DENVER
THE MILE HIGH CITY

CITY AND COUNTY OF DENVER
COVID-19 VACCINE ROLL-OUT
AFTER-ACTION REPORT

December 2021, Version 1.0

CONTENTS

EXECUTIVE SUMMARY

Introduction

The City and County of Denver (CCD) Office of Emergency Management (OEM) engaged in the development of this After-Action Report (AAR) to identify recommend improvements to CCD's Emergency Operation Plans following the COVID-19 vaccine roll-out. OEM sought input from staff who were actively engaged with the Emergency Operations Center (EOC) and were involved with the vaccine roll-out. The scope of the AAR focuses on the City and County-wide vaccination distribution mission and operational collaboration with State, Regional, and Local partners. The AAR activities generated 13 priority recommendations for improvement in seven core themes (detailed below). The recommendations will identify actionable suggestions for improvements in processes and plans and will educate City and County leadership on critical areas of focus. This AAR will inform future planning and response efforts, development, or improvement of CCD response plans, and identify additional resources and assets needed to ensure successful operations in the future.

Overview of Findings

CCD has adopted a ***whole community approach*** to ensure the wellbeing of all its community members, addressing social inequities and ensuring equitable access to medical care. Beginning in the Fall of 2020, CCD began planning efforts for rolling out a community-wide vaccination effort utilizing ***invaluable partnerships*** with State, Regional, and Local partners. These partnerships proved to be integral to the ***equitable access of vaccination resources***, increasing the reach of vaccination efforts by connecting resources with vulnerable and historically underserved populations. Furthermore, CCD's Technology Services for Geographic Information Sharing (GIS) created ***visualizations and datasets*** necessary to identify underserved communities where vaccine resources could be prioritized. GIS datasets were vital for decision makers working to overcome historical health inequities throughout the Denver Metro area. CCD made significant efforts to overcome health inequities—including ***translated materials, inclusive methodologies for site selection, and engagement with new community partners***— which made considerable steps to close the health equity gap.

While CCD has made great strides to ensure the COVID-19 vaccine roll-out was successful, equitable health outcomes were achieved and their EOC operated efficiently, recommendations for improving activations have been identified. For future activations, CCD, alongside its State, Regional, and Local partners will need to continue developing strategies that support health equity across the whole community. Clarification of roles and responsibilities within the EOC and JIC for both internal EOC staff and external partners will allow for improved communication and chain of command. During non-emergency periods, CCD should increase the number of on-call contracts and vendors and expand the number of staff involved in EOC trainings to boost internal response capacity. Ensuring that CCD is equipped with sufficient staff and resources will be paramount to the success of future activations.

DATA GATHERING METHODOLOGY

Description of Activities

CCD's OEM designed three different engagement activities for the development of this AAR: one-on-one interviews, group workshops, and an online survey. These activities served to solicit feedback from EOC staff and stakeholders regarding CCD's COVID-19 vaccine roll-out. The interviews (7 participants) and workshops (25 participants) were conducted virtually with a facilitator and a scribe for note-taking purposes. Survey totals included responses from 55 EOC staffers and stakeholders. All workshop and interview participants were provided the questions prior to the engagement activity and were encouraged to provide additional written feedback regarding topics that may not have been addressed during the activity. All engagement activity participants were encouraged to identify strengths and weaknesses related to the vaccine roll-out and provide suggestions for how to improve processes going forward.

Engagement activity questions were grouped into seven themes based on the COVID-19 Vaccination Plan, Emergency Operations Plan and COVID-19 Recovery Action Plan. These themes are:

1. Communications
2. Data Quality, Availability, and Application
3. Resource and Assets
4. Equity Principles
5. State Coordination
6. Local and Regional Collaboration
7. City Financial, Procurement, and Contracting Processes

The questions were used as a guide to steer conversations with each participant and provoke insightful feedback. If a response warranted it, facilitators asked follow-up questions for clarification or elaboration. The workshop and survey questions (see Appendix 1 and 2) were developed to yield both quantitative and qualitative data on the performance of the vaccine roll-out focusing on strengths and areas of improvement. Workshop and survey questions were developed with similar themes to generate three-dimensional data allowing for the quantitative survey data to be compared against qualitative workshop data. The interview questions (see Appendix 3) were loosely aligned with the workshop and survey questions, allowing for continuity with feedback analysis and within the themes.

DATA GATHERING METHODOLOGY

Participant Selection Methodology

Participants selected for the engagement activities were limited to internal EOC staff and stakeholders who were actively engaged in the COVID-19 vaccine roll-out. This helped to generate report findings focused on internal operations and coordination, rather than external perspectives. When selecting AAR participants and the type of engagement activity they would participate in, CCD considered their role, level of involvement, and visibility into vaccine operations, allowing for broad range of feedback from the many different sections of the EOC. One-on-one interviews were reserved for key decision-makers, such as Directors and Executive Leadership. Workshop participants were selected based on their operational involvement in the vaccine effort. The survey method was reserved for the largest group of staff- those that held roles that were supportive in nature, but with limited managerial or decision-making duties. Engagement activities included staff from all EOC sections.

Plans and Data Referenced

In February 2021, CCD finalized the development of and approved the COVID-19 Vaccination Plan, which serves as the guiding document for all processes related to the vaccine roll-out. The Vaccination Plan provided a framework across twelve focus areas and was implemented alongside CCD's Emergency Operations Plan: Base Plan, and Denver Citywide COVID-19 Response Action Plan. These documents were used to inform the development of the engagement activity questions and establish the engagement activity themes. These plans and reports were compared against the feedback received to determine how well the actual response efforts were aligned with the plans and identify areas of improvement. In addition to these plans significant event logs and vaccine distribution data were reviewed to understand how CCD tailored its approach to the COVID-19 vaccine roll-out. Plans and documents reviewed include:

- Denver Citywide COVID-19 Action Plan, version 1.1 – March 2020
- The Denver Citywide COVID-19 Recovery Action Plan, version 1.3 – October 2020
- Denver Emergency Operations Plan: Base Plan, version 1.2 – December 2020
- COVID-19 Vaccination Plan, version 1.3 – February 19, 2021
- Denver COVID-19 initial Response: After-Action Report – February 2021
- EOC Situational Reports - January 29, 2021 - April 26, 2021
- CDC guidance and any other guidance pertaining to COVID-19 Vaccination Distribution
- Public Health Orders (Denver Public Health and CDPHE)

EVENT SUMMARY AND TIMELINE

Event Summary

In March 2020, the EOC was activated to respond to the rapidly developing and changing COVID-19 Global Pandemic. CCD transitioned from an EOC response to a Long-Term Recovery Committee after the initial COVID-19 response effort, and then reactivated the EOC for the vaccine roll-out. Planning efforts for the vaccine roll-out commenced over the closing months of 2020 following the first indicators that a vaccine would soon be made available. CCD developed the COVID-19 Vaccination Plan in the Fall of 2020 to serve as the guiding document for planning efforts which was aligned with the State's distribution plan.

Phased Approach

Following State of Colorado directives, CCD aligned with the phased approach to manage the distribution and administration of the vaccine to Colorado Department of Public Health and Environment's (CDPHE) list of the most vulnerable, high-risk populations first with subsequent phases broadening eligible populations. As with the response efforts undertaken throughout the pandemic, the vaccination planning efforts required adaptability to the everchanging landscape the pandemic presented. While the State's phased approach provided the operational framework, it was reworked numerous times, forcing CCD to redirect and change course quickly. The phased approached initially made vaccines available under Phase 1A to select populations including high-risk healthcare workers, long-term care staff and dependents. These vaccines were administered at a small number of sites through partnerships with Denver healthcare providers. As more vaccines became available, Phase 1B.1 increased eligibility to a broader group, including adults over age 70 and those otherwise considered high-risk. To ensure vaccines were reaching the most vulnerable populations, CCD established Mobile Vaccine Teams (MVT) in January 2021 and additional community sites starting in February 2021 to support subsequent phases (1B.2, 1B.3, 1B.4 and Phase 2).

Community Partnerships

Establishing community-wide vaccination sites throughout various neighborhoods was a crucial aspect of the roll-out as additional populations became eligible for the vaccine. Utilizing existing community organizations—such as pre-existing healthcare providers and pharmacies—enabled CCD to leverage existing resources and assets for the benefit of as many eligible residents as possible.

Timeline

The timeline below shows the order of events since the start of the pandemic in March 2020 through the end of 2021. The timeline demonstrates the Initial Phase in red and the Second Phase, vaccine distribution, shown in blue.

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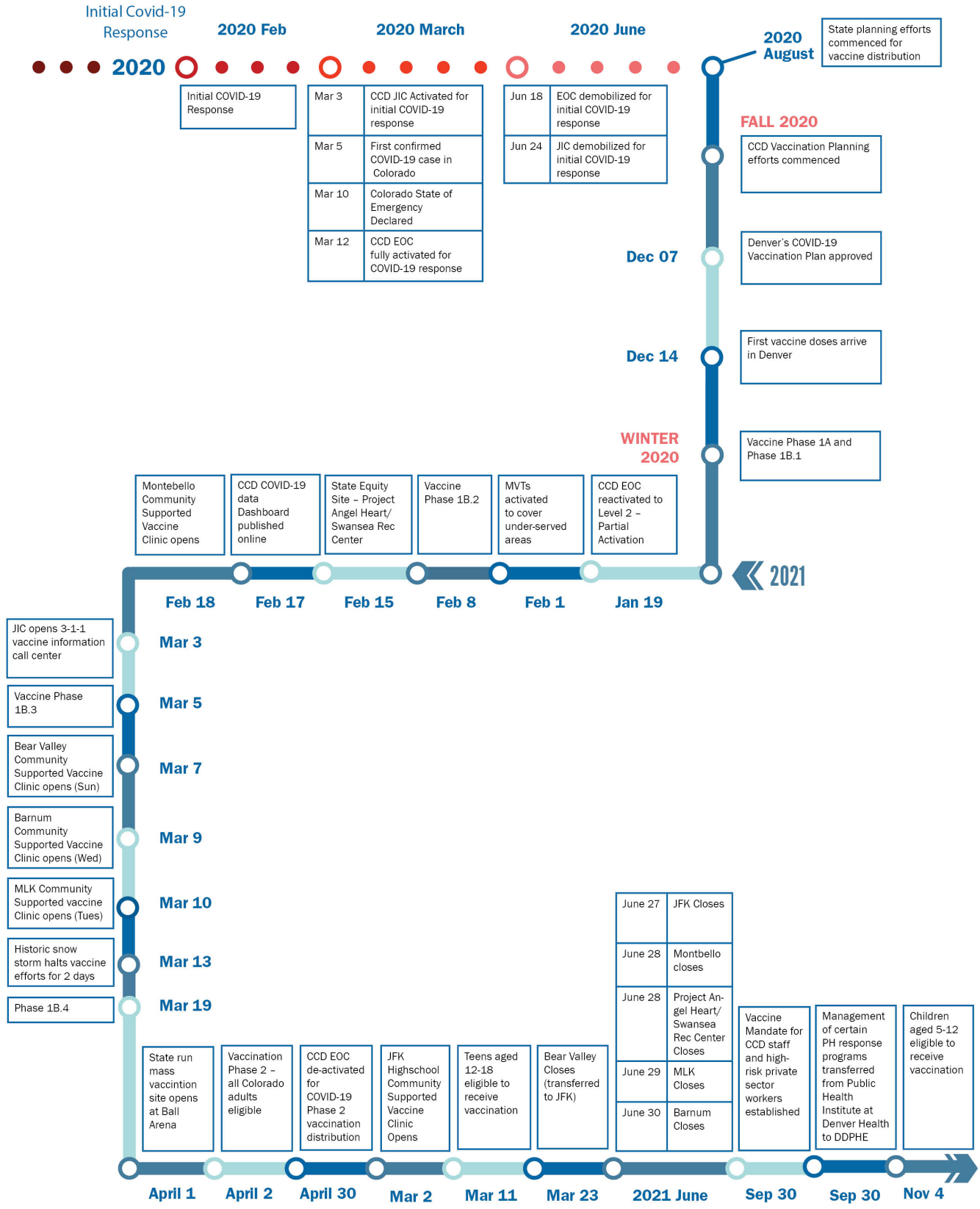
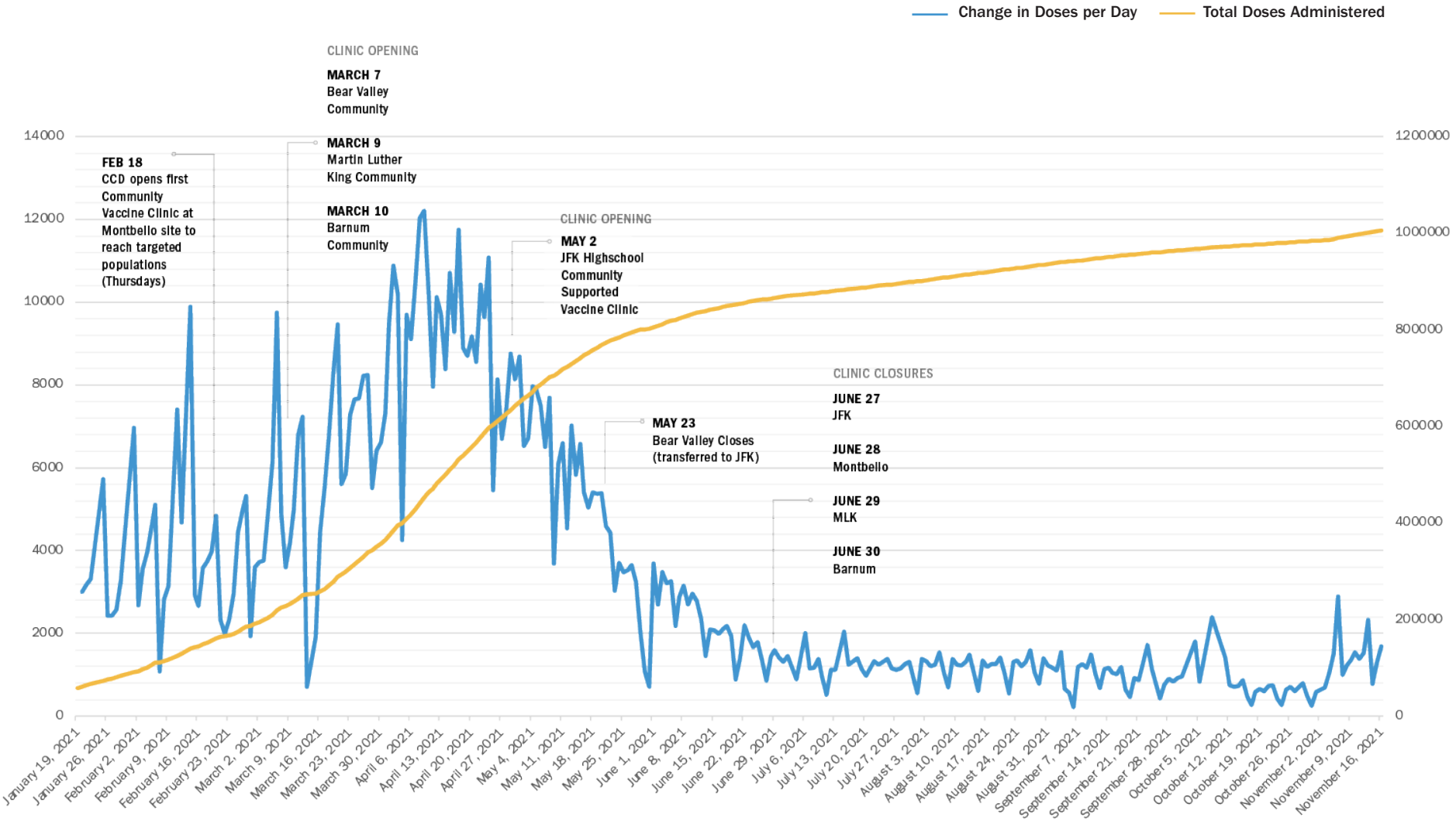
EVENT SUMMARY AND TIMELINE

