.
- **Recommendation 2.4**: NYCEDC, DCAS, and the Department of Small Business Services (SBS) should formalize coordination with local manufacturers, including minority and women-owned vendors, during future emergency response efforts, particularly when resources are scarce.
- **Recommendation 2.5**: The NYC Health Department and NYC Emergency Management should work with FDNY, GNYHA, NYC Health + Hospitals, and NYS DOH to develop statewide patient load-balancing and resource sharing strategies, as well as systems to coordinate movement of patients and resources.
- **Recommendation 2.6**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, NYS DOH, and other NYC and NYS healthcare associations to coordinate with healthcare facilities to revise internal surge plans to incorporate lessons learned from the COVID-19 response, as well as address the needs of community hospitals in implementing surge strategies.
- **Recommendation 2.7**: The NYC Health Department, GNYHA, NYC Emergency Management, NYC Health + Hospitals, and NYS DOH should explore the potential utility of smaller, targeted alternate care sites to serve highly-impacted neighborhoods and special populations, such as infected nursing home patients

who can be discharged from hospitals but need to be housed separately to avoid infecting others.

- **Recommendation 2.8**: OCME should advocate for regulation and requirements (including State legislation) concerning the appropriate storage of human remains, healthcare facility fatality management planning, and establishing a requirement for physicians to sign death certificates for patients regularly under their professional care.
- **Recommendation 2.9**: Upon notification of the potential for a fatality surge, NYC Emergency Management should establish an interagency working group to conduct incident-specific planning and coordination, including the determination of decedent management options.
- **Recommendation 2.10**: OCME should continue to assess its human resources management system and make updates to streamline personnel data.
- **Recommendation 2.11**: The NYC Health Department, with support from the Mayor's Office and NYC Health + Hospitals, should formalize a scalable citywide testing strategy for future respiratory virus surges that pre-establishes agency roles and responsibilities. The strategy should include a plan for how to adapt when testing resources are limited, as well as a plan to integrate congregate settings and prioritize traditionally underserved communities.
- **Recommendation 2.12**: The NYC Health Department, with support from the Mayor's Office and NYC Health + Hospitals, should formalize a scalable citywide contact tracing strategy that pre-establishes agency roles and responsibilities. The strategy should include a plan to integrate congregate settings and prioritize traditionally underserved communities.
- **Recommendation 2.13**: NYC Health + Hospitals, with support from DSS, the Mayor's Office, and the NYC Health Department, should formalize a scalable outreach and support program for individuals with, exposed to, or otherwise impacted by a disease, modeled after the T2 Take Care program, that pre-establishes agency roles and responsibilities. The strategy should include a plan to integrate congregate settings and prioritize traditionally underserved communities.
- **Recommendation 2.14**: The NYC Health Department, with support from OTI, should improve data systems that support case investigation and contact tracing, so they are more scalable and easily integrated with other data systems.
- **Recommendation 2.15**: The Department of Environmental Protection (DEP) and the NYC Health Department should continue to expand wastewater surveillance efforts using current best practices as appropriate, for future public health emergencies.
- **Recommendation 2.16**: The NYC Health Department, with support from the Mayor's Office, NYC Emergency Management, and NYC Health + Hospitals should formalize a scalable citywide strategy for large-scale vaccination efforts that

require vaccine operations outside of the existing healthcare infrastructure that pre-establishes agency roles and responsibilities, including vendor oversight. The strategy should include a plan to integrate congregate settings and prioritize undeserved communities, as well as structures and processes to intake and vet requests for mobile vaccination buses or pop-up vaccination events.
Recommendation 2.17: The NYC Health Department, with support from OTI, should update and revise the VaxApp platform so it can be more readily deployed for future vaccination and other medical countermeasure campaigns.

