STATE OF OREGON AFTER-ACTION REVIEW OF PERSONAL PROTECTIVE EQUIPMENT FOR COVID-19

SEPTEMBER 2020

FINAL DRAFT

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Executive Summary

This after-action review (AAR) focuses on efforts by the State of Oregon to provide personal protective equipment (PPE) to healthcare providers, essential personnel and vulnerable populations from the beginning of the COVID-19 pandemic through May 31, 2020. The AAR identifies areas of success and opportunities for improvement for Oregon to take proactive action in helping the state better prepared to respond to any event.

Methodology

Information was collected from individuals and organizations identified as stakeholders by the State Resilience Officer. Data gathering methods included a series of online surveys, specific to each stakeholder group that was surveyed, as well as interviews with individuals or small groups, and review of documentation related to the response and recovery operations of this event and previous events. These documents included but were not limited to situation reports, after-action reports, articles, incident action plans, and executive orders.

Preparedness

Several elements stand out as essential to Oregon's preparedness to respond to COVID-19. The Oregon Health Authority (OHA), Public Health Division (OPHD) created the Public Health High-Impact Pathogen Plan of Operations (HIPPO) to expand planning beyond the pandemic flu scenario and to be better prepared to respond to a spectrum of pandemic situations. While the HIPPO was not officially signed until March 1, 2020, the plan served as a guide to the OHA response to COVID-19 prior to that date. OHA's previous responses and exercises led to a strong, informed blueprint, as outlined in the HIPPO, even for such an unprecedented response.
At the executive leadership level, the creation of the Governor's Disaster Cabinet (Executive Order 16-07) and subsequent training exercises created a learning experience to allow agency personnel to understand the roles and responsibilities and created increased competency and engagement for response decision making. Oregon was one of the first states to have a FEMA staff assigned to its emergency management agency. The FEMA Integration Team (FIT) is embedded full-time with the Office of Emergency Management (OEM) and from the moment the COVID-19 response involved OEM, FIT personnel were facilitating information sharing, response coordination, and resource requests between the state and FEMA. Finally, OHA had been maintaining control of excess supplies from previous responses, including H1N1. OHA inventoried the supplies in 2019 and had a good handle on what supplies were available and could be quickly deployed to meet immediate needs as procurement efforts for additional PPE began. This preparedness posture set the foundation for the PPE mission of the response to COVID-19.

Response

The State of Oregon reacted very quickly in response to the threat of COVID-19. On January 21, OHA activated its incident management team (IMT) to prepare for and respond to COVID-19

cases. By February 7, OHA recognized the need to make sure PPE was available for frontline workers. In early March, the Emergency Coordination Center (ECC) was activated, engaging broader state agency support and on March 8, 2020, Governor Brown declared a state of emergency to address the spread of the coronavirus with EO 20-03.

Ordering PPE from the federal government occurred in three ways: 1) request for supplies from the Strategic National Stockpile, managed the Department of Health and Human Services; 2) request for supplies through FEMA Region 10; and 3) request directly to the White House Coronavirus Taskforce. In total, Oregon requested 1 million each of N-95 respirators, surgical masks, gowns, gloves and face shields and 140 ventilators. The state received 134,159 N-95 respirators, 319,100 procedural/surgical masks, 64,642 face shields, 52,949 gowns, 1,904 coveralls, 281,324 gloves, and 140 ventilators, or 17 percent of the requested amount.

Requesting supplies from the federal government was not meeting demand and national procurement strategies were not implemented, so state procurement efforts began. It became clear that the global supply chain for PPE and testing supplies was inoperative and traditional mechanisms for sourcing, vetting, procuring, and shipping PPE and testing supplies would not meet demand. Oregon worked aggressively to procure and distribute PPE. What started as a discrete public health response quickly expanded to an enterprise-wide response engaging senior leaders across state government and personnel across many state, tribal, and local agencies.

Findings

The federal National Response Framework defines 31 core capabilities that in general must be accomplished in incident response. Observations on Oregon's PPE efforts can be organized into these core capabilities: Planning, Situational Assessment, Operational Coordination, Operational Communications, and Logistics and Supply Chain Management.

Areas of Success

Preparedness	Training and Exercises—Executive leadership and agency-specific training and exercises increased competency in and engagement in response decision-making.
Situational Assessment	Initial Response—OHA acted in response to a health intelligence briefing in January recognizing the rising risk of a pandemic by standing up the incident management team, allowing Oregon to lean into preparations for response.
Operational Coordination	Executive Collaboration— The Governor quickly established the Coronavirus Response Team (CRT) to engage agency directors in the evaluation of situational information and response actions to determine priorities for the state. Incident Management Teams—Integration of IMT teams helped the CRT/Multi-Agency Coordination (MAC) group, OHA and OEM coordinate and transition from an agency focused response to an enterprise response. Relationship with Partners—Relationships with HHS partners assisted with the initial response to and the distribution of the warehoused PPE. As the sourcing and procuring effort grew, partnerships between FEMA and the private sector yielded good results.

	ESF 7 Problem-solving Mindset—Strong executive leadership and flexibility allowed DAS to embrace common day-to-day practices, adjust operations as the situation required, and engage team members to get the work done.
Operational Communication	**Commitment to Information Sharing at Executive Level**—When a sub-set of agency directors was pulled into the CRT for efficient decision-making, executive leadership leveraged existing teams and meetings to share COVID-19 information, including the Enterprise Leadership Team and weekly 'All agency director' meetings.
Logistics and Supply Chain Management	**PPE Branch**— Establishing the PPE Branch within the incident management structure demonstrated the priority of the operation and created a focal point for that effort. **Push Allocation**—Reserving a portion of the PPE supply as a state cache during push allocation implementation created nimbleness to respond to emerging issues, such as a long-term care facilities or migrant worker programs needing PPE. **Sourcing**—Partnering with Business Oregon to vet potential suppliers created efficiency as DAS vetted product quality only from legitimate businesses. Public-private coordination yielded some of the productive leads, as known business leaders vouched for contacts. **Procuring**—DAS Procurement had direct access to decision makers allowing for quick decision making. A temporary increase in budgetary authority and flexibility in procurement rules minimized the number of times purchasing approval was needed. **Receiving and Distributing**—Moving the PPE operations to the NVC-Wilsonville warehouse was crucial to success, as was engaging the National Guard to run shifts around the clock, ensuring products were received, inventoried, picked and distributed quickly and efficiently. **Ordering and Inventory Tools**—As the response grew, systems were developed to accurately track product information and allow visibility into the inventory.

Areas of Improvement

Preparedness	**HIPPO**—The lack of an enterprise response linkage contributed to the difficult transition of the PPE management work to OEM. **Policy-making Responsibility**—There was frustration that the CRT meetings were more about reporting out than policy setting. Throughout the enterprise response there was a lack of clarity regarding who establishes policy for execution. **Equity**—Decision-making about who qualified as 'first responders,' 'frontline workers,' or 'essential personnel' left many feeling overlooked and potentially at-risk as PPE was allocated and distributed.
Situational Assessment	**Burn Rate**—It was unclear what burn rate meant and guidance on calculating burn rate changed regularly. Inadequate tracking of information on the amounts of PPE received and distributed contributed to problems in calculating burn rate **Data Management**—The OpsCenter process for ordering PPE was confusing, slow, and did not meet the expectations of a timely process for localities. **Information Sharing**—Since this was a state-wide event from the outset, the state was the key situational information manager. Communication with the public and government entities was not as clear or streamlined as it could have been.

Operational Coordination	**Leveraging the Enterprise**—OHA needs to take the role as the lead in pandemic response but pull in support for tasks outside the public health lane. **Responsibility Transitions**— The decision to move PPE management from OHA to the enterprise response system was good and necessary, but each hand-off added complexity and confusion to the response.
Operational Communication	**Warehouse Communications**—Inconsistent information from the NVC-Wilsonville in the first few months of operations reduced clarity and confidence on the status of PPE procurement and distribution efforts. **Equity**—The PPE effort did not take steps to understand vulnerable populations resulting in poor communication about request and distribution mechanisms. **OHA/OEM Communication**—Before the Governor declared a state of emergency, OEM was not actively engaged with OHA efforts, creating an information gap as PPE operations transitioned. Challenges were exacerbated by differing information organizing structures and incompatible information systems. **State to Counties Communication**—The state needed better communication with end users on how the push allocation of PPE supplies would be conducted. **State to Tribes Communication**— Tribes were frustrated by not always being engaged with as sovereign entities.
Logistics and Supply Chain Management	**Product Specifications for Procurement and Distribution**—Changes in Food and Drug Administration (FDA) approved products caused great frustration and required great vigilance, adjustments to protocols, and halting of previously approved purchases when FDA or CDC guidelines changed. **Push Model**—The shift to the push-based strategy mid-incident resulted in changes to request and delivery mechanisms. Multiple information requirements and queries left many overwhelmed. **Testing**—The state public health lab has very limited capacity that is far from adequate when swift test results are critical for infection control.

Opportunities and Recommendations

The State of Oregon's management of the PPE operation during the COVID-19 response revealed opportunities and recommendations for the state to pursue further. These include:

- Leveraging recognition that a state-wide incident requires significantly personnel to cover a function and recruiting additional staff to fill emergency response roles.
- Updating the HIPPO to reflect the connection to the enterprise-wide response system.
- Evaluating enterprise emergency management systems and structures and determining how to layer these systems so they work together effectively.
- Building tools for future activations to guide policy and operational teams into the situational assessment and decision-making rhythm required for effective response.
- Refining of the inventory tracking and ordering instruments to address future incident needs.
- Establishing of an in-state supply chain and catalog of providers for PPE, medical supplies, and other capabilities.

- Examining barriers to success for local businesses when pivoting to meet an emergency need, and then considering investments to help local businesses to be able to respond in the future.
- Establishing an active planning and maintenance process for protective equipment.
- Engaging health equity staff and local partner organizations to better serve vulnerable populations.
- Defining requirements for an effective information management system, then finding a system fits the state's needs.
- Expanding NVC-Wilsonville capabilities to support COVID-19 vaccine distribution efforts.
- Exploring distributed warehousing around the state to ensure supplies are available in multiple locations.
- Examining the capacity of the state lab and determining if additional investment in the lab is needed.