Event Timeline



Vaccination Efforts Data

The graph below shows the daily increase of vaccines administered in relation to the total cumulative does administered. Key dates have been highlighted to show when CCD opened and subsequently closed community sites which correlates with the influx and reduction in vaccine administration rates.



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OBSERVATIONS

OBSERVATIONS

After finalizing all engagement activities, feedback was distilled into Strengths and Areas of Improvement, then grouped thematically. The analysis tracked the number of times a specific topic was mentioned, allowing the topics below to be presented in order of frequency-of-mention (e.g., the most frequently mentioned topic is the first item presented within each section).

1. Communications & Leader's Intent

This section was designed to assess the success of internal, interagency, and external public messaging related to the vaccine roll-out. Engagement activity participants discussed communication strategies and tactics for the public, communication with the State and other partners, as well as internal CCD communications. Engagement questions around this theme attempted to assess if mission and goals were effectively communicated to staff, if roles and responsibilities were clear to activated personnel, and if changes in priorities were communicated efficiently and effectively.

1.1 Strengths

1.1.1 Timely & Consistent External Messaging

Despite coordination challenges with the State (discussed further in Section 5), CCD communications to the public were timely, consistent, and well distributed. New information was rapidly shared with the public via regular press conferences, town halls, and Webmaster updates to city websites. CCD followed strong protocols around data and intelligence sharing.

1.1.2 Timely & Consistent Internal & Cross-Departmental Messaging

The EOC was in regular communication with State and Local Public Health officials and other departments to coordinate the vaccine roll-out. EOC Situation Reports (SitReps) were utilized throughout the activation period, providing valuable information accessible to staff and relevant officials.

1.1.3 Strong 311 Call Center

CCD utilized an already existing 311 call center to disseminate important COVID-19 information to residents. This proved to be an excellent tool for CCD and resource for residents to navigate available City services. The Call Center was able to connect Denver residents to assistance in their desired language and was an important tool for residents who had limited or non-existent access to internet.

15,340 calls received to date

1.1.4 Adaptive EOC Planning and Execution

CCD had to quickly react and adapt to changing State and Federal guidelines and priorities for vaccination efforts. In this changing environment, CCD promptly developed planning and operational documents to permit the rapid launch of vaccination programs. This allowed CCD EOC staff to execute plans, shift course, and effectively relay communication regarding changes in the vaccination distribution plan.

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1.1.5 Strong JIC Leadership & Coordination

JIC leadership adopted a virtual shift schedule to allow staff to keep their "non-emergency" responsibilities moving forward. Staff reported positively on this practice, claiming that it helped to mitigate burn-out and allowed for continuity of non-emergency operations.

1.1.6 Cross-jurisdictional Information and Lesson Sharing

Leadership was focused on learning from other cities' experiences with different response strategies and tactics. Prior to the COVID-19 activation, CCD participated in the Big City Emergency Management (BCEM) Group. During COVID-19 response, CCD held weekly or monthly meetings with cities like New York, Los Angeles, Washington D.C., and San Francisco for information and skill sharing.

1.2 Areas of Improvement

1.2.1 Challenging Communication Around Equity Sites

Confusion around the direction and rationale for organizing equity sites was a consistent theme during the engagement activities. Staff reported a need for a more unified strategy or approach among State and Local actors. The State preferred "pop-up sites," a series of one-day clinics at various locations. Fearing that pop-up sites perpetuated historical inequities wherein institutions would support vulnerable populations with limited and short-term resources, CCD preferred embedded, consistent, community vaccination sites. Additionally, some staff felt that decisions regarding equity sites were not entirely transparent – for example, it was sometimes unclear what populations or demographics were being targeted. Similarly, internal, and external stakeholders were confused as to which agency (i.e., CCD or the State) was responsible for each vaccination site.

More analyses and recommendations on Equity sites will be provided in Section 4 – Health Equity Principles

1.2.2 Disruption in Formal EOC Channels of Communication

Formal, interpersonal EOC channels of communication may not have been operating as designed. There was a reported break in the bilateral, interpersonal, communication flow between leadership and the tactical level of staff. It was perceived that leadership pursued courses of action without incorporating all related stakeholders, creating a deficit in plan situational awareness for staff at multiple levels. Also, Public Information Officers may not have been incorporated in decision-making initiatives between CCD and local health partnerships early enough. Staff reported that this stalled dissemination of information to the public. Additionally, field teams reacting to situational change needed responses or guidance faster than formal EOC channels of communications provided, and thus relied on their informal relationships to gather information or resources necessary to complete assignments.

1.2.3 Delayed Response to Persistent Misinformation

As many communities are now recognizing across the nation, vaccine misinformation hindered the success of the overall pandemic response and related vaccinations efforts. CCD struggled to swiftly identify the

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lasting harm prolific misinformation could inflict and was slow to counteract. This is not a Denver-specific issue. "In February 2020, the WHO declared an "infodemic" of false information, meaning that people are facing an overabundance of information that makes it hard for them to find reliable guidance when they need it (WHO 2020). Misinformation, disinformation (misinformation spread with malicious intent), rumors, and conspiracy theories have reached a volume never previously seen."[1]

One participant stated, "People on the ground may have the solution to the problem, but not the authority to implement it."

1.2.4 Unclear Partner Roles

CCD staff and the general public were unclear as to the specific roles of partnering agencies. Staff reported a need for additional clarity around which agency was administering vaccines and what vaccine inventory they held. CCD did not initially receive a clear accounting of where vaccines were being distributed, and this further hindered coordination. The differences in the logistical roles of Pharmacies, HMOs, the State, and CCD were unclear to staff, stakeholders, and the community. Additionally, community partners were directly communicating with the State to coordinate vaccine sites, bypassing CCD's processes.

1.2.5 Unclear Chain of Command

Internally, some CCD staff felt that the roles and their positionality in the organizational chart were not clear, or not communicated. This inhibited certain sections from force-multiplying because they did not understand all responsibilities across organizations to leverage various assets. Additionally, chain of command while collaborating with partnering agencies was not clear to staff. As the Denver Department of Public Health and Environment (DDPHE) maintains its own organizational structure and leadership, coordination between the agencies complicating the chain of command, and staff were unclear regarding who held authority to make key decisions. One participant noted, "DDPHE DOC is organized and operates differently than CCD's EOC. With concurrent testing operations being handled by DDPHE it was sometimes hard to tell who was in charge of various aspects of the vaccine roll-out with leadership from each agency meddling in the different operations."

1.2.6 Disregarded Evaluation Data for Outreach Strategies

Some tactics were pursued even if the data did not support it. Flyer development and distribution is an example of such a scenario. Some collateral material did not have enough public uptake to warrant the effort that went into creating and mass printing the material, but creation of that material was not re-evaluated. Website tracking links on the handouts did not experience statistically significant engagement. Time and resource heavy social media content received negligible engagement. Despite the lack of compelling data to support their efficacy, certain political pressures still compelled CCD and JIC resources and assets to be allocated to these endeavors.

** Recommendations for this item are addressed in Section 4: Health Equity Objectives.*

The concern around unclear organizational structure featured prominently in workshops, and interviews. However, survey respondents said that roles and responsibilities were clear within their team, ranking the clarity level at 4, with 5 being the highest.

1 Lies, Bots, and Coronavirus: Misinformation's Deadly Impact on Health - Grantmakers In Health (gih.org)

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1.2.7 Complex Process for Reviewing & Approving Communications

State guidance for vaccination implementation was vague and developing a unified message amongst all of Denver Metro Area's communities without clear state guidance was time consuming & slow. This issue was partially remedied mid-activation by bringing multi-jurisdictional communication leadership together.

1.2.8 Existing Response Plans Were Insufficient

One survey respondent explained the impact of imperfect coordination this way, "I think it was difficult due to the lack of national coordination. We ran into bumps due to so many third-party partners not talking to each other or not having a single coordinated system. I think that was a disservice to our community. The approach was government centric and our work with community could have been better."

Existing response plans were either not used or were rendered ineffective by the unprecedented nature of the situation. One participant explained, "Mass vaccination plans (from DDPHE) exist[ed] prior to COVID and more refined COVID specific plans were developed as the vaccine roll-out drew near. However, the State's process and how they prioritized who would get vaccine kept changing. Thus, it made it difficult to effectively execute pre-existing plans and forced the EOC and DDPHE DOC to constantly adjust to new guidance and change the plan on the fly." Plan changes and adjustments were accompanied by temporary confusion and communication issues until everyone was re-educated. The ebb and flow of vaccine supply demanded small frequent changes in vaccine management, and a larger transition of overall vaccine management from the DOC to the EOC and then back to the DOC. Each transition could have been afforded better management, according to engagement activity participants. Due to the demanding nature of the activation, turnover and knowledge loss was high, with some new personnel only receiving just-in-time training. Engagement activity participants expressed numerous times as a process that could have been smoother.