- **Recommendation 2.18**: DDC, with support from DCAS, NYCEDC, and NYC Emergency Management, should develop a centralized database of City-owned properties with site information to more quickly assess the viability and accessibility of potential facilities for public-serving response operations during future emergencies. This includes standardizing the criteria for site selection, conducting site assessments to gather the needed information, and implementing a process for keeping data current.
- **Recommendation 2.19**: The Mayor's Office, with support from DCAS and DDC, should chair an interagency task force to prioritize, assess, and, if possible, equip City-owned properties with necessary updates to serve as public-serving facilities, such as a testing site, service center, or other site for the public to access City services during an emergency. This includes incorporating improvements to maintenance, ventilation, accessibility, and other components into existing development or retrofit plans.
- **Recommendation 2.20**: The NYC Health Department, with support from relevant City agencies, should evaluate the effectiveness and potential drawbacks of vaccine mandates and incentive programs. This should include developing a plan to operationalize vaccine mandates and incentives if the strategies are to be used.

Novel Social and Economic Operations

- **Recommendation 3.1**: NYC Public Schools should continue to provide mobile devices to school staff and students for remote learning during routine school closures to maintain this capability for longer-term school closures. Allocation efforts should prioritize vulnerable students, including those who may have limited access to adequate technology and high-speed internet.
- **Recommendation 3.2**: NYC Public Schools should continue to improve and exercise remote learning capabilities with school staff.
- **Recommendation 3.3**: NYC Public Schools should incorporate principals and other school executives into policy development discussions to help inform decisions based on the insight of those responsible for executing and enforcing policy during future emergencies.

- **Recommendation 3.4**: The Mayor's Office of Food Policy (MOFP), DSS, and NYC Aging should explore development of an emergency food voucher program that allows individuals experiencing food insecurity to purchase food or meals from local, culturally appropriate establishments, grocers, and restaurants to promote community recovery during future emergencies.
- **Recommendation 3.5**: MOFP, in collaboration with MOCS and SBS, should develop pre-vetted lists of culturally appropriate food vendors (i.e., minority and women-owned, kosher- and halal-certified) that meet the City's food quality standards to be leveraged during future emergencies.
- **Recommendation 3.6**: NYCEDC, MOFP, NYC Emergency Management, and SBS should formalize supply chain monitoring and information sharing pathways to support grocery stores during future emergencies with similar disruptions.
- **Recommendation 3.7**: The Mayor's Office, with support from DSS, HPD, NYC Emergency Management, NYC Health + Hospitals, and the NYC Health Department, should formalize a scalable unified isolation and quarantine strategy that pre-establishes agency roles and responsibilities.
- **Recommendation 3.8**: The NYC Health Department, DSS, HPD, NYC Emergency Management, NYC Health + Hospitals, and other agencies should update isolation and quarantine plans to include screening mechanisms to ensure individuals who are sick or at risk of becoming sick are only accepted into hoteling programs administered with medical oversight. Screening should include efforts to identify people with mental health needs warranting services to prevent worsening of illness or crisis or those in need of other mental health care.
- **Recommendation 3.9**: The Mayor's Office, in coordination with NYC Emergency Management, NYC Health + Hospitals, and the NYC Health Department, with support from the Administration for Children's Services (ACS) and DSS, should formalize coordination and contracting with trusted CBOs who are best positioned to provide wrap-around services to individuals in isolation or quarantine within their communities as part of the City's unified isolation and quarantine strategy.
- **Recommendation 3.10**: The Mayor's Office of Community Mental Health (MOCMH), with support from DSS, NYC Health + Hospitals, the NYC Health Department, and relevant State partners, should specifically plan for supporting individuals in isolation or quarantine who have a higher level of medical and mental / behavioral health needs, but who do not require hospitalization as part of the City's unified isolation and quarantine strategy.
- **Recommendation 3.11**: The Mayor's Office should design future emergency-related inspections to minimize disruption of routine inspections as much as possible. The City should limit the amount of the inspection workforce diverted and should prioritize incorporating emergency-related inspection questions into existing business inspections.

- **Recommendation 3.12**: SBS and NYCEDC should continue to engage the business sector on a regular basis to foster coordination and outreach during emergencies.
- **Recommendation 3.13**: SBS should continue to maintain and support interagency use of the NYC storefront businesses database for routine and emergency operations.