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1. Introduction

This after-action review focuses on efforts by the State of Oregon to provide personal protective equipment (PPE) to healthcare providers, essential personnel and vulnerable populations from the beginning of the COVID-19 pandemic through May 31, 2020. The intent is to identify areas of success and opportunities for improvement for Oregon to take proactive action in helping the state better prepare and respond to any event.

2. General Description of the Incident

The novel coronavirus (SARS-CoV-2) that causes a disease known as COVID-19 can result in serious illness and loss of life. In response to international and national public health surveillance in late 2019 and early 2020, the Governor of the State of Oregon and the Oregon Health Authority (OHA), Public Health Division (OPHD) took action to mitigate the spread of the virus.

On January 21, 2020, OPHD activated its incident management team to prepare for and respond to COVID-19. By February 7, ensuring PPE availability was identified as a critical operational objective. On February 28, just prior to the first COVID-19 case in Oregon, the Governor activated a subset of the Governor's Disaster Cabinet to be known as the Coronavirus Response Team (CRT), comprised of the following state agencies and commissions: Department of Administrative Services, Oregon Health Authority, Department of Human Services, Oregon State Police, Oregon Department of Transportation, Oregon Office of Emergency Management, Oregon Military Department, Oregon Department of Education, Department of Corrections, Oregon Youth Authority, Secretary of State, Oregon State Treasurer, and the Higher Education Coordinating Commission to provide policy guidance.

On March 8, the Governor declared a state of emergency to address the spread of COVID-19 with Executive Order (EO) 20-03. Governor Brown's emergency declaration allowed OHA to activate reserves of emergency volunteer health care professionals, bringing online auxiliary medical professionals to work with local health authorities to identify and contain new cases of COVID-19 in Oregon. The declaration also granted broad authority to the State Public Health Director, OHA, and the Office of Emergency Management (OEM), which allowed the agencies to take immediate action and devote all available state resources towards containing the coronavirus in Oregon.

The state Emergency Coordination Center (ECC) at OEM, was activated March 2 (as stated in EO 20-03). All state and local agencies collaborated through the ECC to support the Oregon Health Authority Agency Operations Center (AOC), as the lead agency for public health operations, to ensure timely and consistent messaging and response. The Joint Information Center at the ECC assumed responsibility for responding to all non-health related press inquiries regarding the COVID-19. On March 23, ten days after the national emergency declaration, the Governor issued a stay at home order with EO 20-12.

As the nation came to grasp the threat of the virus and healthcare systems scrambled to identify and care for the sick, the need for PPE for essential workers, including workers in healthcare systems and public safety providers became a priority. It also became clear that the global supply chain for PPE and testing supplies was broken and traditional mechanisms for sourcing, vetting, procuring, and shipping PPE and testing supplies would not meet demand. Oregon worked aggressively to procure and distribute PPE to those in need. What started as a discrete public health response quickly expanded to an enterprise-wide response engaging senior leaders across state government and personnel across many state, tribal, and local agencies.

3. Oregon's Preparedness Posture

This section identifies aspects of the State of Oregon's planning and preparedness activities that positioned the state to effectively initiate a response to the COVID-19 pandemic.

OHA Public Health Division High-Impact Pathogen Plan of Operations

The OPHD created the Public Health High-Impact Pathogen Plan of Operations (HIPPO) to replace the Pandemic Flu Plan, which had been created as a lesson learned after the 2009 H1N1 response. Based on lessons learned in the response to Ebola in 2014-2016, OHPD identified the need to expand planning beyond the pandemic flu scenario to be better prepared to respond to a spectrum of pandemic situations. While the HIPPO was not signed and official until March 1, 2020, the plan served as a guide to the OHA response to COVID-19 prior to that date.

Oregon's previous responses and exercises led to a strong, informed blueprint, as outlined in the HIPPO, even for such an unprecedented response. The ability to convene the Medical Advisory Group, leverage cross-trained OPHD staff in the Incident Management System, and knowledge of the holistic strategies and procedures of the HIPPO were all keys to the state's readiness to respond. Additional tools and capabilities that were foundational to the COVID-19 response include:

- Epidemiological data and surveillance systems to assess health burden, monitor the tempo and magnitude of the outbreak, and evaluate the effectiveness of control measures

- Medical countermeasures, such as:

    - Access to the Centers for Disease Control and Prevention (CDC) managed Strategic National Stockpile (SNS).

    - Plans for local health systems knowing what necessary PPE their community had on hand, where to procure it, and what state systems to use to request additional items.

In general, the HIPPO calls out the need to lean on subject matter experts like the Medical Advisory Group, Incident Management Team, other subject matter experts to guide any sort of prioritization models or allocation strategies.

Training and Exercises

Team training and exercises including the Governor's Disaster Cabinet Exercises (EO 16-07) – a pandemic flu scenario in 2018 and a Portland earthquake scenario in 2019 – built awareness and encouraged participation from state agencies in the Governor's Disaster Cabinet, and created a sense of buy-in for disaster work. The main takeaways to set the Governor's Disaster Cabinet up for success included establishing meetings to build understanding of roles and responsibilities, increased competency in various situational awareness tactics, and ongoing engagement of key staff in continual improvement processes. There were acknowledged gaps specific to lacking secondary and tertiary agency participants, and needing to more directly leverage the private sector including a liaison with Business Oregon.

Region 10 FEMA partners, local public health, and OEM all participated in OHA's 2019 full-scale SNS exercise focused on receiving and distribution of supplies. Additionally, key public health officials had the opportunity to attend training related to incident management with the CDC in fall 2019, as well as conduct an operational review with CDC representatives.

FEMA Integration Team

The FEMA Integration Teams (FIT) program was created in July 2017 to enhance the agency's customer service and the efficiency of program delivery by embedding FEMA staff with its state, local, tribal and territory partners. In November 2018, Oregon was one of the first states to have a FEMA staff assigned to its emergency management agency. Oregon's FIT is composed of a hazard mitigation planner, an operational planner, an external affairs specialist and a preparedness specialist serving as the team lead. The Oregon FIT provides technical support for a range of program areas including all-hazards planning, exercise design and evaluation, recovery planning, and risk assessment and analysis. The team is full-time embedded with OEM and when there is a disaster, the FIT transitions to the disaster staff supporting response and recovery. From the moment the COVID-19 response involved OEM, the FIT personnel were facilitating information sharing, response coordination, and resource requests between the state and FEMA.

Status of PPE prior to January 20, 2020

Excess supplies from previous responses, including H1N1 were stored, but not actively managed prior to January 20, 2020. Over the years, OHA made sure to hold onto supplies and not use it during smaller incidents like Zika, Ebola, or West Nile virus. OHA inventoried the supplies in 2019 and had a good handle on what supplies were available and could be quickly deployed, as shown in Table 1.

TABLE 1: STARTING AMOUNTS OF OHA CONTROLLED PPE CACHE

STORED PPE	N95 Masks	Procedural Masks	Gowns	Face Shields	Gloves
Starting Amount (H1N1 cache)	585,000	50,000	125,000	7,000	1,390,000

Unfortunately, since the cache had not been actively managed there was a portion of supplies that had expired. OHA tracked those items separately in their inventory and pursued approval for use of these supplies in non-medical settings. Expired PPE was tested and tested product lines that were still viable were included in supplies available for allocation. These remaining H1N1 supplies, stored at the Oregon Department of Corrections (ODOC) warehouse, provided initial capability for the state to respond.

This preparedness posture set the foundation for the PPE mission of the response to COVID-19. As with any event there is always room to improve and Oregon, through this after-action review, is taking the steps to better understand how to make that foundation stronger.

4. General Overview of Oregon's Emergency Response

This section provides an overview of the state's emergency response and how planning, approaches, strategy, and priorities shifted where PPE was concerned as the event evolved.

Key Decisions and Operational Overview

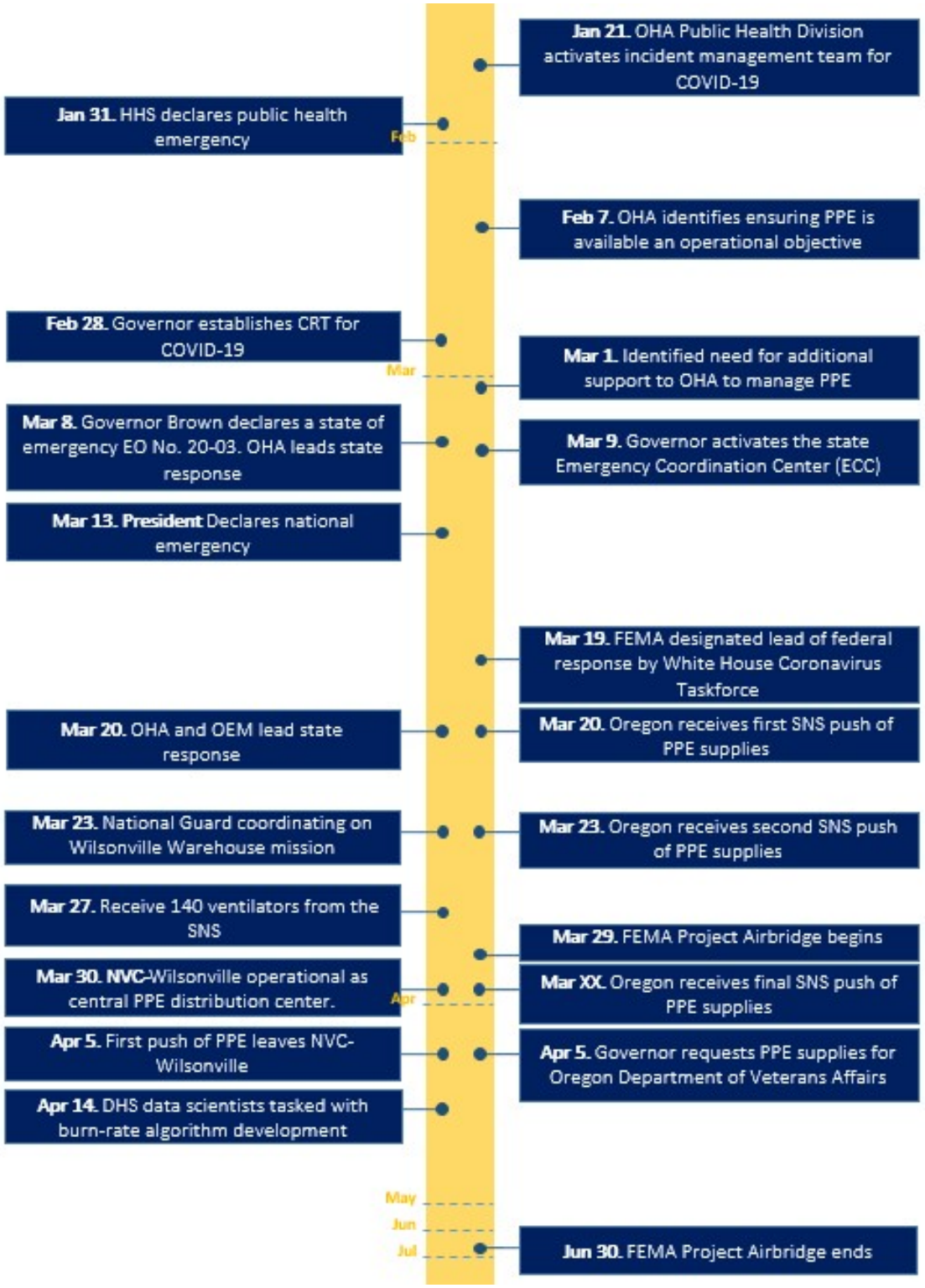
As the threat of the novel coronavirus moved closer to Oregon, as identified in health intelligence briefings in January 2020, OHA moved quickly to turn on internal systems to respond. OHA's actions were the beginning of an all-of-Oregon effort to manage the threat of COVID-19. Key decisions and actions taken by the state as part of the initial response are as follows. Figure 1 provides a visual representation of the timing of decisions and actions.