One participant stated, "There was a tight knit group in the EOC managing the vaccine roll-out who was instrumental, and everything funneled through this group. The DOC remained active during the transition to the EOC and there were growing pains during this phase. How do we transition in and out of an EOC when there is a DOC activation? How are we handing off roles in each direction? It was a little clunky."

Another stated, "From DOC to EOC - EOC to DOC the transition has never been clearly laid out."

1.2.9 Challenging Transitions from Joint Information Center to Individual Agencies

The transition from the JIC to the DOC was a challenging one, characterized by staffing issues, unclear roles and responsibilities, and an uncertain chain of command in both the JIC and DOC. During the transitions it was unclear who would remain in charge during the transition period.

1.3 Priority Recommendations for Improving Communication

1.3.10 Clarify Roles and Responsibilities

Clarify the specific role that each participating agency serves during a response. This can be achieved through the creation a document articulating each participating agency's functional areas of expertise, known as a Core Competency Matrix. This document would supplement the existing Capability Tables outlined in section 3.1.3 in the EOP. A Core Competency Matrix would articulate where each agency has authority (based on their functional area of expertise) to direct response operations. An example can be found on pages 3-4 of the NYC Citywide Incident Management System Charts.

1.3.11 Clarify the responsibilities of specific positions through Job Action Guides

Job Action Guides can be added to the EOP as an Appendix. These serve to outline the specific duties and instructions for completing general tasks, per position.

1.3.12 Combat misinformation proactively and with a single voice through the JIC

Ensure the JIC is well-integrated into EOC and able to receive and respond to intel gathered by all sections. Encourage systems wherein each section can combat misinformation within their field (i.e., misinformation about a particular hospital can be addressed and communicated through JIC). Respond to misinformation with clear, accurate, and easy- to-find information. CCD may consider the creation of a "Rumor Control" system to address misinformation.

2. Data Quality, Availability, and Application

For this theme, engagement activity participants were asked to evaluate the successful use of data for the vaccine roll-out and related decision-making. Were data needs met? Was data used to substantiate decision-making, guide process improvements, and measure success? Could the integrity of the data be trusted?

2.1 Strengths

2.1.1 Integrous Data & Successful Utilization

The Information Section staffed by DenverTechnology Services used influenza vaccine data and developed the ability to map key geographical and demographical information to apply to COVID-19 vaccination data. Unanimously, the Information Section received multiple accolades across engagement activity participants.

2.1.2 Strong Geographic Information System (GIS) Mapping

GIS mapping was crucial to all levels of the activation, especially at identifying and targeting communities most at risk. The foundation of the diagrammatic representation of health inequities started with historically underserved neighborhood and census data but evolved as vaccine uptake informatics were added for each neighborhood. It should be noted that the Call Center helped to improve GIS mapping in serving equity sites; the registration process used by the Call Center collected ZIP Codes to track demographic data and provided some screening in ensuring the resources were used by the intended community.

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2.1.3 Data-Driven Decision Making

GIS mapping, dashboards, and data were powerful tools used during vaccine planning and program implementation. These tools served provided key information to decision makers and assisted in providing data transparency to the public. As was previously mentioned, GIS mapping helped to identify where more clinics were needed and where efforts were effective. Dashboards were highly detailed, capable of analyzing caseloads and vaccine uptake by neighborhood and simultaneously overlaying this information with site maps. This tool proved effective in tracking and disseminating vaccine data internally to CCD staff. Leadership also used this data to allocate the limited supply of vaccines. Similarly, the JIC had a data-driven approach, coalescing data from 311 calls, vaccine registration, Facebook interactions, and other channels of communication to inform strategy moving forward.

Survey respondents ranked their confidence in the integrity of the data a 4 out of 5. One engagement activity participant stated that "Vaccine informatics was [a] success; especially in targeting communities most at risk."

2.2 Areas for Improvement

2.2.1 Inherent Issues with Data Collection, Analysis, and Privacy

A. Data Collection and Analysis: Creating such detailed dashboards was labor-intensive, involving a great deal of virtual coordination with multiple stakeholders and several channels for data collection. CCD was also dependent on receiving data from third-party providers, a process that was not initially streamlined. All these factors created delays and losses in data.

Survey respondents ranked the effective use of data to prioritize resources/ allocations at a 3.95 out of 5.

B. Privacy: Some data were medical in nature and thus subject to HIPAA privacy protections. This obscured some of the data elements from requesters. For example, non-HIPAA data on vaccine distribution was limited to inventory, administration rate, and location. While HIPAA prevented sharing specific information on who received a vaccine, department heads frequently requested to know how many staff from their departments were vaccinated.

2.3 Priority Recommendations for Improving Data Quality, Availability, and Application

2.3.1 Create streamlined process to Gather Data Utilizing a Single Platform to Allow for Input by Different Parties

At the onset of a response, identify what data are needed, who will serve as point of contact for each data type, what is the necessary frequency of data updates, and in what format data should be held.Included in this process should be understanding who will need to access the data and what permissions/privacy factors are needed.

3. Resources & Assets

In this section, stakeholders were asked if they had the expertise, technology, staffing, plans, and checklists necessary to operationalize objectives, and what they might recommend for future activations.

3.1 Strengths

3.1.1 Responsive & Adaptive CCD Performance

Although plans and checklists were subject to change in the unprecedented landscape, CCD was adaptive during the activation. Staff felt they performed well as a team. In general, staff reported that they were able to maximize the resources available to them and were able to successfully navigate the complexities of the response with the personnel, technology, and resources at hand.

3.1.2 Effective Training

Engagement activity participants stated that the training program for EOC activations was appropriate and made them ready for live activations.

3.2 Areas for Improvement

3.2.1 Limited Staff Capacity and Training

While some staff reported that trainings were sufficient, others noted that they felt deficient; either not enough people trained, or not enough position-specific training was available. Staff noted that personnel mission requests (i.e., staffing needs) were a moving target as plans changed drastically and frequently. Some positions were slow to expand analogous to their heavy workload, leaving too many single points of failure and contributing to burnout. One shared example is the strain on Mar Comm professionals in the JIC. Staff reported that the JIC only had 20-25 specially trained Mar Comm professionals, with no options for adequately trained backfills. These 20-25 individuals were activated for an exceptionally long time, their position requiring responsivity on any day at any hour, fatiguing said individuals and leaving significant vacancies in their regular non-emergency positions.

3.2.2 Persistent Resource Shortages

Tasks associated with the vaccine roll-out were made more difficult by persistent resource shortages. The limited technology available to field teams debilitated operations. Some vaccine sites were allotted only one laptop, which was reported to slow registration times. Microsoft Teams was the primary mode of contact, and a phone list was not available for all staff if Teams went down. One individual reported on the survey that they needed a workstation with a camera and a microphone to even be able to connect via Teams. Finally, general vaccine site necessities such as traffic control personnel, signage, and cones were in short supply, creating confusion and longer wait times.

3.2.3 Virtual Environments Need Improvement

Like much of the world adjusting to a virtual work environment, staff reported in adequacies in the systems needed to transition to a virtual workstation. Additionally, some EOC roles do not easily translate to a virtual environment, causing imbalances in workload when on-site roles are transitioned to virtual roles. EOC checklists did include considerations for virtual scenarios.

3.3 Priority Recommendations for Resources and Assets

3.3.1 Increase Inventory of Contingency Contracts

Enhance the number of contracts and breadth of services and resources provided by non-emergency contingency contracts that can be utilized during emergencies.

3.3.2 Expand Logistics Section and Increase Training

Enhance the Logistics Section to include both logistics and procurement teams. Consider enhanced pre-scripted mission requests to expedite processes during activations. Identify procurement specialists that will serve in EOC during non-emergency periods and continually train them on how to prioritize logistics requests, expedite requests, and ensure regulatory compliance.

To illustrate this, one survey respondent wrote, "My impression is that we were slightly under resourced but overachieved […]."

During non-emergency periods, the Logistics Section should convene 1-2 times per month for plans review, address resources need, participate in trainings, and work on general preparedness. In addition to accomplishing these tasks, these monthly meetings build rapport between agencies.

One participant stated: "Trainings helped as a dry run, helped staff prepare for the real thing and help staff realize it is a city-wide response and that a pigeon-hole approach only within EOC would not work."

4. Health Equity Objectives

Engagement activities related to Health Equity Objectives attempted to assess how well participants were apprised of the stated equity missions and goals, if tactics were successful in achieving equitable outcomes, if community partnerships were effective, and what changes could improve future activations.

4.1 Strengths

4.1.1 Advantageous Community Partnerships

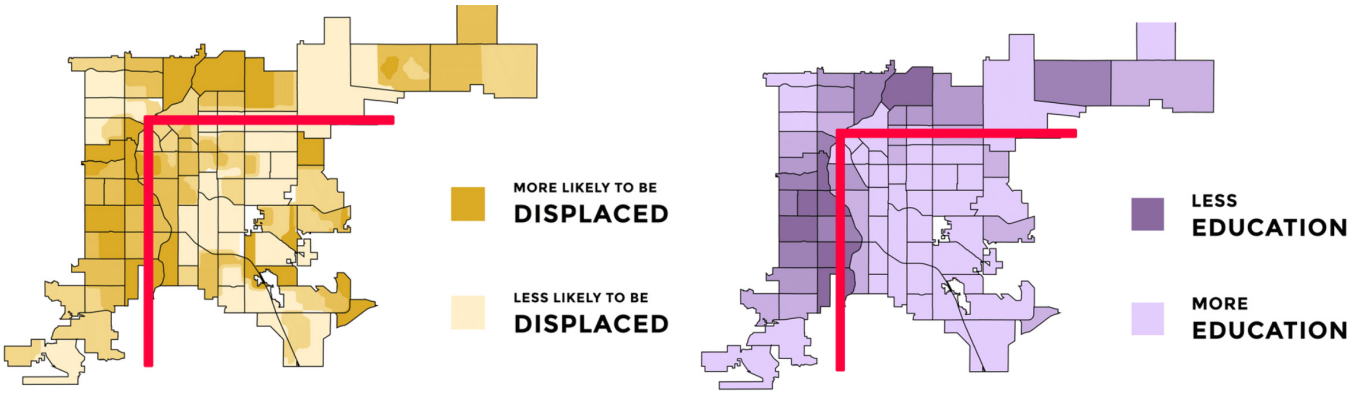
The importance of community partnerships was mentioned several times in the engagement activities. Once partnerships were made with community-based and faith-based organizations, they were critical in

providing intelligence and distributing information for communities most at risk. These relationships were also the impetus for behavior change for vaccine hesitancy. For example, coordination with community partners enabled smaller vaccination sites to be embedded in targeted, under-vaccinated neighborhoods.

4.1.2 Equitable Actions as a Focus

Most engagement activity participants agreed that equity was a focal point in the Vaccine roll-out. Equity across race, gender, and socio-economic levels is a pillar of Mayor Michael B. Hancock's agenda and was mirrored by the EOC. The standing Racial Equity Council was engaged to inform vaccine efforts, a Director of Equity Branch was onboarded in the EOC for expertise, and an equity review process was introduced in the EOC action plan. There was a consistent cadence of meetings dedicated to social justice issues. Engagement activity participants utilized the "Inverted L" in their planning. The inverted L which -as the name suggests – is an inverted letter L, that when overlayed on a map of Denver "forms a boundary more or less aligned with I-70 and I-25 [...] the shape also illustrates stark physical and socioeconomic barriers in the city..."[2] that are both historical and present today. It should also be noted here that the dashboards mentioned in Strengths 2.3 were functional in tracking the equity of vaccine administration.

The efficacy of clearly communicated equity missions and goals was ranked at a 3.86/5 by survey respondents. Respondents ranked the plan's success at supporting equity also at a 3.86.



4.1.3 Constant Translation of Materials into Multiple Languages

As part of the effort to promote health equity, vaccine outreach materials were translated into multiple languages whenever possible. The translation of vaccination materials was mentioned repeatedly during engagement activities. CCD made a concerted effort to translate a span of materials into approximately thirteen different languages (per reports), and an ASL interpreter was present at every press conference. Staff put significant effort into working with community partners to ensure that messaging was tailored to each community.