Response Staffing

- **Recommendation 4.1**: NYC Health + Hospitals should investigate strategies to reduce disparities in permanent and temporary contracted public healthcare staff benefits, where possible.
- **Recommendation 4.2**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH, with support from healthcare partners, to create a transparent, streamlined process for healthcare facilities to request and receive healthcare surge staff (e.g., MRC and other volunteers, State and Federal staffing assets, contracted staff).
- **Recommendation 4.3**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH, with support from healthcare partners, to formalize a centralized coordination mechanism to fulfill and manage healthcare surge staff requests for future citywide emergencies.
- **Recommendation 4.4**: The NYC Health Department and NYC Emergency Management should work with GNYHA, NYC Health + Hospitals, and NYS DOH to coordinate with healthcare facilities to develop plans and processes to receive and rapidly onboard and orient healthcare surge staff.
- **Recommendation 4.5**: The NYC Health Department, with support from OMB, should develop specifications and requirements for a future GPO and Loan Provider Program for healthcare surge staff, including considerations for healthcare facilities that serve traditionally underserved communities.
- **Recommendation 4.6**: The Mayor's Office should encourage City agencies to review and revise job descriptions and annual tasks and standards documents to include the potential for City employees to support emergency response operations, where appropriate.
- **Recommendation 4.7**: NYC Emergency Management, with support from DCAS, the NYC Health Department, OLR, and other agencies, should document administrative, legal, and technological policies and considerations for City employee emergency re-assignment. This should include identifying titles excluded from emergency re-assignment and actions agencies should take during an emergency to formalize City employee re-assignment. This guidance should also include a process for notifying agencies to begin documenting hours City

employees work on emergency response in agency timekeeping systems to facilitate potential FEMA reimbursements.

- **Recommendation 4.8**: NYC Emergency Management, with support from DCAS, the NYC Health Department, and OLR should develop guidance on how agencies should match employee titles and skillsets to pre-identified response roles (e.g., canvassers, outreach workers).
- **Recommendation 4.9**: NYC Emergency Management, with support from the NYC Health Department, OLR, and other agencies as appropriate, should identify technological solutions to more effectively coordinate and track City employee volunteers and re-assignments for response operations.
- **Recommendation 4.10**: The Mayor's Office, in collaboration with DCAS, the NYC Health Department, OLR, and other agencies as appropriate, should centrally develop and release City employee health and safety guidance and resources for City agencies during future emergencies.
- **Recommendation 4.11**: City agencies should identify staff that are responsible for interpreting and applying citywide employee health and safety guidance to specific agency sites and operations.
- **Recommendation 4.12**: The Mayor's Office, with support from DCAS-Citywide Occupational Safety and Health, Law, the NYC Health Department, and OLR, should review available guidance from Federal, State, and City authorities regarding City employee health and safety in the event of an emergency and how to effectively roll out changes during future emergencies.
- **Recommendation 4.13**: OLR should promote and distribute information about EAP and WorkWell NYC to City agencies to increase awareness of these programs to support City employee mental health and wellness.
- **Recommendation 4.14**: The Mayor's Office, with support from DCAS, MOCMH, OLR, and OMB, should review existing leave policies and associated guidance to effectively address employee mental health issues, particularly for City employees working on emergency response operations.
- **Recommendation 4.15**: The Mayor's Office should continue to consider expansion of flexible work arrangements and compressed schedules for all City employees. This consideration should include review of diversity and inclusion policies to ensure best practices.

Data and Technology

- **Recommendation 5.1**: OTI and NYC Emergency Management should continue to mature the Data Governance Workgroup to manage progressively complex issues, including identifying and negotiating data sharing agreements (with considerations for sharing personally identifiable information [PII]) and

implementing scalable software and technologies before the next large-scale emergency.