- On January 21, 2020, the Oregon Health Authority Public Health Division activated its incident management team to prepare for and respond to COVID-19.
- On January 31, 2020, the U.S. Department of Health and Human Services (HHS) declares a public health emergency. OHA is the lead state agency for public health emergencies.
- On February 7, 2020, OHA identifies ensuring PPE is available as an operational objective.
- On February 28, 2020, Governor Brown announced plans to convene a Coronavirus Response Team to coordinate state and local agencies COVID-19 response. The Coronavirus Response Team, a sub-set of the Governor's Disaster Cabinet established as part of EO 16-07, engaged agencies with an expected role in responding to the incident.

- On March 3, 2020, the Governor requested through the U.S. Vice President, as Chair of the White House Coronavirus Task Force, 400,000 each of N-95 respirators, procedural/surgical masks, gowns, gloves, Tyvek suits, Biocell Ambulance Protection Systems (Biocell-APS) and 75-100 ventilators.
- On March 8, 2020, Governor Brown declared a state of emergency to address the spread of coronavirus with EO 20-03.
- On March 2, 2020, the state Emergency Coordination Center, managed by OEM, was activated for the COVID-19 response.
- On March 11, 2020, COVID-19 was declared a pandemic by the World Health Organization.
- On March 11, 2020, Governor Brown sent a letter to Vice President Pence, and Leaders McConnell, Schumer, McCarthy and Speaker Pelosi restating and increasing Oregon's request for supplies from the SNS for 600,000 procedural/surgical masks, 400,000 N-95 respirators, gowns, gloves, face shields, Tyvek suits, Biocell-APS and 75-100 ventilators. Additionally, requested 96 boxes of collection swabs, 96 boxes of transport media, 27 boxes of extraction kits, and 15 boxes of TaqPath Master Mix.
- On March 13, 2020, a national emergency was declared in the United States for the COVID-19 outbreak.
- On March 23, 2020, Governor Brown ordered the postponement of all elective and non-urgent health care procedures, including but not limited to hospitals, ambulatory surgery centers, outpatient clinics, dental clinics, and veterinary clinics, in order to conserve personal protective equipment and hospital beds for the state's COVID-19 emergency response efforts.
- On March 19, Governor Brown requested, through FEMA Region 10, 140 ventilators, 1 million each of procedural/surgical masks, gloves, gowns, respirators, and face shields.
- On March 19, 2020, the White House Coronavirus Taskforce designated FEMA as the lead of federal response to COVID-19.
- On March 20, 2020 OHA and OEM are both noted as lead of the state COVID-19 emergency response[1].
- On March 23, 2020, Governor Brown issued a stay at home order with EO 20-12.
- On April 5, 2020, Governor Brown requested FEMA's assistance with PPE supplies for two state veteran's homes on behalf of the Oregon Department of Veterans Affairs: 32,000 face shields, 684 reusable eye protection, 7,125 masks, 1,404 N95 respirators, 172 cases gloves, 26,000 yellow gowns – disposable, and 1,520 COVID test kits.
- On April 14, 2020, data scientists from the Oregon Department of Human Services were tasked with establishing an algorithm for calculating burn rate estimates.

[1] OHA External Relations page: https://www.oregon.gov/oha/ERD/Pages/Oregon-reports-26-new-COVID-19-cases.aspx

FIGURE 1: KEY PPE DECISIONS TIMELINE



PPE under OHA

Prior to January 20, 2020 supplies of PPE previously obtained during the H1N1 outbreak between September 2009 and July 2010 were stored at the ODOC warehouse. The PPE mission started at the end of February with the established 'pull' process where end-users submit requests for resources to OHA, the requests are vetted and approved, and then supplies are disbursed. OHA distributed PPE supplies from the state-controlled cache stored at the ODOC warehouse. Almost immediately, OHA started to see a PPE shortage. Health care facilities and others that need PPE such as first responders, needed help getting PPE.

ODOC was never intended to manage the processes to inventory, procure, maintain or distribute the OHA PPE items stored there. Once the state realized the ODOC warehouse supplies would need to be distributed across the state and that more robust process and procedures would be required, it was clear that ODOC was not the owner of the process. Given that reality, OHA reached out to the Department of Administrative Services (DAS) for assistance and the PPE effort expanded to include DAS Printing and Distribution facilities and personnel.

Once DAS was engaged, online forms to facilitate ordering, picking and distribution were created. DAS began to sort and distribute orders using vehicles from fleet services. This structure continued for approximately three and a half weeks until the H1N1 stock was depleted. As the state cache of PPE dwindled, OHA was requesting supplies from the SNS. At that point, knowing that federal requests and procurement efforts would result in large shipments of supplies to be received and distributed, the decision was made to manage PPE from the North Valley Complex Wilsonville warehouse (NVC-Wilsonville). This warehouse was purchased by DAS at the end of 2019 and required minimal outfitting to begin functioning.

DAS Printing and Distribution Warehouse

Even as DAS took on the bulk of the PPE distribution work, the ODOC warehouse personnel were not completely removed from PPE responsibility. When the Governor ordered elective and non-urgent surgeries to be stopped on March 23, 2020, donations of PPE for essential medical services were requested. The ODOC warehouse was identified as the location for donations drop-off. The call for donations was answered and car after car came by to drop off donations.

PPE under ECC

As soon as the ECC was activated on March 9, the shift of PPE management from OHA to OEM began. Initially OEM tried to manage the mission through Emergency Support Function (ESF) 5—Information and Planning, however ESF 7—Logistics took over when it became clear it was a full procurement effort. OHA indicated in the Situation Status Report on March 10 that DAS, as the primary agency for ESF 7—Logistics, was taking over the PPE effort and requests would now go through ESF 8—Health and Medical, rather than directly to OHA.

At this point, the pull process was still in use, so requests from tribes and counties were submitted through the ECC information management system called OpsCenter. When OpsCenter became involved in resource requests, OHA lost visibility into the orders. A request would be submitted through OpsCenter, then directed to OHA, as the ESF 8 lead, for validation and approval. For PPE requests, OHA needed to see the request orders so they could ask follow-up questions and clarify what was really needed. Since the specificity was not built into existing OpsCenter views, OHA used forms outside of the system to determine specific requirements. Ultimately, this led to a data reporting challenge, as OpsCenter reports did not reflect PPE details since that information was captured outside of the system.

At the same time as management switched from OHA to OEM, PPE warehouse management began the transition from the Printing and Distribution facility and the ODOC warehouse to NVC-Wilsonville.

NCV-Wilsonville Pre-Use

NCV-Wilsonville Now

DAS managed the preparation of NVC-Wilsonville and all operations with internal personnel that was augmented by experienced warehousing staff from State Surplus and staff from the Department of Public Safety Standards and Training (DPSST). In mid-March, the idea of tasking the National Guard to support PPE warehousing and distribution efforts was raised realizing the massive effort it would likely become. Beginning March 23, National Guard leadership began working full-out to organize and assume the PPE receiving and distribution role. On March 30 the initial National Guard team was in place and NVC-Wilsonville began receiving incoming goods and preparing for distribution operations.

The team of over 100 Guard personnel were up and operational in a couple of days. The Guard took over receiving, accounting, and distribution. With the Guard in place, PPE distribution was able to execute the 'push' method. In the push method, the state sent regular bulk shipments of received, purchased, and donated PPE to all counties and tribes. This process did not require counties and tribes to submit requests for individual locations. The first push of PPE supplies occurred on April 5 to multiple tribes and counties. The Guard developed a distribution plan so that within 24 to 48 hours of the warehouse receiving a shipment, the product would be going out to localities or tribes. This plan included constant communication to counties and tribes regarding shipments to ensure they were willing to receive the supplies. Allocation percentages were used to divide up what was received. There were five distribution hubs, so a bulk shipment would be split into five hub shipments. Once at the hubs, each shipment would be broken down further into the county- or tribe-specific shipments and delivered. The majority of feedback noted that operations flowed smoothly once the Guard established a process and is still working well. When Guard was ending deployment, the PPE effort switched back to the pull method.

Truck Loaded for Distribution

Since the federal government was unable to provide adequate PPE resources to Oregon, the state had be resourceful to secure the necessary supplies. This was a significant challenge with global supply shortages and competition among states and the federal government to procure PPE. Fortunately, companies and manufacturers in Oregon and across the country helped by donating supplies and offering PPE for purchase.