2 This shape explains Denver's past, present and likely its future - Denverite, the Denver site!

4.1.4 Critical and Successful Mobile Vaccination Team

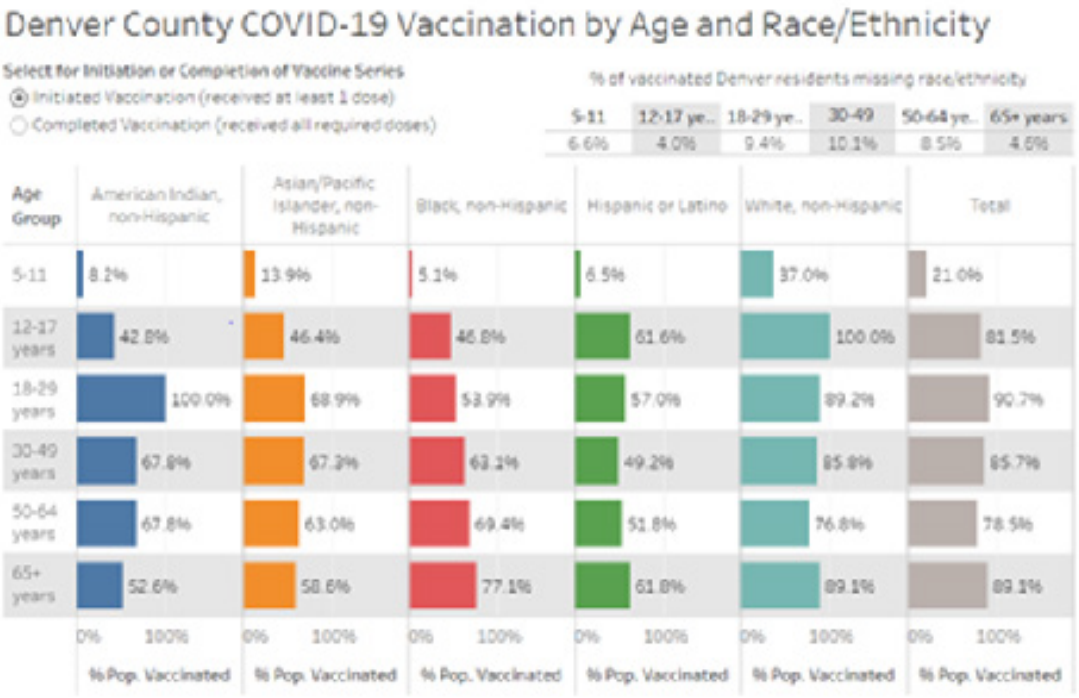
MVTs were a critical strategy for meeting vaccination goals, particularly for hard-to-reach communities. Outreach for MVTs operations was successful. Moving operations to 'where people are,' rather than at a centralized site was a key strategy for overall vaccination program success.

4.2 Areas for Improvement

4.2.1 External Obstacles to Equitable Outcomes

The engagement activities found that "equity goals were a valiant effort, but [there is] lots of room for improvement." CCD did not have control over the scarcity of vaccines at the beginning of distribution, which allowed for access inequities to persist. Tactics like translation and strategic locations operationally help make vaccines accessible, but that cannot always combat vaccine hesitancy. Furthermore, the State could countermand any CCD equity initiatives. One notable example is the CCD plan for vaccinating shelter guests that was re-routed entirely by the State. The graph below shows the disparities between racial groups in Denver. Workbook: Denver COVID-19 Data Summary (tableau.com).

A survey respondent stated, "Collaboration with external partners was critical for implementing vaccine equity efforts."



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4.2.2 Limitations to Equity Tactics

Internally, CCD staff felt that plans were subject to shortfalls in relation to equity. Although equity objectives were established as vaccination efforts progressed, engagement activity participants expressed that they were not aware of an internal definition of equity or any key performance indicators for achieving it. Below is an example of these objectives and how they were measured, as seen in the EOC Action Plan from April 26,2021.

Current Status: 93.2%

COMPLETED VACCINES VERSUS TARGET, OVERALL AND BY GROUP

Group	Current Status % Completed Vaccination	6/1/21 Target 60% Denver Pop. 40% by Group	9/1/21 Target 70% Denver Pop. 50% by Group	1/1/22 Target 75% Denver Pop. 65% by Group
Total Denver Pop.	37.2%	No	No	No
16-17	6.7%	No	No	No
18-29	25.5%	No	No	No
30-39	35.3%	No	No	No
40-49	29.5%	No	No	No
50-59	36.4%	No	No	No
60-64	48.8%	Yes	No	No
65-69	60.8%	Yes	Yes	No
70+	71.1%	Yes	Yes	Yes
American Indian	27.6%	No	No	No
Asian/PI	26.3%	No	No	No
Black	23.2%	No	No	No
Hispanic or Latinx	15.4%	No	No	No
White	41.2%	Yes	No	No

The Denver Assessment found that issues outside of CCD's purview may have affected their ability to meet stated equity goals. Wage theft, abusive employers, no paid time off to quarantine/isolate, get tested, get vaccinated, or rest from the side effects all play into inequitable vaccine uptake rates.

4.2.3 Low Morale Surrounding Equity Tactics

Reports depicted equity tactics as "...very aspirational in nature, as opposed to something tangible we could [...] deliver on." Another participant indicated, "To be honest much of what we did seemed performative - like we were checking a box but not thinking through the products thoughtfully." The Equity Review in the EOC action plan was for being a box-checking initiative with few mechanisms of reinforcement. Teams relied on a limited number of subject matter experts (i.e., equity officers couldn't be in every meeting), and knowledge from staff turnover could be an impediment.

4.2.4 Deficient Solutions to Systemic Inequities

The vaccination plan could not have rectified larger systemic inequities, but measures to circumnavigate

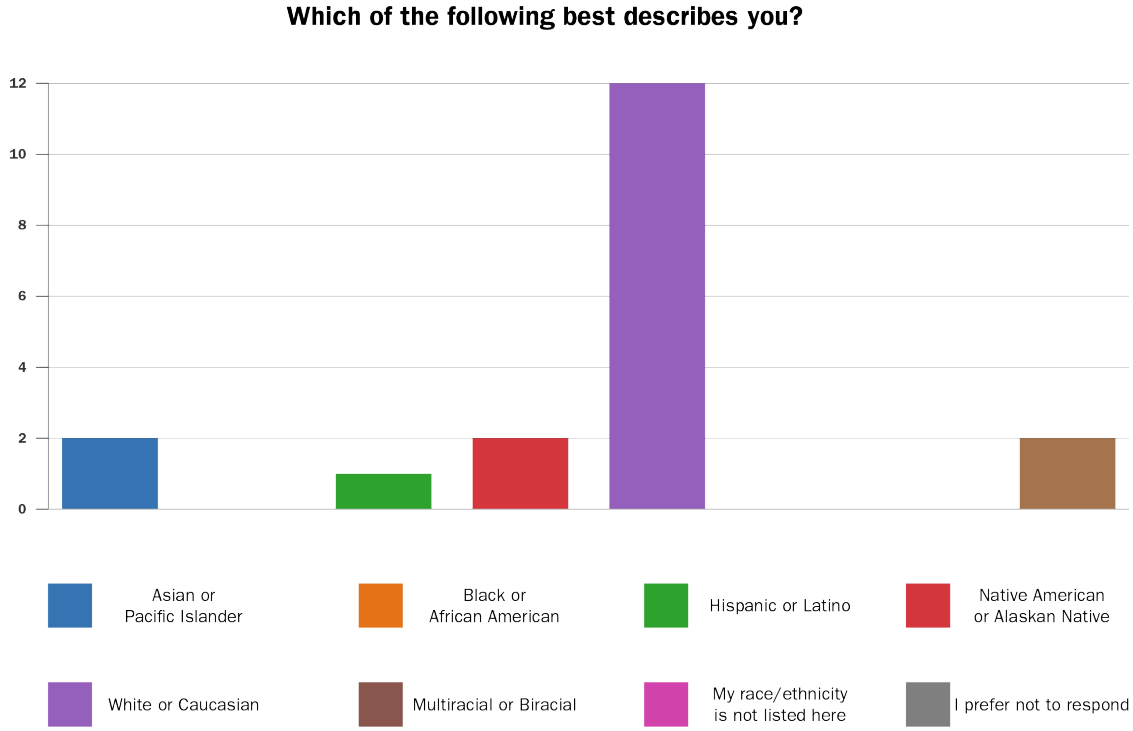
them were not a definitive success. Some residents did not have transportation to the mass vaccination sites. Some lower income and/or elderly residents did not have the internet access to register for the vaccine. The Denver Assessment conducted by a program of the Public Health Institute at Denver Health, found that non- English-speaking residents would have had to be able to navigate the internet in English to find translated registration platforms. This same assessment found that language-specific phone lines asked lots of personal questions, which deterred anyone worried about their status, or that of someone close to them, from pursuing vaccination. CCD staff tried to circumvent the problems of larger vaccine sites by embedding smaller ones in targeted neighborhoods. A unique infrastructure challenge to be noted is the East Colfax neighborhood. That zone had little to no libraries, recreation centers, firehouses, etc. which could provide the necessary resources to establish a site. Another issue that characterized mass vaccination sites was resources being swiped by unintended audiences. One engagement activity participant noted "Mega sites – Ball Arena – [were] amazing [and] knocked through supply the City couldn't have. A lot of the people getting the shots were not from Denver, Less than 50% Denverites." Some residents would benefit from sites intended for vulnerable populations. However, if the JIC did not advertise an equity site, "no one would know about them".

4.2.5 Compromising Translations of Materials

Constant translations of materials were lauded as a social justice cornerstone of the vaccine roll-out; however, translations were not necessarily consistent. Each time a public health order changed, a draft had to be edited and then translated, causing delays. CCD staff had to decide whether to release the English version of the public health orders immediately or release all translated versions 48 hours later. Even when translations were provided, they were often in need of editing; and staff lacked language services and speakers to correct errors. In some cases, they relied on community partners to translate materials. In The Denver Assessment, residents expressed that "translated" does not equate to "trusted" and literal translations do not always convey the same meaning.

4.2.6 Emerging Relationships

Arguably, reaching equity goals could have been more efficient if certain CCD relationships had been stronger. Chief among these relationships was that of community partnerships. CCD spent valuable time establishing the necessary connections with target communities. Establishing relationships, trust, and rapport with key community groups in advance of a response activation could have yielded a higher return on investment than buying ads or going door to door. These relationships could have mitigated vaccine hesitancy, or privacy concerns expressed by vulnerable populations. There was a specific call amongst engagement activity participants for authentic, sustained, homegrown connections, not transactional relationships. Survey resultsl, as shown below, back this assertion that staff may not have the diversity needed for truly equitable outcomes.



Anonymous workshop participant stated: "COVID really highlighted inequities in housing, health, education, how do we address them with the community and not to the community."

Another stated: "We are at a disadvantage, because like most agencies, we are not staffed by people from these disadvantaged communities. It's an issue in the State in general. We were making uneducated guesses without a more diverse staffing pool."

4.3 Priority Recommendations for Meeting Health Equity Objectives

4.3.1 Enhance CCD's Capacity to Reach Vulnerable and Minority Populations

Procure a marketing consultant that specialize in outreach to hard-to-reach populations or convene a working group of the JIC that specializes in communications to vulnerable populations. This division must focus on 'pushing' information to those communities proactively.

4.3.2 Consider Developing a Neighborhood Ambassador Certification Program.

The Neighborhood Ambassador Program can engage neighborhood leaders before an emergency, to train them in specific, limited EOC functions or response needs. These individuals will help broker trust between CCD staff and residents and facilitate operations within key geographic areas.

4.3.3 Conduct a Non-Emergency Vulnerability Assessment

There are several tools that help us to better understand what populations or neighborhoods are most vulnerable during an emergency. Completing demographic studies using these tools during Blue Skies will better support equity objectives during response planning. Some of these tools include the CDC's Social Vulnerability Index which is a location-specific assessment that utilizes 29 socioeconomic variables that contribute to a community's vulnerability to disaster. The USDA's Food Access Research Access can also be used to identify geographic areas where that have been underserved by commercial grocers. This metric may serve as a good indicator for a community's resource accessibility.