- **Recommendation 5.2**: OTI and the Mayor's Office of Operations, with support from NYC Emergency Management, should establish an emergency data lead for future emergencies, responsible for coordinating interagency data sharing, management, and reporting needs to streamline data pipelines and prioritize and consolidate reporting.
- **Recommendation 5.3**: The NYC Health Department, with support from GNYHA, NYC Emergency Management, and NYC Health + Hospitals, should work with NYS DOH to review and streamline healthcare data reporting requirements and automate data collection to improve accuracy and produce near real-time reporting.
- **Recommendation 5.4**: The NYC Health Department, FDNY, GNYHA, NYC Emergency Management, and NYC Health + Hospitals should work with NYS DOH to standardize definitions for healthcare facility data to create a shared understanding of terms and consistent data use to inform decision-making.
- **Recommendation 5.5**: OTI should hold and support enterprise-wide flexible, easy-to-use data storage, analysis, and visualization software with real-time interagency data sharing and reporting functionality for City agencies to support routine and emergency operations. The enterprise-wide software should have sufficient processing and analytic power to handle large quantities of data, have automation capabilities, and be flexible and interoperable to maximize reporting efficiency.
- **Recommendation 5.6**: OTI, DCAS, the Mayor's Office, and OMB should support agency efforts to prioritize hiring and training staff with skills to support data collection, analysis, and visualization and offer expanded professional development opportunities to recruit and retain staff with needed data-related skillsets.
- **Recommendation 5.7**: The Mayor's Office, DCAS, and NYC Emergency Management should formalize a citywide emergency remote work policy to implement during large-scale emergencies, as necessary.
- **Recommendation 5.8**: The Mayor's Office, DCAS, and NYC Emergency Management should develop guidance for remote work as a continuity strategy and require City agencies to incorporate into their Continuity of Operations (COOP) plans. Additionally, City agencies should more holistically evaluate how to continue providing essential services in a remote environment, including plans for operationalizing the field-based workforce.
- **Recommendation 5.9**: City agencies, in coordination with OTI, should routinely assess the ability of staff to work remotely, such as testing the functionality of devices and network bandwidth, to ensure agency routine and emergency operations can continue in the event of another large-scale emergency requiring transition to remote work.

Public Outreach and Communications

- **Recommendation 6.1**: The Mayor's Office should develop a mechanism to expedite review of agency public messaging during future emergencies. This should include triggers for the Mayor's Office review and methods to align City agency messaging related to public health emergencies to be consistent with NYC Health Department messaging. This should also include an exemption or a further streamlined process for messaging to healthcare providers.
- **Recommendation 6.2**: The Mayor's Office of Engagement, with support from NYC Emergency Management and the NYC Health Department, should formalize a scalable citywide community engagement strategy that pre-establishes agency roles and responsibilities for future emergencies. The strategy should include a plan to prioritize communities of color and traditionally underserved communities. This includes sustained investment in and collaboration with these communities and partners, beyond contacting local organizations to provide information.
- **Recommendation 6.3**: The NYC Health Department, the Mayor's Office of Engagement, and NYC Emergency Management should continue contracting with local organizations and coordinating with healthcare providers and medical practices to provide public health information and City resources through trusted channels and to develop relationships with entities vital to community resiliency and recovery.
- **Recommendation 6.4**: The NYC Health Department, with support from relevant agencies, should formalize a misinformation and disinformation feedback loop strategy to track and assess sources and develop messages that fact check any false information. The strategy should explore additional methods to collect community feedback and address misinformation and disinformation during future public health emergencies.

Equity

- **Recommendation 7.1**: The Mayor's Office of Equity and Racial Justice (MOERJ), NYC Emergency Management, the NYC Health Department, and OTI should work with equity experts to assess the emergency data the City collects to better inform response operations. This should include identifying trends, gaps, and how collecting additional data (including, but not limited to, standardized disability, race, ethnicity, gender, and preferred language) can enhance the City's understanding of disparate impacts during emergencies to improve outcomes.
- **Recommendation 7.2**: MOERJ should coordinate with MOIA, NYC Emergency Management, the NYC Health Department, and other agencies with established equity programs to develop citywide standards and guidance for City agencies to incorporate equity frameworks and designated Equity Officers into their emergency plans and response structures.