PPE Ordering from Federal Government

Ordering PPE through the federal government happened in three ways: Requests for supplies from the SNS, requests for supplies through FEMA Region 10, and requests directly to the White

House Coronavirus Taskforce. In the Governor's April 8 letter to the House Committee on Homeland Security, Oregon's requests for, responses to, and receipt of PPE and other critical medical supplies from the federal government were outlined as follows[2]:

- March 3 – Sent to Vice President, as Chair of the Coronavirus Task Force, requesting 400,000 each of N-95 respirators, procedural/surgical masks, gowns, gloves, Tyvek suits, Biocell Ambulance Protection Systems (Biocell-APS) and 75-100 ventilators. Neither a response nor supplies were received.
- March 11 – Sent letter to Vice President Pence, Leaders McConnell, Schumer, McCarthy and Speaker Pelosi restating and increasing our request for supplies from the SNS for 600,000 procedural/surgical masks, 400,000 N-95 respirators, gowns, gloves, face shields, Tyvek suits, Biocell-APS and 75-100 ventilators. Additionally, requested 96 boxes of collection swabs, 96 boxes of transport media, 27 boxes of extraction kits, and 15 boxes of TaqPath Master Mix. HHS responded that Oregon would need to submit an official form through the HHS Assistant Secretary for Preparedness and Response (ASPR).
- March 12 – Sent requested ASPR form for 600,000 procedural/surgical masks, 400,000 N-95 respirators, gloves, gowns and goggles, and 23,188 Tyvex suits, as well as 100 Biocell-APS, 100 ventilators, 96 boxes of collection swabs, 96 boxes of transport media, 27 boxes of extraction kits, and 15 boxes of Taqpath Master Mix.
- March 19 – Requested through FEMA Region 10 for 140 ventilators, 1 million each of procedural/surgical masks, gloves, gowns, respirators, and face shields.
- March 20 – Received SNS first push of supplies to Oregon, which included 36,855 N-95 respirators, 87,795 procedural/surgical masks, 16,718 face shields, 13,630 gowns, 70 coveralls, and 48,533 gloves.
- March 20 – Requested lab supplies including 96 units of swabs, 27 extraction kits, and 15 boxes Taqpath Master Mix (possibly a re-request from the March 12 request through OHA to ASPR).
- March 23 – Received SNS second push of supplies to Oregon, which included 36,855 N-95 respirators, 87,795 procedural/surgical masks, 16,718 face shields, 13,630 gowns, 70 coveralls, and 48,533 gloves.
- March 25 – Resubmitted a request through FEMA Region 10 for 140 ventilators, 1 million each of procedural/surgical masks, gloves, gowns, respirators and face shields, 4 federal medical stations with 250 beds each and 4 medical pharmacy kits.
- March 27 – Received 140 ventilators from the SNS.
- March XX? – Received SNS final push of supplies to Oregon, which included 60,450 N-95 respirators, 143,511 procedural/surgical masks, 31,207 face shields, 25,688 gowns, 1,765 coveralls, and 184,258 gloves.

[2] Bullet points minimally modified from the April 8, 2020 letter to Chairman Bennie Thompson of the House Committee on Homeland Security, US House of Representatives.

In total, Oregon requested 1 million each of N-95 respirators, surgical masks, gowns, gloves and face shields and 140 ventilators. The state received 134,159 N-95 respirators, 319,100 procedural/surgical masks, 64,642 face shields, 52,949 gowns, 1,904 coveralls, 281,324 gloves, and 140 ventilators, or 17 percent of the requested amount.

Testing and Testing Supplies

As with PPE, securing testing supplies became a huge challenge. It was clear the federal administration was not prioritizing Oregon. The normal process of setting up a procurement contract and buying supplies was not a viable possibility. The companies producing testing materials decided who got supplies. A key decision was to have senior leaders, including Oregon Senators, directly contact private sector companies. It was recognized early that they needed to ensure Oregon would be in the mix and would get some supplies. Senior leaders called directly, multiple times.

The capacity of the state lab to process tests was very limited, so there was work to establish testing capacity with hospital labs. To understand what supplies were necessary, the Governor's Office worked with OHA and pulled together meetings with hospital labs to understand their equipment, what supplies they had, and what they needed.

Data Management and Burn Rate

OHA reported the first calculated burn rate in the March 18 Situation Status report, as shown in Figure 2. While labeled 'burn rate' this figure represented the amount distributed out of the cache.

FIGURE 2: OHA CALCULATED BURN RATE ON MARCH 18

ESF-8 Burn Rate

Supplies as of 3/18/2020

NON-EXPIRED PPE	N95 Gerson 1370	N95 North	Face Shields	Splash Shields	Gowns
Current level	365,586	49,581	2,963	100	0
Starting amount (with state reserve)	506,400	74,100	8,160	480	16,280
burn rate so far*	48.23%	39.47%	76.34%	80.81%	100.00%
EXPIRED PPE	Procedural Masks	N95	Gloves TNT	Gloves N-Dex	Gloves Non-Sterile Latex-Free
Current level	18,751	5,924	1,096,731	3,941	52,003
Starting amount	49,254	7,420	1,272,000	4,000	63,000
burn rate so far*	61.93%	20.16%	13.78%	1.47%	17.46%
EXPIRED PPE	Gloves Tru Advantage	Gowns L	Gowns XL	Gowns XXL	
Current level	15,023	1,236	1,024	1,822	
Starting amount	15,920	2,426	2,103	2,664	
burn rate so far*	5.63%	49.06%	51.31%	31.61%	

*Orders have been filled for 2 weeks. The total includes 30% of the non-expired PPE reserved - 20% for state agencies and 10% for tribes.

Figure 3 shows that five days later all PPE categories had a burn rate of over 75%, which reveals the speed with which requests for PPE inundated OHA.

FIGURE 3: OHA CALCULATED BURN RATE ON MARCH 23

ESF-8 PPE Burn Rate

Supplies as of 3/23/2020

NON-EXPIRED PPE	N95s	Face Shields	Splash Shields	Gowns
Current level	**118,009**	**402**	0	0
Starting amount (with state reserve)	580,500	8,160	521	16,280
Burn rate so far*	**79.67%**	**95.07%**	100%	100%

EXPIRED PPE	Procedural Masks	N95	Gloves	Gowns
Current level	**1,925**	**789**	**317,513**	**964**
Starting amount	49,254	7,420	1,354,920	7,193
Burn rate so far*	**96.09%**	**89.37%**	**76.57%**	**86.60%**

*This chart reflects PPE distributed by OHA. Orders have been filled for 3 weeks. The total includes 30% of the non-expired PPE reserved - 20% for state agencies and 10% for tribes; tribes are receiving all of their allocated PPE. The PPE allocation plan will be revised during this operational period and PPE collection and distribution will be maintained by the ECC.

As the ECC took over management of the PPE effort, data management continued to be a challenge. The need for PPE happened extremely quickly and the enterprise-wide need for PPE was not anticipated. It was suggested that data tracking was not prioritized from the very beginning and staff were not assigned the data tracking task in sufficient number to meet the need. This hampered efforts to track and report accurate, timely numbers throughout the response. As seen in Figure 4, beginning inventory numbers were unknown in ECC PPE reporting as of March 27. Figure 5 shows the ever evolving effort to track PPE inventory, once federal shipments were received, supplies were procured, and donations were received.

While the state struggled with this, it was noted that data management challenges existed at the federal level and that often the federal representatives relied on the state for information on what was received, rather than tracking what was sent.

FIGURE 4. ECC PPE INVENTORY TRACKING, MARCH 27

ECC Personal Protective Equipment (PPE) INVENTORY

PPE	Masks		Gowns	Face Shields	Gloves	Ventilators
	N95	Surgical				
Beginning Inventory	TBD	TBD	TBD	TBD	TBD	TBD
Quantity Received – Purchased	0	0	0	0	0	140
Quantity Received – Donation[3]	0	100,000	0	0	0	0
Quantity on order[2]	100,000	0	10,000	100,000	1,680 bx	200
Daily Quantity Shipped[1]	93,140	6,800	1,173	216	154,500	0
Total Quantity Shipped[1]	465,940	53,850	55,899	11,280	1,391,400	0
Current Inventory[1]	157,040	219,000	22,408	23,804	103,906	140*

Inventory as of March 27, 2020
*under verification

Donations:

- 45 offers were directed to local donation sites.
- 16 replies were sent for general information
- 3 offers were directed to the state location*

FIGURE 5: PPE SUMMARY SHOWING SHIPMENTS, PROCUREMENTS AND DONATION AS OF MARCH 31

Date: PPE Summary

3/31/2020	Surgical Masks	N95	Gowns	Face Shields	Gloves	Ventilators
Federal Shipments						
Initial shipment	144,000	69,840	21,138	20,604	201,000	-
Requested	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	140
Received	143,000	-	-	-	-	140
Outstanding	*857,000*	*1,000,000*	*1,000,000*	*1,000,000*	*1,000,000*	-
State Procurements						
Purchased	500,000	1,660,000	-	175,000	4,910	-
Received	-	-	-	-	-	-
Outstanding	*500,000*	*1,660,000*	-	*175,000*	*4,910*	-
Donations						
Received	100,000	-	-	-	-	-
Total Received	**387,000**	**69,840**	**21,138**	**20,604**	**201,000**	**140**
Daily Shipment	-	-	-	-	-	-
Total Shipped	**53,850**	**465,940**	**55,899**	**11,280**	**1,391,400**	**-**
Current Inventory*	**362,000**	**157,040**	**22,408**	**23,804**	**117,740**	**140**

*These amounts include the inventory from the H1N1 stockpile.

Activity for today includes 143,000 surgical masks shipped from the Strategic National Stockpile and purchases totaling 10,000 N95 masks, 75,000 face shields, and 2,600 gloves.

Once federal requests for supplies started being fulfilled, FEMA began requiring burn rate reporting before releasing additional supplies to states. Some confused the request for burn rate information as being related to FEMA's Project Airbridge, but the reporting requirement was tied to direct requests to FEMA submitted through the standard resource request process. FEMA's supply was limited, thus they needed data to evaluate nationwide allocation based on need.

Oregon struggled to provide burn rate information that FEMA would accept. Tribal and County emergency managers that received PPE were asked to supply burn rate information, but guidance on calculating burn rate was inadequate. With resource requests on hold awaiting burn rate information, the Governor's Office requested assistance from the Department of Human Services, and specifically the Office of Reporting, Research, Analytics, and Implementation (ORRAI). The Director of Research for ORRAI spent time in warehouse to evaluate operations, connected with localities to understand local systems and then came up with an algorithm. FEMA approved the algorithm for calculating burn rate and it was shared with tribes, counties, and cities to help with calculations.