Vaccine eligibility was not decided by the City and County of Denver, but an external analysis conducted by doctors at Denver Public Health (now the Public Health Institute at Denver Health) suggests an age-based roll-out may not have been equitable. The life expectancy for non-Whites is negatively affected by social determinants of health (access to healthcare, comorbidities, etc.). Therefore, delineating people aged sixty-five and older are eligible for vaccination further exacerbated health inequities based on the evidence of the increased vulnerability of Black and Indigenous People of Color (BIPOC) communities.

5. State Coordination

This section is dedicated to evaluating the partnership between the State and CCD, providing observations on the strengths of the partnership and opportunities for improvement.

5.1 Strengths

5.1.1 Productive Relationship Between State and City and County of Denver

The State supported CCD through the provision of political advocacy, subject-matter expertise, and technical support. That sentiment was echoed regularly by engagement activity participants, who asserted the State advocated for CCD and its residents in obtaining FEMA funding and was helpful in providing planning and logistics support for the large, mass-vaccination sites for resident access.

For subject-matter expertise, CCD leadership had weekly access to State public health to seek guidance on response strategies, as well as a regular cadence of meetings to discuss progress of the vaccination roll-out. The State served as a network partner to forge new partnerships, for example, in connecting CCD to 9Health and Safeway for community vaccination sites.

Furthermore, the State was a great data partner to CCD by sharing datasets and providing technical expertise on data analysis and interpretation.

5.1.2 Continued Improvement of Relationships

The relationship between the CCD and the State continued to improve over time, aided by a philosophical alignment on issues like equity and a willingness to improve processes. As the activation continued, communication streamlined. Coordination around vaccination sites also improved as time went on.

5.2 Area for Improvement

5.2.1 Challenging Vaccine Supply

Phase 1 of COVID-19 management, the testing and initial response phase, was locally driven. Phase 2 however was dictated by the State of Colorado. Although CCD pushed for local control, ultimately, they were forced to shift their paradigm to adhere to State guidance. Accessing vaccine supplies was unpredictable as the State controlled the distribution of needed supplies. Guidance from the State on how to administer the limited supply was vague and constantly changing. There were inefficiencies in how the vaccine could be administered. While in some cases, protocols permitted staff to administer extra doses to individuals who were not presently eligible in order to prevent waste (e.g., doses remaining at the close of business), CCD could not administer vaccines to readily available recipients if they were not in eligibility parameters, for fear of losing vaccine supply. Some staff found this practice a waste of lifesaving opportunities. "You could have a 69-year-old person in your vaccine site, but if the guidance said 70, you had to turn them away. Which means you then must go back to get the next wave – and you lose people that way. Even if you have the people and the vaccination supply because the State could pull your vaccine." If CCD was too judicious with their adherence to phases, and there were vaccines left over, the State would cut down their vaccine supply. The vaccine supply was diminished when CCD was moving forward with community outreach. The State threatened to take vaccine supply if CCD did not adhere strictly to the phased approach. Moreover, State guidance neglected entire sectors or allowed certain sectors to get vaccinated disregarding their own phased approach guidance. For example, Xcel Energy workers were not considered as frontline workers and had to vaccinate their employees in another State to protect their frontline workers. Another example was a beverage company was allowed to vaccinate their employees while Denver Water employees were denied the opportunity.

5.2.2 Delayed Communication and Information

The disconnect between the State and the CCD was distinctly felt in communications and information. It was unclear to CCD staff what constituted an essential employee, sewing discord in administering vaccines to front-line workers. Although there were weekly State calls, frequent emails, and mirroring of State communication, the Governor's Office remained unpredictable, often holding press conferences to announce major policy shifts without alerting CCD first. Field locations learned of directives through the media before it reached them using EOC channels of communication. It was a continual challenge to interpret messages from the State (with counties each having their own interpretation) and update communication channels accordingly. Such discrepancies resulted in a significant increase in phone calls from the public asking for clarification.

5.2.3 Inflexible Coordination with the City

CCD plans could be re-routed with interference from the State. The State initially preferred large, drive-through sites such as the Ball Arena. The CCD favored smaller points of distribution and leveraging the existing healthcare infrastructure. While great numbers of individuals can be vaccinated at the Ball Arena, vulnerable populations, who often have limited access to transportation or web access, are better served by smaller, strategically placed vaccination sites. To ensure a steady supply of vaccine, CCD was compelled to allocate resources for a combination of site types to align with the State. Engagement participants noted the State's tendency to work in a silo, sometimes duplicating efforts and confusing partners, who sometimes did not know if they were working with the State or CCD. An example of this discord was the vaccination plan for individuals experiencing homelessness. CCD spent time and resources deciding between the benefit of the one-shot Johnson & Johnson vaccine and the less controversial Moderna or Pfizer when the State intervened and re-routed the plan.

5.2.4 Conflicting Political Influence

Participants reported that CCD's priority neighborhoods for vaccine sites sometimes conflicted with guidance provided by the State. At least one staff member reported that CCD's planned vaccine sites were relocated based on the direction of State elected officials, without data to support the site selection. At times, these location selections appeared politically motivated and could not be supported by the data. Staff reported that it sometimes appeared that decisions were made by "a small group of State executives", with some disconnect between public health recommendations.

5.2.5 Misleading Information Led to Public Mistrust

Unpredictable and contradictory State actions had public repercussions for all government agencies. For instance, CCD received mission requests for sites that were managed by the State. They would also receive inquiries or complaints from the public on those same State-run sites, and it reflected poorly on CCD when they couldn't resolve these issues.

One participant noted, "Most people are not willling to make a distinction between City, County, and State - all are "the government" to the public."

5.3 Priority Recommendations for State Coordination

See recommendation 3.3.2: EXPAND THE LOGISTICS SECTION & INCREASE TRAININGS. An Expanded Logistics Section will help build relationships and rapport with State Partners, and plan for response, scarce resources, supply chain, and other logistics issues during emergency and non-emergency periods.

6. Local & Regional Collaboration

Local and regional collaboration was mentioned across the board in engagement activities, warranting its own section dedicated to evaluating such partnerships.

6.1 Strengths

6.1.1 Successful Partnership with Denver Housing Authority (DHA) and Department of Housing Stability (HOST)

Denver Housing Authority and Department of Housing Stability had previously established relationships with community members and other partners that were able to be leveraged for the vaccination program. The partnership with DHA contributed to successful vaccinations for those individuals housed in DHA facilities while HOST assisted with vaccinating the population experiencing homelessness. These partnerships assisted with staffing shortfalls at shelters, wherein DHA and HOST staff, rather than EOC staff, filled staffing needs.

6.1.2 Strong and Diverse Community Collaboration

Although community partnerships took time to build, CCD was able to collaborate with a diverse group of community organizations, from small grassroots neighborhood groups to larger not-for-profits in the community. COVIDCheck Colorado was identified as a successful partnership. Additionally, CCD utilized its own internal City agency, Human Rights and Community Partnerships (HRCP) to assist with leveraging and coordinating with external organization. Leveraging formal, and informal community liaisons was an integral component of reaching hard-to-reach community members. Additionally, CCD and its community organizations were able to co-sign letters to the Governor in order to show their mutual agreement and suggestions for action.

6.1.3 Centralized Coordination in EOC and Mayor's Office

The centralized power within the Mayor's Office allowed for quick decision making, despite the multitude of stakeholders that could have delayed the process. The Mayor's Office and EOC remained in direct, consistent communication throughout the operation. At the start of the activation, the EOC Director was the Mayor's Chief of Staff, but then transitioned to the Deputy Chief of Staff for most of the response.

6.1.4 Strategic Denver Agency Participation in Programs

To maintain quality and efficacy of existing operations and programs, CCD limited the number of programs it engaged in. One example of this engagement was the hospitality employee campaign. However, some engagement participants felt that some of decisions on what programs to engage in were not necessarily or obviously data driven.

6.2 Areas for Improvement

6.2.1 Unclear Role of City Council within EOC Operations

City Council members became engaged in vaccine site planning and operations, but their specific role, limits of their authority, and how to best leverage their unique positions within the response structure was unclear. Staff noted that in limited circumstances, Council and the EOC messaging were in conflict, specifically while vaccines were in short supply and consistent messaging around eligibility was imperative. Staff struggled to know how to appropriately engage council in either providing information or in seeking consultation. Councils' relationship with the EOC was not clear to everyone, and the State and Council would communicate without EOC involvement. Council's needs and expectations for data and reports were initially undefined, though a weekly cadence for reporting was eventually developed.

6.2.2 Lack of Compensation for Grassroots & Community Groups' Efforts

Local grassroots & community groups held an important role within vaccine operations; however, their efforts were uncompensated due to inflexible financial rules that prevented, therefore, were expected without financial compensation or reimbursement.

6.2.3 Tenuous Rapport between Agency Leadership & Elected Officials

Elected officials and Agency Department Heads did not have a solid foundation of rapport prior to this activation, hindering communications.

6.3 Priority Recommendations for Local and Regional Collaboration

6.3.1 Convene Executive Policy Group to Drive Leader's Intent during Activation

The Executive Policy Group should contain the Mayor's Office and Department Leads to help ensure that directives are de-conflicted across departments, and that information flows 'up' from operations to decision makers from the Department heads.

6.3.2 Consider Formalizing Processes to Financially Compensate Community Groups

Community groups may be reimbursed for their rime spent on response activities via Mutual Aid Agreements (MAA) established during non-emergency periods. The MAA should specify the specific services the organization will provide (Scope of Work, SOW) the limits of the work, triggers for services, expectations for how the group will track their efforts and costs, and directions for how the group should submit invoices to CCD for reimbursement. MAA can be templated during on-emergency periods, with SOWs established when the need is identified.

7. City Financial, Procurement, and Contracting Processes

Engagement activity participants were asked to describe the successes and areas for improvement in the ability for the City's Financial, Procurement, and Contracting processes to manage the vaccine roll-out. Questions were asked around the clarity of procedures and the efficiency.

7.1 Strengths

7.1.1 Regular Guidance and Reminders from Finance

The majority of City staff who collaborated with Finance and/or Procurement reported positively, indicating that they received regular correspondence with regulatory guidance and deadline reminders. Survey responses indicated that Finance representatives were included in their team or workflows, so that Finance/Procurement was not an obstacle to vaccine roll-out. Contracts for printing were fast and sending task orders/purchase orders through the printing contracts were easy.

7.2 Areas for Improvement

7.2.1 Unclear Funding Sources

Vaccination expenses were not clearly tied to an originating funding source, making it unclear if the potential funder was FEMA PA, COVID-19 Relief Funds (CRF), or general fund. Corresponding eligibility of expenses under each funding source was not always clear.

7.2.2 Insufficient "Non-Emergency" Contracts to Meet Response

Existing contracts were insufficient to accommodate needed supplies & services, particularly regarding Marketing and Communications. New procurements were necessary rather than relying on robust standing contracts; this caused delays in operations. There were insufficient centralized resources (contracts) that agencies could rely on to meet operational needs.

7.2.3 Protracted Procurement Processes

Contracting & procurement processes, Municipal Codes, and State Statutes were not designed for response timelines and caused delays in procuring needed supplies or services necessary for the vaccination program. Alternative procurement pathways resulting from the State of Emergency were not sufficiently expedited (e.g., Staff reported a one-month procurement timeline to contract with EMS for in-home vaccine provision). Existing financial tools for partnering and funding community organizations were not effective (e.g., The EOC wanted to provide a community organization with phones to help register people in their own native language. That organization was asked to pay for those phones and services lines and be reimbursed later).

7.2.4 Insufficient Documentation, Cost Projection, Procurement, and Budgeting

Consistently, documentation of record was inadequate for operations and/or not maintained in real time.

Requirements for documentation or documented processes were ignored or postponed, with the intent to resolve later. These issues were mentioned twice in the engagement activities. “We would do what we needed do, then do the documentation after the fact. We’re the City, we aren’t going to go broke.” “There wasn’t really room for me to turn to the Chief of Staff to tell them there wasn’t funding for that [specific initiative]. We would have to figure out the funding later.” One participant noted that some of their vendors were paid at the end of the activation. Procurement continued despite low fund balances. Staff reported ‘notable challenges’ with developing cost projections for FEMA. There was a reported disconnect between Planning & Finance in coordinating projected costs for future operations. Finance also had difficulty finding document of record, particularly for MVTs.