- **Recommendation 7.3**: MOERJ should be included as agency liaisons to the City's EOC to better engage with leadership to promote an equity-focused response during future emergencies.
- **Recommendation 7.4**: NYC Aging should coordinate with NYC Emergency Management, the NYC Health Department, and other organizations such as the NYC Cabinet for Older New Yorkers[25] and those in direct service with older adults to develop citywide standards and guidance to better address older adult needs in emergency plans and response structures.
- **Recommendation 7.5**: City agencies should comply with Local Law 12 / 2023, Local Law 13 / 2023, and Local Law 30 / 2017[26] and regularly assess their routine operations and emergency plans to ensure DAFN and language access considerations are addressed during emergencies. Agencies should regularly update standard communications materials for emergency response to reflect changing demographics and emerging language needs.
- **Recommendation 7.6**: MOIA, NYC Emergency Management, and OTI should work with agencies to support development of a more robust, scalable infrastructure for multilingual communications during emergency response. This should include enhancing interagency coordination mechanisms; building up contracted and in-house capacity for translation, interpretation, audio-visual, and social media production; expanding partnerships with immigrant-serving community organizations; and exploring the use of language technologies as components of delivering culturally and linguistically appropriate engagement.

[25] The Cabinet for Older New Yorkers is an interagency collaborative established to realize and institutionalize an age-inclusive New York City through structural, legislative, and systemic solutions.
[26] https://intro.nyc/local-laws/2023

Appendix B: Participating Agencies

The following City agencies and departments participated in the NYC COVID-19 Response Review assessment and development process:

- Administration for Children's Services (ACS)
- Department of Citywide Administrative Services (DCAS)
- Department of Design and Construction (DDC)
- Department for the Aging (NYC Aging)
- Department of Buildings (DOB)
- Department of Correction (DOC)
- Department of Environmental Protection (DEP)
- Department of Health and Mental Hygiene (NYC Health Department)
- Department of Parks and Recreation (Parks)
- Department of Sanitation (DSNY)
- Department of Small Business Services (SBS)
- Department of Social Services (DSS)
- Department of Transportation (DOT)
- Greater New York Hospital Association (GNYHA)
- Law Department (Law)
- Mayor's Community Affairs Unit (CAU)
- Mayor's Office of Criminal Justice (MOCJ)
- Mayor's Office of Contract Services (MOCS)
- Mayor's Office of Housing Recovery Operations (HRO)
- Mayor's Office of Immigrant Affairs (MOIA)
- Mayor's Office of Management and Budget (OMB)
- Mayor's Office of Operations
- Mayor's Office of Talent and Workforce Development (NYC Talent)
- New York City Economic Development Corporation (NYCEDC)
- New York City Emergency Management (NYC Emergency Management)
- New York City Fire Department (FDNY)
- New York City Health and Hospitals (NYC Health + Hospitals)
- New York City Housing Authority (NYCHA)
- New York City Police Department (NYPD)
- New York City Public Schools (NYC Public Schools)
- Office of Chief Medical Examiner (OCME)
- Office of Labor Relations (OLR)
- Office of the Mayor
- Office of Technology and Innovation (OTI)
- School Construction Authority (SCA)
- Taxi and Limousine Commission (TLC)

Appendix C: Methodology

The NYC COVID-19 Response Review Report was informed by a review of City response documentation, surveys of key stakeholders, and facilitated discussions with responding agencies and departments, key partners, as well as former City leadership. This section summarizes the methodology and data collection process used to inform this Report.

- **Step 1: Document Review**
  - Collection and analysis of existing City background and evaluation materials (approximately 75 documents), as well as open-source information, relevant to the City's COVID-19 response. The findings from the document review provided necessary background and contextual information used to inform the development of the stakeholder surveys and facilitated discussions.
- **Step 2: Stakeholder Surveys**
  - Creation and distribution of 19 Focus Area-specific surveys to address information gaps from the document review and narrow down priority topics for facilitated discussions.
- **Step 3: Facilitated Discussions**
  - Conduct of 35 facilitated discussions with a comprehensive group of stakeholders.
- **Step 4: Response Review Report**
  - Development of the NYC COVID-19 Response Review Report to document best practices, lessons learned, areas for improvement, and recommendations using information collected from City response documents and open-source information, surveys, and facilitated discussions.