FEMA Project Airbridge

Beginning March 29, 2020 the FEMA Supply Chain Task Force established Project Airbridge as one prong of a supply chain stabilization effort. Project Airbridge was created to shorten the amount of time it takes for U.S. medical supply distributors to bring PPE and other critical medical supplies into the U.S. during the COVID-19 pandemic response. Project Airbridge shipments arrived up to nine times faster than cargo deliveries by sea, which typically take 30-40 days, allowing prioritized distributors to deliver medical supplies to the point of greatest need across the nation during the height of the COVID-19 response.

Overseas flights arrived at operational hub airports for distribution to hotspots and nationwide locations through regular supply chains. Flight arrivals did not mean supplies would be distributed in the operational hub locations. Per agreements with distributors, 50 percent of supplies on each plane were for customers within the hotspot areas with most critical needs. The remaining 50 percent was fed into distributors' normal supply chain to their customers in other areas nationwide. HHS and FEMA determined hotspot areas based on CDC data.

This shipment method was a temporary solution to expedite the transportation of commercially distributed PPE from international manufacturers to the United States. With the stabilization of the PPE supply chain across the U.S, Project Airbridge was phased out with the final flight landing in the United States on or about June 30. There remains significant confusion about standard FEMA resource requests and Project Airbridge operations.

5. Capabilities Analysis

The National Response Framework[3] outlines core capabilities that are the activities that generally must be accomplished in incident response. No core capability is the responsibility of any one party or single level of government and interdependencies exist among many of the core capabilities. Organizing observations from an after action review by the associated core capability helps link identified strengths, opportunities, and recommendations for improvement to national guidance and helps track progress through incidents and exercises over time. The categories listed below were selected as areas of evaluation to organize identified strengths and areas for improvement for the management of the PPE during the COVID-19 response:

- Planning
- Situational Assessment
- Operational Coordination
- Operational Communications
- Logistics and Supply Chain Management

PLANNING

Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or tactical-level approaches to meet defined objectives.

STRENGTHS

➔ High-impact Pathogen Plan of Operations

Analysis: The HIPPO guided OHA's response to COVID-19 and clearly defines roles and responsibilities for medical countermeasures including CDC-maintained SNS supplies, and outlines steps to source, procure, manage and allocate PPE. The HIPPO states the OHA IMT is responsible for tracking and inventorying all resource requests received through the ESF 8 AOC and assets distributed during the incident.

➔ Training and Exercises

Analysis: OHA has been building an IMT for the last year. They worked with the state and with unions to be able to pull people into the team, then met every month to run scenarios. An earlier full-scale exercise allowed OHA to practice the federal resource

[3] There are 15 core capabilities aligned with the Response mission area. https://www.ready.gov/sites/default/files/2019-06/national_response_framework.pdf

request process and manage product and track distribution down to the local health department level.

The Governor's Disaster Cabinet Exercises in 2018 and 2019 created a sense of buy-in for disaster work across state agencies. As learning experiences, the exercises underscored the need for agency personnel to understand roles and responsibilities and to work toward increased competency in and engagement in response decision-making.

AREAS FOR IMPROVEMENT

➔ High-impact Pathogen Plan of Operations

Analysis: The HIPPO is primarily an ESF 8 plan, and it does not provide roles and responsibilities nor the process to coordinate with OEM, DAS, or the entire state enterprise. As a result, OHA initially attempted to own the entire incident, rather than tapping state-wide response resources to assist. OHA quickly became buried in the response and could not maintain parity with the big picture of the event that was evolving around them. The requirements of the event overwhelmed their capacity and they did not alert the rest of the enterprise of that. The lack of an enterprise response linkage contributed to the difficult transition of the PPE management work to OEM. OHA and OEM's relationship has suffered through this dynamic.

Recommendation: Update the HIPPO to reflect the connection to the enterprise-wide response system. Lessons learned through this experience should also be reflected. Critical elements to include in the update are:

- Defining and assigning responsibility for assessing OHA's capacity to execute the response throughout an incident.
- Define metrics that measure needs and capacity requirements.
- Establishing mechanisms to inform and trigger activation the larger system.

Recommendation: Train and exercise ESF 8 personnel based on the plan and then orient state, tribal, and local partners to OHA's preparedness and response posture, as reflected in the plan.

➔ Policy-making Responsibility

Analysis: The CRT was 'established to provide policy guidance' to the response and was comprised of relevant agency leadership. Still, throughout the enterprise response there was a lack of clarity regarding who establishes policy for execution. There was frustration voiced that the CRT meetings were more about reporting out than policy setting. At the ECC level, some thought OHA should make policy decision

and others thought OEM was responsible. This had a direct effect on the ability to fulfill PPE requests. Type 1 and Type 2 IMTs were brought in to facilitate the creation of incident priorities and establishment of a battle rhythm for the response. The IMT helped transition the CRT to the Multi-agency Coordination group (MAC) and served as MAC-Support, guiding situational awareness, what future activities needed to take place, then rolling that information up to the strategic level to support identifying priorities. This was a good decision and proved effective, but time and energy was burned in the absence of policy decision-making from incident on-set.

Recommendation: Conduct additional incident management trainings for the Governor's Disaster Cabinet to build on the lessons learned through this incident. Additional training will help build fluency and confidence for Governor's Office personnel and agency leaders.

Recommendation: Build tools for future activations to guide the team into the situational assessment and decision-making rhythm required for effective response.

➔ Inventory Management

Analysis: Preparedness efforts (and political will with associate funding) have not prioritized procuring and maintaining a cache of supplies for pandemic response. Oregon was lucky to have the remaining H1N1 supplies that supported initial response until SNS and creative procurement efforts yielded results.

Perspective:
Inventory management was something most states across the country struggled with as supply chains were impacted and the need to maintain a cache of PPE resources was not a current planning priority.

Recommendation: An active planning and maintenance process for protective equipment should be established. At a minimum, this includes:

- A process to evaluate and determine what supplies to keep in a cache.
- A methodology to maintain and cycle supplies to be ready to deploy.
- A system for enterprise-wide inventory management
- A system to evaluate priorities for distribution.
- A methodology for burn rate calculation.
- A reporting mechanism for inventory at the tribal, city, county, and health system level of what PPE they have on hand.

Opportunity: The inventory tracking system developed by DAS during this response should be captured and leveraged to support on-going inventory management. This system could be applicable to other resource management efforts beyond PPE.

➔ Equity

Analysis: Decision-making about who qualified as 'first responders,' 'frontline workers,' or 'essential personnel' left many feeling overlooked and potentially at-risk as PPE was allocated and distributed.

Recommendation: Engage health equity staff and local partner organizations to clarify language and understanding around 'first responders' and similar labels ensuring that people who serve vulnerable populations are included.

SITUATIONAL ASSESSMENT

Provide all decision makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response.

STRENGTHS

➔ Initial Response

Analysis: OHA activated emergency operations on January 21 following a health intelligence briefing on the novel coronavirus and the rising risk of a pandemic. Soon after the OHA IMT stood up and monitoring began. Around January 30, OHA pulled together a briefing with Department of Human Services (DHS), OEM, and other partners to work on the threat of COVID-19 to Oregon. Until early March, PPE requests and distribution were managed through OHA. Thanks to the existing H1N1 supplies in the ODOC warehouse, initial immediate needs could be met.

➔ Visualizing Information

Analysis: As the enterprise-wide response system activated to support the COVID-19 response, a robust reporting system that included ArcGIS dashboards was brought into play. ArcGIS StoryMaps, created by OEM's GIS personnel, increased situational awareness about available PPE and distribution rates across the state. Once more accurate supply numbers were available and dashboards were created, situational information was available to partners through secure Hub Sites. Available data could be accessed by partner agencies, downloaded and used to support response activities. A public Hub Site allowed community members to view dashboards of data as well. Uptime and availability of the information through the ArcGIS online platform rather than a local server was useful for information sharing.

AREAS FOR IMPROVEMENT

➔ Burn Rate

> **Perspective:**
> As noted, the definition of burn rate and guidance on how to calculate it was something every state and territory struggled with.

Analysis: The burn rate reporting requirement was linked to FEMA Headquarters' need to decide how best to distribute limited PPE supplies across the country. FEMA needed to understand how much was on hand and how fast supplies were being used. At the state, tribe, and local level it was unclear what burn rate meant and guidance on calculating burn rate changed regularly.

Inadequate tracking of information on the amounts of PPE received and distributed contributed to problems in calculating burn rate, as did the lack of incentive for PPE end users to be honest about their needs as all were desperate to continue receiving PPE. On April 14, DHS data scientists were tasked with creating a methodology based on case count and rate of PPE burn and provided a tool for burn rate calculations for county and tribal partners. The Director of research for the Office of Reporting, Research, Analytics and Implementation (ORRAI) spent time in the warehouse to evaluate operations, connected with localities to understand the request and usage system, then came up with an algorithm to calculate burn rate. The algorithm was approved by FEMA and deployed to counties and tribes to help them calculate burn rate.

Recommendation: Recognizing that supply burn rate will continue to be required reporting in future events, evaluate the COVID-19 burn rate algorithm to determine if it is a method that will be effective in other situations. This could be tested as part of the fire response if PPE is being used due to poor air quality. Adjust the algorithm as necessary, then build tools to share with tribes, cities, counties, and health systems to facilitate the calculation and sharing of burn rate information. Inventory management, information sharing, and communications must be considered and addressed in any system established to support future burn rate calculations.

➔ Data Management

Analysis: The process for ordering PPE was confusing, slow, and did not meet the expectations of a timely process for localities. OpsCenter, the information management system used at the ECC, is not 'user friendly' and does not align with multiple needed items, quantities, types, etc. The lack of notification from the software program about the status of an order or changes required staff to continuously monitor the software system 10 hours a day for updates.

The variability in PPE types and specifications was incompatible with PPE resource requests submitted through OpsCenter. Due to this incompatibility, OHA developed a separate form for PPE ordering to facilitate the validation and approval processes. The OHA form, since it is outside OpsCenter, did not feed information into OpsCenter which circumvented the ability to run reports for situational awareness.

Recommendation: Engage state, tribal, and local stakeholders to define requirements for an effective information management system, then compare the desired requirements against OpsCenter's capabilities. If OpsCenter does not meet the majority of functionality as defined by the collaborative requirements process, research information management systems to find a system that better fits the state's needs and pursue procurement of the system.