7.3 Priority Recommendations for City Financial, Procurement, and Contracting Processes

7.3.1 Revise procurement regulations to accommodate expedited emergency procurements

Procurements should remain compliant with all Federal and State regulations including FEMA Public Assistance (PA) requirements, while also reducing administrative burden and time delays.

7.3.2 Increase Non-Emergency Period Procurements of Contingency/On-Call Vendors for Response Logistics

Services, and Surge Support Staff. Many vendor services and supplies can be competitively bid during non-emergency periods and held in an on-call contract for activations.

7.3.3 See Item 3.3.3: Recommendation for a Logistics Center

APPENDIX

APPENDIX 1

Workshop Engagement Activity Questions

Workshop/Survey – Deputies/Assignees (Implement Strategy, 'Means & Modes')

NOTE: All questions to be tailored to the specific mission/goals of each workgroup (I.e., Ops, etc.)

Communications

1. Were mission and goals effectively communicated to your team?
    - Strengths/ Improvement Opportunities?
2. Were roles & responsibilities clear within your team?
    - Between/Across teams?
3. When there were changes in priorities, were they communicated efficiently and effectively?
    - How were they implemented in the operations? Best Practices?
    - Were priorities communicated with adjusted Key Performance Indicators (KPIs)? Metrics for success?

Data Quality, Availability, and Application

1. Quality of Data- Were your data needs met? Data Inputs from your team? Strengths/ Improvement Opportunities?
2. Application of Data- How well was available data used to effectively prioritize resources/ allocations?
3. Data Integrity- How were data used to demonstrate success? Were decisions based on accurate data?

Resources & Assets

1. Did you have the resources you needed to fulfill your mission? Considerations:
    - Expertise
    - Technology
    - Staffing
    - Plans
    - Checklists
2. What other resources would have been helpful to have?

Equity Principles

1. Were Equity missions and goals effectively communicated to your team?
    - Strengths/Needs for Improvement
2. Did the plan's tactics successfully support equity goals? (i.e., language translation, MVT location selection, etc.)

APPENDIX 1

3. Was engagement with community partners effective in meeting equity goals?
    - Why? Opportunities for improvement?

Coordination with the State of Colorado

1. Describe how the partnership and/or coordination with the State worked.
2. What obstacles did you encounter?
3. In what ways was the State successful in supporting Denver's operations?

EOC Processes

1. Regarding the Emergency Operation Center processes, were the EOC and Vaccination plans effective when coordinating the vaccine roll-out?
2. Are there any suggested improvements for the plans?

Financial Operations

1. Were the City's financial, procurement, and contracting processes for managing the vaccination response clear and efficient?
2. Please describe successes and challenges.

Best Practices

1. Concerning your role in the vaccination roll-out, are there any additional best practices or areas of improvement you would like to share?

APPENDIX 2

Survey Engagement Activity Data

COVID-19 Phase 2 After Action Report Survey

Please complete this 17 question survey to assess the performance of the vaccine roll-out plan. This should take no more than 15 minutes. * Required

1. What is/was your role during the allocation, staging, distribution, and administration of COVID-19 vaccine? You may select more than one descriptor.

☐ Leadership
☐ Management
☐ Staff
☐ Related-stakeholder
☐ Emergency Operation Center
☐ Public Health and Environment Departmental Operations Center
☐ Joint Information Center
☐ Other

2. If you selected "Emergency Operation Center" in the above section, please indicate your section below.

☐ Management Section
☐ Planning Section
☐ Operations Section
☐ Logistics Section
☐ Finance Section
☐ Information Section
☐ Liaison Section
☐ Not applicable to me

3. If you selected "other" in question 1, please describe your role here.

APPENDIX 2

4. Which of the following best describes you?
☐ Asian or Pacific Islander
☐ Black or African American
☐ Hispanic or Latino
☐ Native American or Alaskan Native
☐ White or Caucasian
☐ Multiracial or Biracial
☐ My race/ethnicity not listed here
☐ I prefer not to respond

5. Were mission and goals effectively communicated to your team? Please rank the efficacy using the 1-5 scale below, 1 being not at all communicated, 5 being perfectly communicated.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6. Were roles and responsibilities clear within your team? Please rank the clarity using the 1-5 scale below, 1 being not at all clear, 5 being perfectly clear.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

7. When there were changes in priorities, were they communicated efficiently and effectively? Please rank the communication using the 1-5 scale below, 1 being not communicated at all, 5 being perfectly communicated.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

8. Overall, were your data needs met? Please rank the quality of data using the 1-5 scale below, 1 being that your needs were not met at all by the data provided and 5 being that your needs were sufficiently met.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

9. How well was available data used to effectively prioritize resources/allocations? Please rank the efficacy using the 1-5 scale below, 1 being ineffective and 5 being very effective.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

APPENDIX 2

10. Overall, how would you rank the integrity of the data? Please rank the integrity of the data using the 1-5 scale below, 1 being the data was compromised and 5 being the integrity of the data was accurate.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

11. Overall, did you have the resources you needed to fulfill your mission? Please consider expertise, technology, staffing, plans, checklists, and anything else that comes to mind.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

12. Were the equity missions and goals effectively communicated to your team? Please rank the efficacy using the 1-5 scale below, 1 being not communicated at all and 5 being perfectly communicated.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

13. Did the plan's tactics successfully support the equity goals? Please rank the success using the 1-5 scale below, 1 being the tactics failed to support equity goals and 5 being the tactics achieved equity, according to the set goals.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

14. Was engagement with community partners effective in meeting equity goals? Please rank the efficacy using the 1-5 scale below, 1 being ineffective and 5 being very effective.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

15. What went well in implementing the tactics supporting the equity goals? What opportunities are there for improvement?

APPENDIX 2

16. Describe how the partnership and/or coordination with the State worked. What obstacles did you encounter? In what ways was the State successful in supporting Denver's operations?

17. Regarding the Emergency Operation Center processes, were the EOC and vaccination plans effective when coordinating the vaccine roll-out? Are there any suggested improvements for the plans?

18. Were the City's financial, procurement, and contracting processes for managing the vaccination response clear and efficient? Please describe successes and challenges.

19. Concerning your role in the vaccination roll-out, are there any additional best practices or areas of improvement you would like to share?

APPENDIX 3

Interview Engagement Activity Questions

City and County of Denver
COVID-19 Vaccine After Action Review
DRAFT Interview Questions
One-on-One Interviews (Set Strategy/ Develop Intent)

1. Regarding Collaborating with the State: What were the key challenges in coordination? What aspects were successful?

2. Did you seek lessons learned and advice from outside jurisdictions (other cities, states, etc)? Was that effective?

3. Regarding coordinating with local elected officials, what challenges did you experience? Corrections for the future? What aspects were successful?

4. Regarding the Emergency Operation Center processes, were the EOC and Vaccination plans effective when coordinating the vaccine roll-out? Are there any suggested improvements for the plans?

5. From an Equity perspective to what extent were Community Partnerships effective in achieving equity goals?
   a. Did Community Partners play an appropriate role in planning and decision making?
   b. Best Practices in that collaboration?

6. Were historical data and plans helpful at all? (i.e., Avian Flu pandemic plans, H1N1)

7. Data-Driven Decision Making
   a. Did we hit the mark on making data-based decisions?
   b. What could have been improved?
   c. Best practices and pitfalls in filtering out 'the noise' and disagreements?
   d. Was integrity of data (mode of presentation) ever a concern?

8. Regarding Public Information, were we successful in creating unified messages? (Why? Opportunities for Improvement?)
   a. How successful were the different sections of the EOC in coordinating information through JIC?
   b. Best Practices and Pitfalls for Public Information?

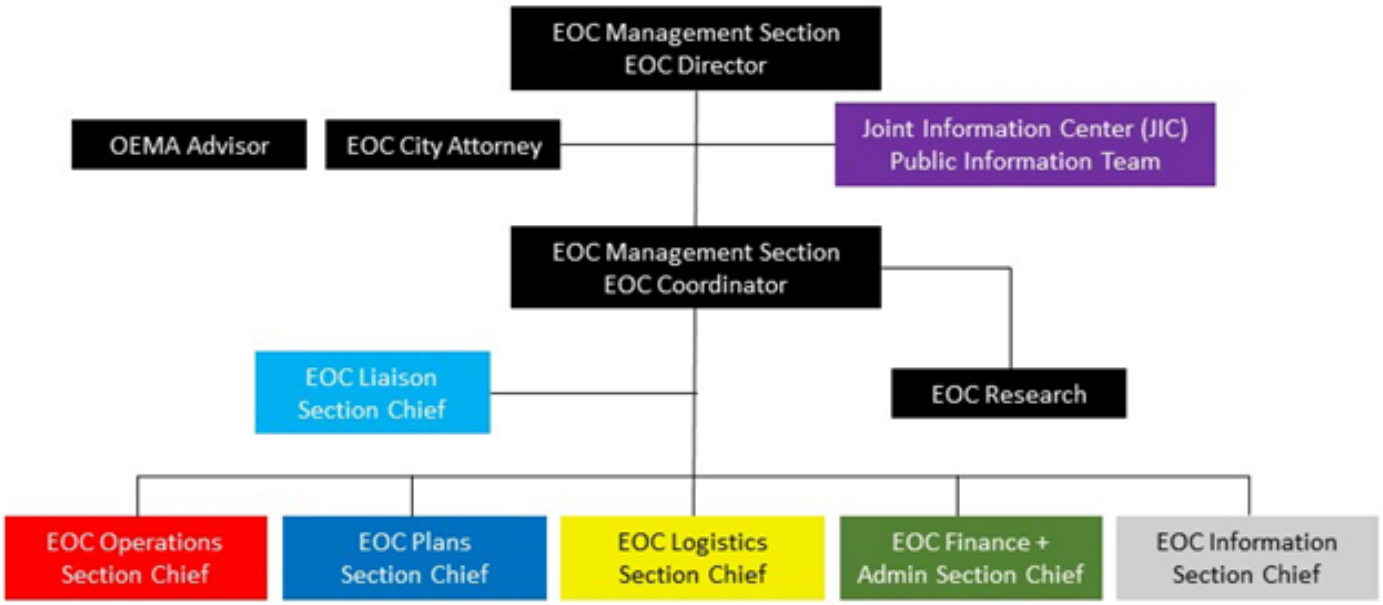
APPENDIX 3

9. How effective was the City's translation and public information process in ensuring public messaging of vaccine information to non-English speakers?

10. Concerning your role in the vaccination roll-out, are there any additional best practices or areas of improvement you would like to share?

APPENDIX 4

EOC Structure



APPENDIX 5

The Denver Assessment Preliminary Findings

Sullivan & Co.

COVID-19 & The Denver Community

Key Findings for The Denver Assessment

Equity Concerns for Vaccine Rollout		
Topic	Issue	Recommendations
Translations	Vaccine registration was in English. Translated versions were difficult to find for someone who cannot navigate a website in English. Translation isn't a silver bullet. Just because it's translated doesn't mean it's trusted and straight translations don't always convey the same meaning.	Language specific links to translated material need to appear within the first 30 seconds of a visitor's experience, if web-based options are a must. Leverage trusted community sources to disseminate information. Broaden rapid translation contracts and community partnerships to vet quality of translation in a short amount of time.
Deterrents to Using Resources	Language specific phone lines (ex: Spanish) asked lots of personal questions, which deterred anyone worried about their status, or worried about someone close to them, from pursuing vaccination or testing. The hours of some vaccine sites and testing sites were not accommodating to many essential employees that work odd hours.	At Home Rapid Test could be a powerful tactic in circumventing deterrents, but many Denverites felt that you needed to speak English and have the ability to navigate the internet to be able to receive an At Home Rapid Test. Reconsider how many data points are necessary for certain demographics already reluctant to seek care. Consider extending vaccine and testing at workplaces or offering more time slot options throughout the day. Or evening.

APPENDIX 5

Sullivan & Co.