Limitations

Given the scope, scale, and duration of the COVID-19 pandemic and the nature of information collection, there are several limitations and considerations to be mindful of regarding this review.

During information collection (surveys and facilitated discussions), the Response Review Lead Team engaged key current and former City employees involved in COVID-19 response operations. Therefore, the findings in this Report are not inclusive of all response staff perspectives and experiences. To maintain participant anonymity, feedback in this Report is not attributed to the specific agency(ies).

Though multiple operations are included in this Report, it is not intended to be an exhaustive review of all of the City's COVID-19 response operations. As the NYC COVID-19

Response Review Report's focus is on citywide operations, further evaluation of setting- and / or population-specific operations is recommended to capture critical lessons learned.

Appendix D: Acronyms

ACRONYM	TERM
ACS	New York City Administration for Children's Services
ASL	American Sign Language
CAB	Community Advisory Board
CAU	New York City Mayor's Community Affairs Unit
CBO	Community-based Organization
CDC	U.S. Centers for Disease Control and Prevention
CDI	Certified Deaf Interpreters
CIMS	Citywide Incident Management System
CIR	Citywide Immunization Registry
City	New York City Government
COOP	Continuity of Operations
DAFN	Disabilities, Access, and Functional Needs
DCAS	New York City Department of Citywide Administrative Services
DDC	New York City Department of Design and Construction
DEP	New York City Department of Environmental Protection
DOB	New York City Department of Buildings
DOC	New York City Department of Correction
DoD	U.S. Department of Defense
DOT	New York City Department of Transportation
DSS	New York City Department of Social Services
EAP	Employee Assistance Program

ACRONYM	TERM
NYCEDC	New York City Economic Development Corporation
EOC	Emergency Operations Center
FBO	Faith-based Organization
FDNY	New York City Fire Department
FEMA	Federal Emergency Management Agency
GNYHA	Greater New York Hospital Association
GPO	Group Purchasing Organization
H3	Helping Healers Heal
HERDS	Health Electronic Response Data System
ICU	Intensive Care Unit
JFK	John F. Kennedy International Airport
Law	New York City Law Department
ONL	New York City Mayor’s Office of Nightlife
MOERJ	New York City Mayor’s Office of Equity and Racial Justice
MOCJ	New York City Mayor's Office of Criminal Justice
MOCS	New York City Mayor's Office of Contract Services
MOFP	New York City Mayor’s Office of Food Policy
MOIA	New York City Mayor’s Office of Immigrant Affairs
MOU	Memorandum of Understanding
Mpox	Monkeypox
MRC	Medical Reserve Corps
MTA	Metropolitan Transportation Authority
NYC	New York City

ACRONYM	TERM
NYPD	New York City Police Department
NYS	New York State
NYS DOH	New York State Department of Health
OCME	New York City Office of Chief Medical Examiner
OLR	New York City Office of Labor Relations
OMB	New York City Mayor's Office of Management and Budget
OTI	New York City Office of Technology and Innovation
Parks	New York City Department of Parks and Recreation
PII	Personally Identifiable Information
PPE	Personal Protective Equipment
PRL	Pandemic Response Lab
RSV	Respiratory Syncytial Virus
SBS	New York City Department of Small Business Services
SCA	New York City School Construction Authority
SME	Subject Matter Expert
SNS	Strategic National Stockpile
State	New York State Government
T2	Test & Trace Corps
TLC	New York City Taxi and Limousine Commission
TRIE	Task Force on Racial Inclusion & Equity
U.S.	United States
USNS	U.S. Naval Ship
V4AC	Vaccine for All Corps

ACRONYM	TERM
VA	U.S. Department of Veterans Affairs
VCC	Vaccine Command Center
WEA	Wireless Emergency Alert

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