➔ Information Sharing

Analysis: Since this was a state-wide event from the outset, the state was the key situational information manager. Communication with the public and government entities was not as clear or streamlined as it could have been. The transition of PPE management from OHA to OEM highlighted challenges that played out in messaging to the locals and tribes.

Perspective:
Information was changing at a pace never seen before and on a scale never experienced before.

The sheer volume of information and correspondence from state, federal, local and tribal organizations was overwhelming and with guidance and requirements changing on a frequent basis it was hard to keep up.

- "Guidance was lacking in the beginning around prioritization and allocation. Each new update or 'ask' seemed lacking in clear guidance or criteria."
- "Documents changed within 24 hours of being sent out. A week later the process would change a second time."
- "Localities never quite knew who was in charge of the PPE at the state, who made the decisions and who we could go to for questions."
- "There were multiple State Liaisons emailing the same information (with no revision dates on documents) it became a whirlwind of deciphering if you had already read something, was this the newest version, what had changed, and why did we receive it after 5pm with little notice it was even coming."

Recommendation: Evaluate existing planning guidance and operating procedures to identify opportunities to streamline communications to tribes, cities, and counties.

Recommendation: Establish a unified naming convention for documents that includes version tracking. A master document repository accessible to designated communicators will help ensure the most current versions of documents are distributed to stakeholders.

➔ Equity

Analysis: The PPE effort did not initially prioritize the concern for equity. Understanding which communities were being affected, such as communities of color, vulnerable populations, and more was a gap.

Recommendation: Establish roles and responsibilities for communicating with vulnerable communities and organizations that work with them. This position or team should be tasked with deliberately evaluating the situation to identify vulnerable populations, understand the needs of each community, and then develop a targeted outreach strategies to mitigate the impacts.

OPERATIONAL COORDINATION

Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.

STRENGTHS

➔ Executive Collaboration

Analysis: The Governor quickly established the CRT, a subset of the Governor's Disaster Cabinet (EO 16-07), to engage agency directors in the evaluation of situational information and response actions to determine priorities for the state. Based on this collaboration, the Governor issued EO 20-10 on March 19, 2020 calling for the suspension of elective procedures to conserve and redirect PPE to the state's COVID-19 emergency response. This decision eased the decision-making related to healthcare facility PPE requests. Knowing that any healthcare provider request was solely focused on reducing staff exposure to COVID-19, rather than an elective procedure, reduced the request validation burden for OHA staff.

➔ Incident Management Teams

Analysis: The integration of IMT teams and leadership from ODF (Type 1 IMT), OSFM (Type 2 IMT), and DPSST helped the CRT/Multi-Agency Coordination (MAC) group,

OHA and OEM coordinate and transition from an agency focused response to an enterprise response. The transition of PPE operational responsibility, while still challenging, was made easier with the leadership from the IMTs. When OEM and OHA started merging, the IMTs facilitated the establishment of the collaborative effort and things started moving more fluidly. Priority setting and decision making was improved.

Opportunity: More coordinated communication, and strategic planning on future implementation.

➔ Relationship with Partners

Analysis: OHA's relationship with HHS partners assisted with the initial response to COVID-19 and the distribution of the warehoused PPE. As the PPE effort became a sourcing and procuring effort, there was a good partnership between Oregon and FEMA and leveraged well-established partnerships with the private sector.

The FEMA Integration Team's pre-existing relationship with OEM and having worked with OEM staff pre-event, made it easier to coordinate. Once the ECC was activated, many agencies came together quickly to get state, local and tribal partners the PPE they needed.

➔ ESF 7 Problem-solving Mindset

Analysis: DAS execution of ESF 7 responsibilities benefited from strong executive leadership as well as flexibility to roll with punches. They embraced common day-to-day practices of getting the work done and evolved their efforts as parameters changed. DAS operations were able to adjust as the situation warranted rather than being rigid. The DAS team stepped up to do the work outside their normal duties.

Opportunity: Recognition that a state-wide incident requires significantly more than two or three people to cover a function. Deeper bench depth is likely needed across all agencies with a functional role.

AREAS FOR IMPROVEMENT

➔ Leveraging the Enterprise

Analysis: The enterprise response engages all state partners with the expectation that they understand their role, that they are prepared, and that they can execute their role. OHA needs to be able to take the role as the lead in pandemic response and they need to be the trusted voice. That means they are not warehouse managers, transportation organizers, shelter managers, etc. They need to leave those tasks to those who fill those roles day-to-day. When you complicate a role with 'outside the

lane' functions the main role becomes bogged down under the burden of the other tasks. It's important for any incident lead agency to constantly evaluate the need to pull in support. The PPE effort clearly could be handled outside of OHA but still coordinated with OHA.

Recommendation: The different systems and structures established to run agency incident response operations need to be evaluated to determine the best alignment for effective and efficient response. Work is needed to determine how to layer these systems so they work together, how agencies should assess response capacity to determine when assistance is needed, and identify coordination mechanisms to ask for help.

➔ Responsibility Transitions

Analysis: Responsibility for PPE management shifted from OHA to OEM to the National Guard and DAS, and ultimately to DAS for the sustained effort for this event. The decision to move operations from OHA to the enterprise response system was good and necessary, but each hand-off added complexity and confusion to the response.

Recommendation: If an enterprise response perspective was applied from the beginning, these challenges may have been avoided. HIPPO should be updated to include clear linkages to the state-wide emergency response systems and day-to-day functions and capabilities should be utilized whenever possible.

➔ Data Management

Analysis: Early on there was no process or person responsible for managing PPE inventory. There was significant political and media interest in wanting granular data on PPE availability and distribution. Data was pulled by multiple people from multiple sources resulting in conflicting numbers being shared with the community. A significant amount of time was spent trying to de-conflict numbers. Ultimately the inventory management system built by DAS using SmartSheets helped to address this challenge.

Recommendation: Explore expanding the inventory management system that was established by DAS to provide a shared portal with state and local response personnel. This system should also be evaluated for use in other types of disasters to account for resources.

➔ Leveraging Expertise

Analysis: Tasking the National Guard to execute PPE receiving and distribution at the NVC-Wilsonville is noted as an overwhelming success in the response. However, not

leveraging existing state warehousing experts was a missed opportunity. Inventory management suffered due to the lack of training on shipping and receiving that has to be done to track and pay bills. Ultimately, the loss of information negatively affected the downstream reconciliation and potentially the reimbursement process. If the state has warehouse experts, they should be used from the beginning to support accuracy in the inventory counts and information.

At NVC-Wilsonville, the National Guard did not have much inventory or warehouse experience that resulted in frustration with record keeping. For example, it was hard to get NG personnel to pull packing slips and turn them in for data entry. The NG was a great asset for delivery, but willingness to embrace just-in-time training by the in-house experts would have been more efficient and avoided some inventory management problems.

Recommendation: ESF lead agencies can catalogue skills needed to successfully execute functions, and then identify other agencies, divisions, or departments with similarly skilled personnel. Each ESF should maintain these rosters of potential support organization. Personnel from these support organizations should be engaged in training and exercises to understand how they can support the state's response to an emergency.

➔ State to Counties Coordination

Analysis: Changes to forms, requirements, and processes were not well communicated. Changing the reporting requirements for allocations, and burn rates was very challenging for local emergency managers and public health to keep up with and comply with. "The concept of the PPE Allocation Plan was valued" but "because this process was so new to the locals and the end users it was challenging to communicate."

Recommendation: "The best possible improvement the State can make is to combine the OHA PHEP and County EM's into one email distribution list...we work together and need to have the same information at the same time."

OPERATIONAL COMMUNICATIONS

Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available, among and between affected communities in the impact area and all response forces.

STRENGTHS

➔ Commitment to Information Sharing at Executive Level

Following the Governor's Disaster Cabinet exercise in October 2019, it was acknowledged that it is hard for 33 agency directors to move quickly on disaster response. When COVID-19 emerged, the decision was made to pull a sub-set of agency directors into a Coronavirus Response Team for efficient decision-making. Other agency directors were certainly interested in what was going on, but they understood why a smaller group was established. To keep all agency directors informed, existing teams and meetings were leveraged as opportunities to share COVID-19 information. An example is the twice a month Enterprise Leadership Team (24 agencies) – not related to disasters – meetings. 'All agency director' meetings were held weekly via Zoom to keep all informed. Inside the Governor's Office, key staff briefed legislators on a daily basis and responded to many requests and comments from the public.

AREAS FOR IMPROVEMENT

➔ Warehouse Communications

Analysis: It was very hard to get consistent information out of the NVC-Wilsonville in the first few months of operations. It would be known that a delivery was supposed to arrive on X day, and have Y in the delivery. It took as much as a week to get confirmation that something was there, or if not all of it was received. Information had to be requested multiple times before being provided, which slowed down the ability to close out requests. The communication challenge is tied to the lack of priority placed on data collection, the lack of specificity of what information should be tracked, and the lack of shared tools to enter and track information.

Unfortunately this reduced clarity and confidence on the status of PPE procurement and distribution efforts. Conflicting numbers created confusion and significant addition work was necessary to chase down and then validate or correct PPE supply numbers.

Recommendation: Establish systems to guide the warehouse lifecycle, from receiving, inventorying, storing, picking, and shipping. Implement these systems at the very beginning and provide oversight to ensure data tracking is done. The inventory tracking tools born out of this incident are a strong foundation to build on. Designate a reporting timeline to keep information flowing.

➔ Equity

Analysis: The PPE effort did not include a deliberate evaluation and understanding of vulnerable populations. For the first couple of months, the state did not do a good job understanding which communities were being disproportionally affected to include communities of color, homeless and sheltered populations, agricultural producers and processors, and so on. Lack of focus on these populations resulted in poor communication about PPE request and distribution mechanism. Many who serve these populations heard through other stakeholders about PPE options rather than from the state.

Recommendation: The state needs to prioritize the identification of vulnerable populations, determine who at the state and local levels typically work with those groups, and then evaluate the processes and plans currently in place for working with vulnerable populations to see if they need to be adjusted for a disaster. This may require that the state increase its capabilities and resources for coordinating with the private and non-profit sector in general.

Recommendation: The State should look to the local jurisdictions to see how they work with and support their vulnerable populations directly. Many locals indicated they have process and programs in place already and simply utilized those during this event.

Additionally, the private sector has resources and capabilities that the state does not that allows them to be innovative and nimble. The state should find out what strategies, tactics, and tools the private sector uses to reach vulnerable populations and see if any of their solutions could be helpful to the state.