COVID-19 & The Denver Community

Key Findings for The Denver Assessment Continued

Equity Concerns for Vaccine Rollout		
Topic	Issue	Recommendations
Invisibility	Many non-white residents felt invisible; their multiple competing priorities with limited resources to work with precluded them from COVID-19 information and resources. The pressure on individuals to combat COVID-19 is intense, but not on employers. Wage theft, abusive employers, no PTO to quarantine/isolate, get tested, get vaccinated, or rest from the side effects all appear to be invisible barriers to actions, not addressed in mainstream information about COVID-19.	Best practice would be to put information and resources in the way of residents' daily trajectory. Resources to incentivize employers and inversely, repercussions for abusive employers need to be in place to properly combat COVID-19.
Institutional Trauma	The word of mouth is king in BIPOC communities, as trust is placed in known entities and individuals, not institutions that have been responsible for trauma and abuse in the past. A good experience had by a trusted person is worth way more than medical facts. Likewise, one bad experience had by an acquaintance can outweigh compelling statistics of positive outcomes. State and City institutions operating in a vacuum to make decisions for BIPOC communities breeds mistrust. No matter how well-planned the initiative, it will be dismissed as a White Savior narrative.	Maintain authentic relationships with community partnerships, and apply a marketing and branding focus on improving customer experience of historically underserved Denver residents Invite community partners to the table at the decisions-making level.

APPENDIX 6

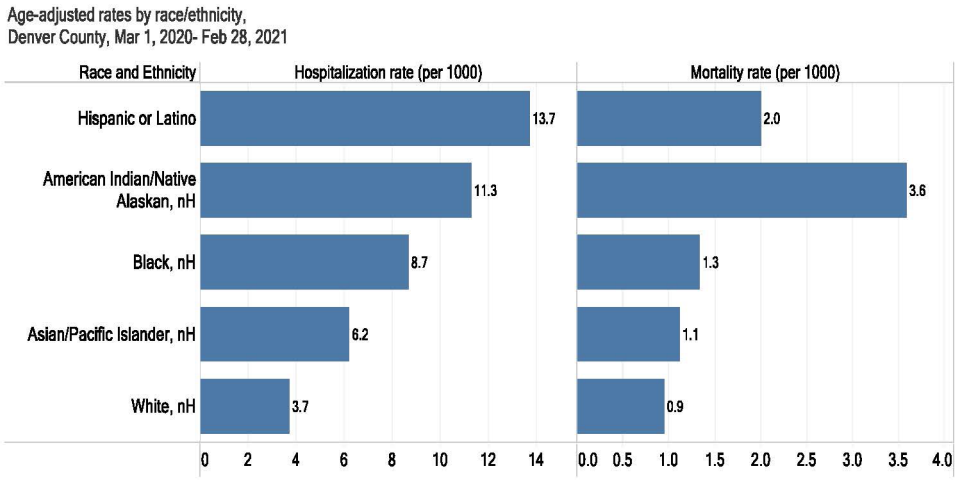
COVID-19 Age-Related Analyses

COVID-19 Age-related analyses, Denver Colorado

Denver Public Health

March 1, 2020-February 28, 2021

COVID-19 Age-adjusted rates among adults by race/ethnicity

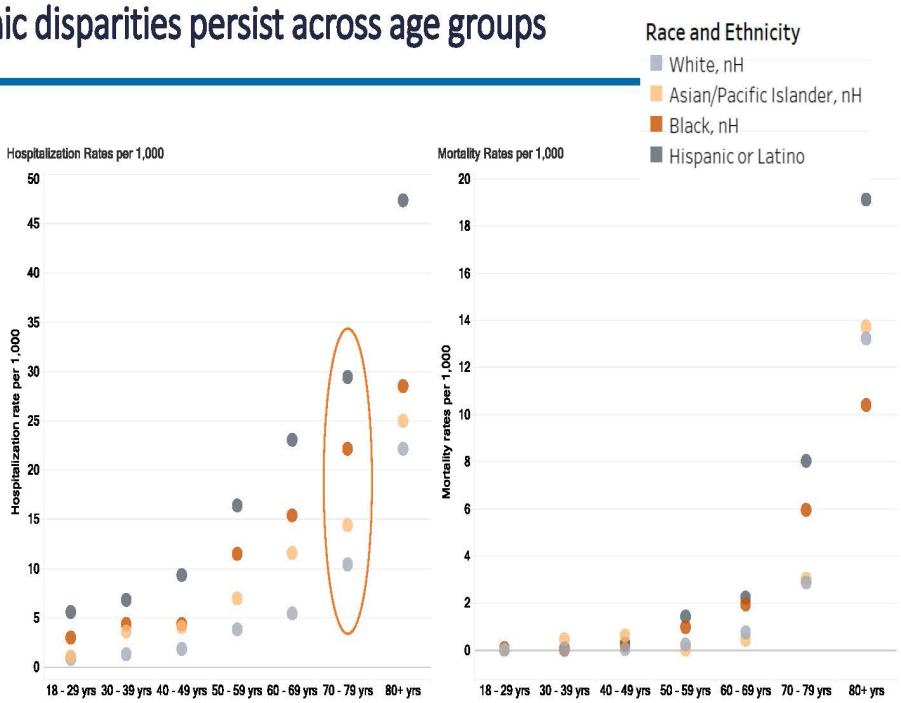


Direct standardization with 2000 US Standard Population and the following age groupings: 18-29, 30-39, 40-49, ... 80+).
Source: Denver Public Health COVID-19 Surveillance System lab-confirmed case data, March 1, 2020-Feb 28, 2021; Population data: Department of Local Affairs (DOLA)

DENVER PUBLIC HEALTH

APPENDIX 6

Racial/ethnic disparities persist across age groups

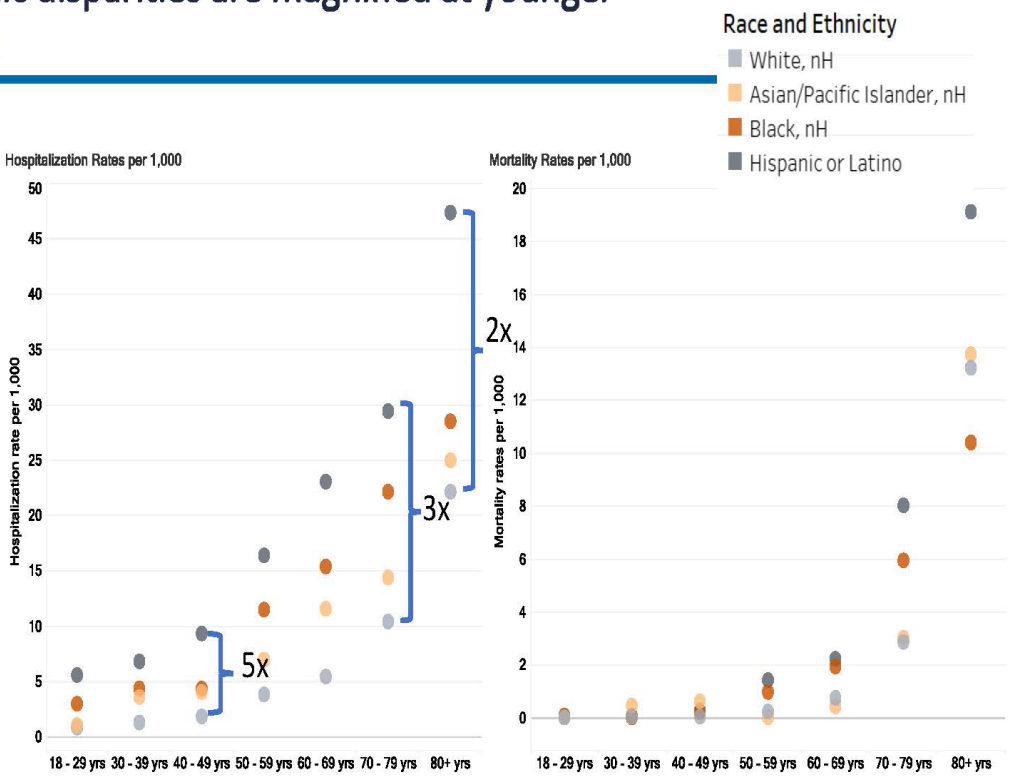


Source: Denver Public Health COVID-19 Surveillance System lab-confirmed case data, March 1, 2020-Feb 28, 2021
Population data: Department of Local Affairs (DOLA)

DENVER PUBLIC HEALTH

APPENDIX 6

Racial/ethnic disparities are magnified at younger age groups



Source: Denver Public Health COVID-19 Surveillance System lab-confirmed case data, March 1, 2020-Feb 28, 2021
Population data: Department of Local Affairs (DOLA)

DENVER PUBLIC HEALTH

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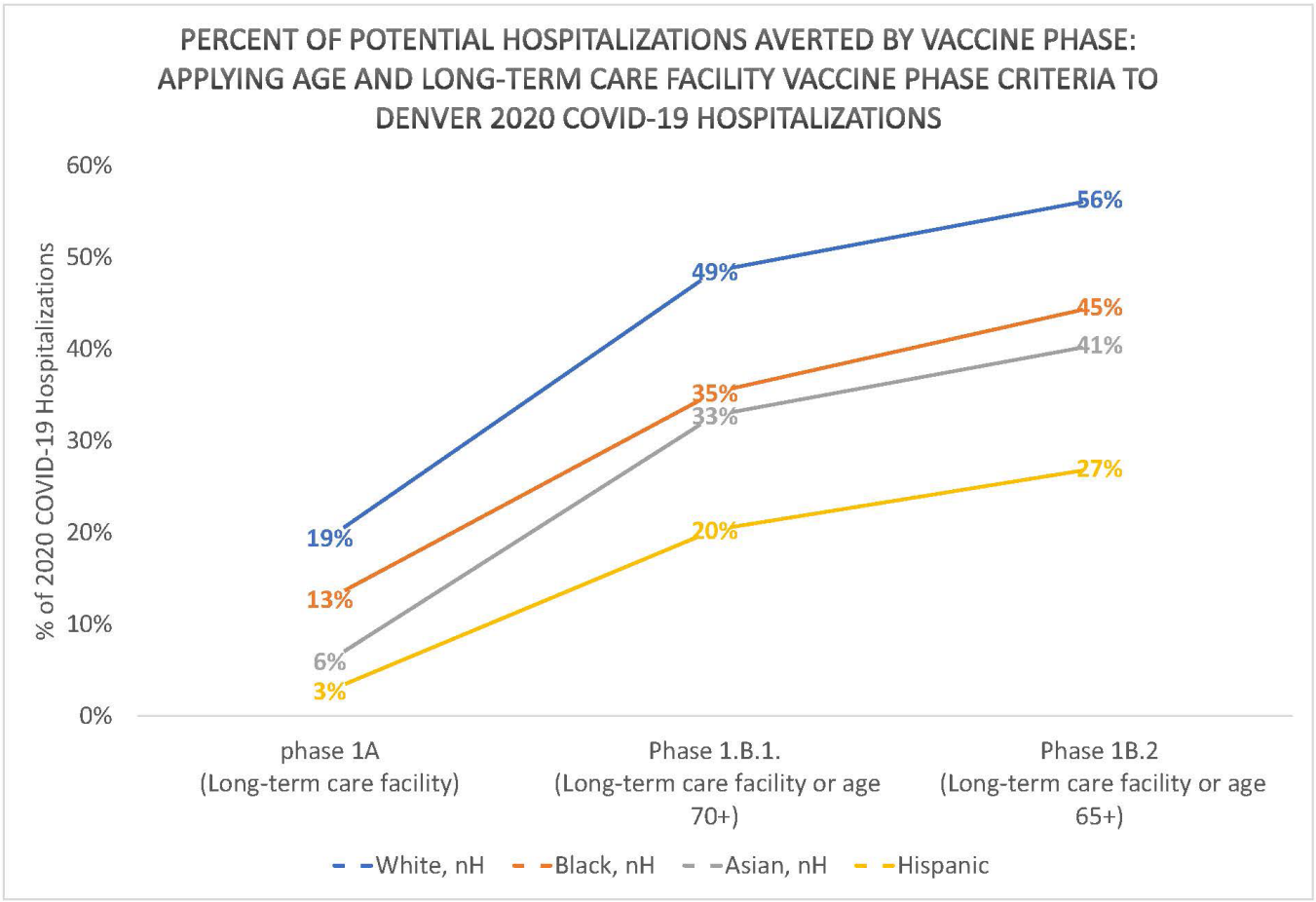
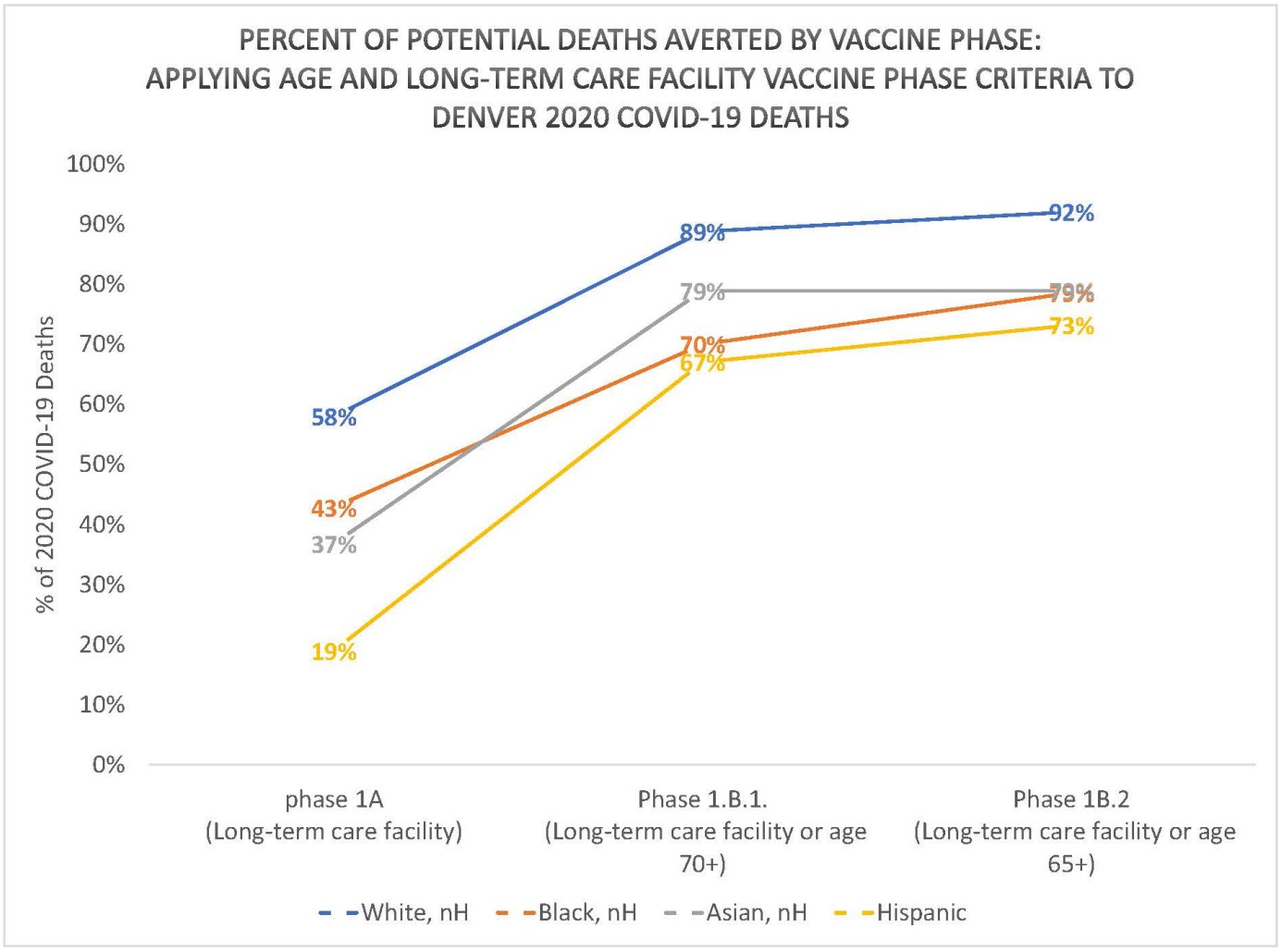