➔ OHA/OEM Communications

Analysis: Communication issues between OHA and OEM contributed to problems during the transition of PPE operations. During the period before the Governor declared a state of emergency, OEM leadership was not actively engaged with OHA efforts. This created an information gap once the ECC was activate. There was a perception that OHA did not place priority on getting information to the ECC. OHA was making decisions independently and not communicating them to OEM or to their own representatives assigned to the ECC. Challenges were exacerbated by differing information organizing structures (lifelines vs. ESFs), as well as use of incompatible information systems (Tableau vs. ArcGIS).

Recommendation: OEM and OHA, and the enterprise as a whole, need to establish information sharing expectations during public health emergencies. OHA has

authority for public health response, but this response revealed the full-scale response effort a pandemic requires. Establishing triggers and tools to facilitate this information sharing will support more effective and efficient response.

Recommendation: Work with technology system providers to identify data sharing options that would allow Tableau and ArcGIS to push and/or pull data from one system to the other.

➔ State to Counties Communications

Analysis: Communication with locality stakeholders seemed to be a challenge. The state could have better communication with end user on how the push allocation of PPE supplies would be conducted. Managing stakeholder expectations was a major effort as well. It seemed everyone thought PPE was a free handout. In reality, all entities needed to keep working their own vendors and outlets. There was also a lack of clear communication between the ECC and locals on burn rate methodology.

It appeared that communication between local emergency managers and health care professionals did not have the fidelity necessary for a solid supply and demand distribution tracking system. Local emergency managers were never provided an allocation document so they would know how much was targeted for their community.

Recommendation: Evaluate scenarios to identify when state agencies are likely to be relied on as main source of incident information to counties and cities. Where possible, identify essential elements of information the state should push to tribes, counties and cities in those events. The goal is to provide information and guidance to help them be effective in their communities, but also in reporting back up to the state.

➔ State to Tribe Communications

In general, most tribes felt like they were getting the information they needed, understood the processes being used, and what was required. However, the volume of information being circulated was overwhelming to some. There was also no clear understanding as to why the allocation of PPE to tribes did not get distributed immediately even though it had been allocated. The tribes were also frustrated by not being engaged with as a sovereign entity as they should be.

Recommendation: State agencies should refresh training on tribal sovereignty as it relates to emergency response and recovery.

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Deliver essential commodities, equipment, and services in support of impacted communities and survivors, to include emergency power and fuel support, as well as the coordination of access to community staples. Synchronize logistics capabilities and enable the restoration of impacted supply chains.

STRENGTHS

➔ PPE Branch

Analysis: Establishing the PPE Branch within the incident management structure demonstrated the priority of the operation and created a focal point for that effort. While typically part of the logistics section, because it was so important and having issues it needed to be elevated into operations. Through the PPE Branch and the engagement of the National Guard to operationalize the mission, the state was able to create a PPE strategic plan and stabilize the PPE effort. Ultimately, this allowed leadership to focus on issues other than PPE.

➔ Push Allocation

Analysis: The National Guard was essential to the transition to the push allocation method. The National Guard rapidly deployed over 100 personnel and assigned them to the PPE mission at NVC-Wilsonville. They were able to provide a reception and distribution structure sufficient to support the push effort. When the National Guard demobilized, the PPE supply was adequate to sustain efforts and respond to community needs.

Reserving a portion of the PPE supply as a state cache during the push allocation implementation created some nimbleness to respond to emerging issues. The state allocation set-aside was tapped to respond to unexpected requests, such as a long-term care facilities or migrant worker programs needing PPE.

➔ Sourcing

Analysis: The state has existing contracts with suppliers of PPE and within a day or two stock was depleted. Sourcing vendors for PPE immediately became a priority. The DAS procurement team, whose typical role is establishing contracts for state agencies to use and not actually doing purchasing, stepped in to execute the sourcing and procuring mission. The DAS procurement team's efforts to source whatever they could while prioritizing quality and fiscal management resulted in a success.

Business Oregon—In early March, potential vendor contacts came from everywhere. DAS procurement partnered with Business Oregon to do the vetting of companies contacting them with offers of PPE. Business Oregon looked up companies in registries and databases to see if the company was a legitimate business. A spreadsheet of those determined to be legitimate were sent to DAS for the purpose of vetting the product quality.

Public-Private Collaboration—Public-private coordination yielded some of the best leads. Known business leaders came forward with contacts they could vouch for. Other Oregon businesses had contacts in China like customs brokers and quality inspectors that could be leveraged to validate products and get the deal done. For example, an Oregon snowboarding company that buys fabric in China provided great support. Oregonians also stepped up to manufacturer products, including 3-D printed items, gowns, and hand sanitizer.

Opportunity: The new processes set up for vetting vendors need to be evaluated, compared to normal process, and then documented to support future efforts.

Opportunity: Establish an in-state supply chain and catalog of providers for PPE and other capabilities, medical supplies, and such. This should be supported by guidance on required standards, procurement processes, required certifications, and so on.

Opportunity: The state should examine barriers to success for local businesses when pivoting to meet an emergency need, then consider investments to help local businesses to be able to respond in the future. This could mean hiring someone to certify products and supplies as meeting relevant safety standards (e.g., FDA, CDC).

➔ Procuring

Perspective:
States and locals across the country and the world were having issues with validating businesses and vendors, supplies and deliver. Scams were common and dealt with across the board.

Analysis: The DAS procurement team typically does not buy much stuff, but rather establishes contracts, then agencies buy products through those contracts. They had a team of about eight people focused on procuring PPE, many who experienced a sharp learning curve on all the follow-up nuances needed to ensure success. The team decided to work in their offices to enable them to make decisions quickly, do purchase order quality checking and to troubleshoot problems. At the onset of the COVID-19 response, an end-to-end procurement system was not in place, so the team used Microsoft Word templates and Excel tracking sheets, which required lots of manual updates. With the vetted vendor sources, the team continued to order PPE regardless of the health numbers. Orders were purposely spread across vendors

to prevent unexpected delivery failures. Their efforts ensured that the state never ran out of PPE and was able to meet the identified need in the medical community.

Access to Decision Makers—The emergency declaration opened up wider options for procurement to buy needed items. DAS Procurement had a direct line to Oregon's Chief Operating Officer. This strong, trusted relationship allowed for quick decision making in the extraordinary procurement environment during COVID-19. This included a temporary increase in budgetary authority to minimize the number of times purchasing approval needed to be requested. Many state procurement officers were not able to institute emergency procurement orders such as this.

Flexibility—Procurement rules changed during the course of COVID-19 response. For some vendors the state needed to pay 50% down to secure the order, which is never done in a normal state procurement environment. Since China's working hours are Oregon's sleeping hours, decisions had to be made extremely fast. The team learned that to get a wire transfer, they needed to be at the state treasury by 10am to get the transfer approved, and then immediately send the funds to the overseas company. Without this level of effort and efficiency, they would lose the order to another purchaser.

Connections—PPE products were overwhelmingly manufactured in China and shipped to the US. Due to demand, freight capacity got chopped up and cost skyrocketed. A connection at the Port of Portland facilitated a connection with a contact at Cathay Air that allowed Oregon to get supplies moved more quickly and at lower cost. Connections with a professional organization for procurement officers – including 50 people in Oregon – proved helpful as weekly calls allowed for comparison of experiences and identification of successes, challenges and work-around options.

➔ Receiving and Distributing

Analysis: OHA requested support from DAS Printing and Distribution to distribute the H1N1 PPE supplies stored at the ODOC warehouse. DAS agreed, made space in the printing warehouse, and created an online order form to receive orders. The supplies from ODOC were sorted and then distributed based on orders. DAS printing used vehicles from fleet services and also rented sprinter vans and panel vans. This effort lasted for three and a half weeks until the H1N1 PPE stock was depleted. Once it was clear PPE supplies would come in large truckloads from FEMA and HHS, it was clear a larger spaces was needed. The newly purchased warehouse at Wilsonville was evaluated and turned on.

NVC-Wilsonville—Moving the PPE operations from the ODOC warehouse to the DAS warehouse at Wilsonville was crucial to success. The National Guard was able to run

shifts around the clock, ensuring products were received, inventoried, picked and distributed quickly and efficiently. Once the National Guard demobilized, operational hours went to less than 24/7 and it was very important to make sure someone was there to receive shipments. A dedicated phone for receiving was established and it was handed off with each shift. That one phone is the central point for contact on receiving shipments.

Having DAS and FEMA Region 10 representation at the warehouse when shipments arrived was valued. These representatives could make sure they got what they were supposed to get.

National Guard—It took a couple days to get the warehouse up and operational. The priority was to establish the capability to get shipments in, get products inventoried, and get them out. A distribution plan was developed so that within 24 to 48 hours of the warehouse receiving a PPE shipment, the product would be going out to localities and tribes. The OHA allocation percentages were used to divide up what was received. The National Guard established five distribution hubs, so a bulk shipment would be split into five hub shipments. Once at the hubs, the supplies would be broken down to the county- or tribe-specific shipment amounts and delivered. Testing kits were on a quick turn-around as well, and were in and out of the warehouse in three days.

Opportunity: The NVC-Wilsonville will be pivotal in successful distribution of testing supplies and future vaccine supplies. Refrigeration capacity is critical to success. The volume of refrigeration capacity needed to support testing and vaccine supplies should be determined and the facility should be outfitted with appropriate equipment to meet that need.

➔ Ordering and Inventory Tools

Analysis: DAS and National Guard representatives worked together to set up an ordering tool for counties and tribal partners, as well as an inventory management system relevant to the NVC-Wilsonville operations in mere hours of standing up. This was a modification of the tool established by DAS Printing and Distribution to create pick sheets and made it useful for the warehouse operations. Since allocation was now a push methodology, an allocation matrix created by OHA was introduced.

For example, if the warehouse received 1,000,000 masks, that number would be put into allocation spreadsheet. The allocations to tribes and counties were set in the matrix, along with the state hold-back. It would create the pick sheets for each county and tribe, as well as the state.

The ordering system had a variety of dashboards that allowed online access to inventory, and incoming supplies. Since a number of people entered orders into the system, it was important to have 'live' inventory to avoid an 'over-order' of products.