PERCENT OF POTENTIAL HOSPITALIZATIONS AVERTED BY VACCINE PHASE: APPLYING AGE AND LONG-TERM CARE FACILITY VACCINE PHASE CRITERIA TO DENVER 2020 COVID-19 HOSPITALIZATIONS
% of 2020 COVID-19 Hospitalizations
60%
50%
40%
30%
20%
10%
0%
19%
13%
6%
3%
49%
35%
33%
20%
56%
45%
41%
27%
phase 1A (Long-term care facility)
Phase 1.B.1. (Long-term care facility or age 70+)
Phase 1B.2 (Long-term care facility or age 65+)
White, nH
Black, nH
Asian, nH
Hispanic

APPENDIX 6


PERCENT OF POTENTIAL DEATHS AVERTED BY VACCINE PHASE:
APPLYING AGE AND LONG-TERM CARE FACILITY VACCINE PHASE CRITERIA TO
DENVER 2020 COVID-19 DEATHS
% of 2020 COVID-19 Deaths
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
58%
89%
92%
43%
70%
79%
37%
79%
67%
73%
19%
phase 1A
(Long-term care facility)
Phase 1.B.1.
(Long-term care facility or age 70+)
Phase 1B.2
(Long-term care facility or age 65+)
White, nH
Black, nH
Asian, nH
Hispanic

APPENDIX 7

COVID-19 Phase 2 After Action Report Survey(1-19)

ID	Overall, did you have the resources you needed to fulfill your mission? Please consider expertise, technology, staffing, plans, checklists and anything else that comes to mind.	What went well in implementing the tactics supporting the equity goals? What opportunities are their for improvement?	Describe how the partnership and/or coordination with the State worked. What obstacles did you encounter? In what ways was the State successful in supporting Denver's operations?	Regarding the Emergency Operation Center processes, were the EOC and vaccination plans effective when coordinating the vaccine rollout? Are there any suggested improvements for the plans?	Were the City's financial, procurement, and contracting processes for managing the vaccination response clear and efficient? Please describe successes and challenges.	Concerning your role in the vaccination rollout, are there any additional best practices or areas of improvement you would like to share?
2	Yes, I had the resources needed to fulfill the mission but what was missing was a clear understanding of why the EOC was activated and what we were trying to accomplish that wasn't already being handled by DDPHE's DOC and the JIC. It seemed like only the Liaison Branch, DDPHE's DOC and the JIC were needed for the activation since they were the only ones with something to contribute during the meetings.	I felt the tactics were very aspirational in nature as opposed to something tangible we could actually make progress and deliver on in the EOC's capacity.	Challenges existed in data sharing between the state, DDPHE and vaccine administrators.	Again, the objectives of the activation was partially unclear, principally because the EOC/CCD did not have much authority when it came to the rollout plan, which was determined by the state.	n/a to my role	A stronger understanding of the mission and more clearly defined objectives, were needed. The objectives should be things we can actually deliver on or move the needle on as opposed to the very general and aspirational ones that populated the action plan.
3	My impression is that we were slightly under resourced but over achieved in terms of the vaccine equity plan.	Good communication amongst key members in the EOC	n/a	Yes I think the vaccine rollout for equity populations was rolled out smoothly.	Folks with solid knowledge of the city processes were part of the team and that did not prove to be an obstacle to vax rollout	n/a
4	Yes but, receiving data from third party vaccine providers was difficult early on.	Not involved in this activity	Not involved in this activitiy	yes, no other suggestions	Not involved in this activty	Not involved in vaccine rfollout
5	There were some shortages of traffic control personnel, cones, signage, etc. as the State was reaching out to Council members and others in the City to set-up PODs that were not resourced through the EOC. Thus, they came to the EOC late and asked for resources which often weren't available.	Use of mapping and data to identify underserved communities where PODs and clinics were most needed.	State's use of "Community Vaccination Centers or CVCs" was not about addressing equity gaps, but vaccination as many people as possible at sites like the Ball Arena. It was effective, but not in reaching marginalized populations. Also, State's process of circumventing the Denver EOC to go straight to local lawmakers to create pop-up clinics lead to confusion for the public and duplication of efforts.	Mass prophylaxis plans (from DDPHE) existing prior to COVID and more refined COVID specific plans were developed as the vaccine rollout drew near. However, the State's process and how they prioritized who would get vaccine kept changing. Thus, it made it difficult to effectively execute pre-existing plans and forced the EOC and DDPHE DOC to constantly adjust to new guidance and change the plan on the fly.	Source of funds that paid for response unclear. City's emergency reserve process not clear as many vaccine costs were tied back to random agencies that had money in their budgets. What qualified as FEMA PA versus CRF versus Gen Fund was not always clear.	
6	Yes	The equity review in the EOC Action Plan	I didn't have interaction with the State other than trying to put together a presentation for them.	I think the coordination between the vaccination sites, their hours and staffing and where to store and keep track of all that information could have been better coordinated.	I believe so. I wasn't involved with the procurement processes as it related specifically to vaccinations.	None I can think of at this time.
7	Yes	Use of data to drive decisions	Data support was very helpful	Yes. No.	Yes	
8	Did not play a significant role	None noted	No involved	Somewhat, unclear at times what our role was	No involvement	None
9	Yes	N/A	Both the state and city of Denver did an excellent job in response to covid	None	N/A	None
10	Nothing really comes to mind. Thank you.	(You have two typos in this question.) I thought our equity goals were a valiant effort, but lots of room for improvement.t.	N/A in my role	N/A in my role	I think this worked well; for example, getting outside printing done was easy and fast.	From this activation, the city launched a weekly newsletter to about 10,000 subscribers. I think that is a very positive innovation and I hope it evolves and continues.
11	Needed a workstation with a camera and microphone to connect via Teams.	N/A to my position	N/A to my position	Yes.	Yes.	Development and implementation of safety plans is essential to keeping staff safe. Safety Plans were developed and implemented as an afterthought and after possible exposures had occured.
12	Yes	There was no clear definition of what it meant to be "equitable". To be honest much of what we did seemed performative- like we were checking a box but not thinking through the products thoughtfully.	I have no comments	I think it was difficult due to the lack of national coordination. We ran into bumps due to so many third-party partners not talking to each other or not having a single coordinated system. I think that was a disservice to our community.	Yes	We need to have a better understanding of what equitable communication looks like. It can't be just translating press releases or flyers, and we can't rely on third parties to design or draft or communications materials without proper support.
13	yes for the most part. leadership communication was not always done well.	clear focus on equity in the work.	there were challenges with alignment.	The approach was government centric and our work with community could of been better.	Seemed to take a lot of time to get things done.	used evidence practices to administer vaccines.
14	Yes- I was accommodated well and the option was always there to ask for what I needed	I feel like this part of the effort was slightly underbaked. We wanted to be as equitable as possible but I'm not sure we had the data available to really act in the most equitable way, and our staff did its best with what is a pretty homogenous group. Some of the efforts, like extensive translation of some documents, felt like it was done out of good intentions but not necessarily out of a good idea of what the community actually needed.	The only real obstacles I had when dealing with the state were simply that they lacked the resources they needed so their technology wasn't always the best (google docs?!)	I think we executed well given the tools and information we had. Frankly, the federal level interventions were so poor that I feel like we really had to do a lot with a little and we were responsible for carrying out a huge effort that lacked support at state and federal levels.	I felt like it needed to be clarified over and over again who was actually administering the vaccines themselves. Was it pharmacies? Was it HMOs? Was it the state? Was it us? I wish we'd had a clearer sense of the actual logistics that we could present clearly to citizens but that information was always changing.	
15	yes	Equity was sole focus of activation.	I wasn't involved in those discussions so don't know	EOC operations seemed focused on equity areas. Could have used some additional discussion on employee vax events.	yes	
16	Yes.	Community partners were instrumental in success	n/a	Yes	n/a	n/a
17	Yes	The teams got in to the neighborhoods well. Unfortunately not everyone in the neighborhoods were interested in getting the shot.	N/A	The EOC plan for making the vaccines available was great! When the dialogue turned to how to compel people to get the shot, that seems like a violation of civil liberties.	N/A	N/A
18	yes	data to support the efforts from the state and Denver Health.	State and Denver health were great data partners to support testing and vaccine administration	none	I didnt get too involved there	for a long term event, like a pandemic, establishing both long and short term goals with supporting metrics is important
19	Infusion of federal COVID 19 funds was in place and allowed us the freedom to do our work, with fiscal controls always at the forefront.	Collaboration with external partners was critical for implementing vaccine equity efforts.	It was a solid B, support for our plans since they complemented and didn't duplicate the state's efforts.	I think the vaccination plans were well thought out and vetted.	As good as I have seen them.	
20	Responding to staffing requests was a challenge as the plan changed drastically and frequently.	I think anyone who wanted the vaccine was able to get it.	There were times it seemed we were operating at cross purposes.	For the most part, yes.	I had little to do with that side of it.	Solidify the plan prior to having people solve staffing issues that later disappear because the plan changed.