Product Specifications—As more diverse inventory was procured and received, more precise information on each type of PPE could be tracked. Being more detailed in product information tracking was a good improvement that allowed for visibility into the inventory details.

Opportunity: The inventory tracking and ordering instruments should to be captured, refined, and expanded to address future incident needs.

AREAS FOR IMPROVEMENT

➔ Inventory Management

Analysis: The supplies on hand at the ODOC warehouse prior to January 20, 2020 were not all ready to be used off the shelf. Some of the supplies had expired or had deteriorated and could not be used. Inventory numbers from the H1N1 supplies did not always reflect what was in a box. For example, a box labeled as containing 100 face shields when opened by a locality would actually have 63 face shields. The inability to provide accurate numbers created frustration, confusion and extra work. It took a long time to establish a procurement order log, which created a ripple of challenges throughout PPE operations.

Expectations and goals related to managing PPE resources, including tracking and reporting inventory, changed based on requests from federal partners, including the White House, FEMA and HHS. Political interest in PPE was a challenge as political representatives wanted to wrap their hands around the PPE information to show progress. Without accurate numbers, there was not a lot to share to represent the forward leaning response of state government.

Recommendation: An inventory management strategy needs to be established with clear roles and responsibilities for proper storage of supplies, expiration tracking, and stock rotation and replenishing.

Recommendation: An enterprise-wide inventory management system would improve information visibility and response efficiency. If the state wants to have distributed warehouses with multiple locations and multiple inventories, it will need a system that can provide data on what product the state has and where it is located. Once the inventory is set in the system, the state will be able to track anything in the state. Linking to an ordering system will allow inventory to be ordered and pulled.

Opportunity: The inventory management system established by DAS at the NVC-Wilsonville provides an excellent foundation to build on. Determining how to provide a shared portal with state, tribal, and local response personnel would be a useful improvement. Integrating the inventory management system with the ECC's information management center, whether Ops Center or a new system, should be explored.

➔ Warehouse Transitions

Analysis: ODOC was a storage facility and was never intended to be more than that. Per the state EOP, logistics and resources are supposed to be managed by the ECC. The warehousing transition happened because initial processes were not adequate and the enterprise was not being used. From the very beginning, DAS Printing and Distribution was involved to assist OHA and ODOC with distribution. After a few weeks, it became apparent more supply and distribution coordination was needed.

Recommendation: With NVC-Wilsonville now operational, the potential for warehouse transitions is diminished. The state should explore distributed warehousing facilities around the state to ensure supplies are available in multiple locations for emergencies with transportation infrastructure disruptions or weather conditions that prohibit movement of supplies.

➔ Product Specifications for Procurement and Distribution

Analysis: Order lists provided to procurement to assist with purchasing were very generic and did not provide enough detail to guide staff to the right products. Since the procurement team are not medical or PPE specialists, they did not even know what questions to ask to make sure the right item was being selected. Guidance on approved products was also vague. For example, they were told to order products that were FDA certified, but the right term to ask for was a product with 'FDA Clearance.' As states were left competing with other states and other counties to secure PPE, quickly knowing the correct type of PPE to order (e.g., N95 masks vs. KN95 masks) could make the difference in securing an order or missing an opportunity. Earlier and better coordination on the type and level of protection offered by various PPE items could have been better communicated to the procurement team.

Perspective:
Certifications, product specifications and requirements changed at the federal level after many states and locals had already made purchases, ultimately impacting the viable supplies on hand for distribution.

Approved Products—Changes in FDA approved products caused great frustration when a purchased KN95 product was later removed from the list of products approved for medical use. An opportunity was identified that allowed the non-medical grade KN95s to be used with added labeling to be clear they were not for medical use. The procurement team had to be vigilant and adjust protocols and halt previously approved purchases when FDA or CDC guidelines changed.

KN95 Masks Labeled for Non-Medical Use

Quantity—Another point of confusion was the quantity to procure. "More and as fast as possible" was the direction from OHA, fueled by some political pressure. The DAS ESF 7 team and others in the ECC raised questions of how much is enough but "more and faster" remained the answer for some time. Eventually, DAS pointed out we could order and possibly prepay for 100s of millions of PPE items but asked if that is what the state really wanted to do. Once that point resonated, more realistic targets were determined.

Perspective:
Understanding what might be needed for something that was unknown and a struggle for all stakeholders.

Ordering Guidance—PPE supplies are packaged in different quantities. Orders based on the allocation percentages would specify quantities of supplies that didn't align with packaging, creating unnecessary struggle for warehouse staff charged with picking orders. For example, a box of swabs may come as 50 per box or 100 per box. An order for 75 swabs is a challenge to pick.

Testing Supplies—The testing supply ordering process did not work. Everyone needed testing supplies, but 'order what you need and we'll let you know if we have some' was not useful to localities. Since there were many different types of labs operating, various specimen collection types and media were needed. A change to consider is to share what was available with hospitals so they could adjust their orders accordingly. The time for an emergency manager to talk to the lab and then their supply chain folks to get an order together, then for the locality process to get the order into the county system, then to OpsCenter – only to never hear back about the status of an order – created significant frustration.

Recommendation: Develop and maintain PPE specifications and quality standards to guide future procurement purchases. Once specifications are determined, procurement should establish price agreements and an expanded list of approved vendors, looking to local businesses whenever possible. In an incident, dedicate subject matter experts to advise in the procurement of bulk PPE purchases. Estimates on quantities needed based on different emergency scenarios should be explore to help establish baseline quantity guidelines for purchasing.

Recommendation: To address the discrepancy between order quantities and package quantity, work should be done to see if the ordering system can be adjusted to reflect packaging quantities, or to guide order amounts (e.g., must be ordered in multiples of 50, based on packaging).

➔ Push Model

Analysis: Feedback from tribal and local recipients of PPE resources through the push allocation model show 50 percent did not have needs met. Extreme supply chain disruption hindered the state's ability to use the traditional resource request and fulfillment strategy for PPE supplies. When the state shifted to the push-based strategy mid-incident, there were changes to request and delivery mechanisms, and multiple information requirements and queries left many overwhelmed. Some local emergency managers did not know what they would be receiving or received excess amounts of things they did not immediately need (ex. hand sanitizer). They also indicated that the delivery schedules, processes and notifications were inadequate.

There was concern that the allocation process did not recognize tribal sovereignty; they were lumped into the same group as the counties at the beginning. While this was recognized and remedied, this needs to be avoided in the future. Frustration over allocated supplies not being released to tribes was also a concern.

Recommendation: Deliberate outreach and implementation planning must occur to anticipate challenges and allow for active stakeholder engagement to address concerns. Plans should be reviewed and updated to outline the linkage between resource request challenges and stakeholder outreach.

Recommendation: State agencies should refresh training on tribal sovereignty as it relates to emergency response and recovery.

➔ Testing

Analysis: The state public health lab has very limited capacity. At the beginning of COVID-19 testing operations the lab could handle 80-120 tests a day. Now it can handle around 400 test a day, which is still far from adequate when swift test results are critical for infection control. One locality reported an 18-day delay in getting test results.

Perspective:
Approaches and capacity for testing in each state differs. A national evaluation or approach may be necessary for ensuring consistency.

Recommendation: The state should examine the capacity of the state lab and determine if additional investment in the lab is needed.

Appendix 1—Acronyms and Definitions

Acronym / Term	Definition
AOC	Agency Operation Center
ASPR	Assistant Secretary for Preparedness and Response
CAPO	Community Action Partnership of Oregon
CBO	Community Based Organizations
COG	Continuity of Government
COOP	Continuity of Operation Plans
CRT	Coronavirus Response Team
DAS	Department of Administrative Services
DPSST	Department of Public Safety Standards and Training
ECC	Emergency Coordination Center
EM	Emergency Management
ERC	Economic Response Council
ESF	Emergency Support Function. Quick sheet can be found at: https://www.oregon.gov/OEM/Documents/Oregon_ESF_Descriptions_One_Page_Job_Aid.pdf
ESF 5	How the State of Oregon will compile, analyze and coordinates overall information planning activities in the ECC. The primary agency tasked with ESF 5 is OEM.
ESF 7	How the State of Oregon will provide logistical and resource support during a time of emergency, as well as provide financial tracking and records management of overall costs of the state's response. The Agency tasked with ESF 7 is DAS.
ESF 8	How the State of Oregon will coordinate plans, procedures and resources to support health and medical care during a time of emergency and/or a developing potential health and medical situation. The primary agency tasked with ESF 8 is OHA.
FBO	Faith Based Organizations
GDC	Governor's Disaster Cabinet
HSPR	Health Security Preparedness and Response
ICP	Incident Command Post
IMT	Incident Management Team
JIC	Joint Information Center
Key Decisions	Decisions that include activating and expanding operations, coordinating with the Governor's office, and decisions based on Executive Orders.
LPHD	Local Public Health Departments
MAC	Multi-Agency Command
MAC-S	Multi-Agency Command Support

Acronym / Term	Definition
NGO	Non-Profit Organizations
NVC-Wilsonville	Warehouse facility called North Valley Complex located in Wilsonville, OR
ODF	Oregon Department of Forestry
ODOC	Oregon Department of Corrections
OEM	Office of Emergency Management
OHA	Oregon Health Authority
OMD	Oregon Military Department
OSFM	Oregon State Fire Marshall
PHD	Public Health Division
PPE	Personnel Protective Equipment
Pull Method	PPE distribution process where counties and tribes submit requests for resources to the state, the requests are vetted and approved, and then PPE supplies are disbursed.
Push Method	PPE distribution process where the state made regular PPE bulk shipments of received, purchased, and donated items to all counties and tribes. This process does not require counties and tribes to submit requests for individual locations.
SRO	State Resilience Officer

Appendix 2—Report Methodology

The information in this report focused on the approach to coordinating and resourcing personal protective equipment for the COVID-19 response in the State of Oregon. The information collected was derived from individuals and organizations that were identified as stakeholders through the Governor's Office and the State Resilience Officer. The information was gathered through a series of online surveys, specific to each stakeholder group that was surveyed as well as interviews held virtually either one-on-one or in small groups. The contractor also reviewed documentation related to the response and recovery operations of this event and previous events. These documents included but were not limited to situation reports, after-action reports, articles, incident action plans, executive orders and other documentation.

Stakeholders in the Review

Representatives from the following organizations participated in interviews during this project:

- Department of Administrative Services
- Department of Administrative Services, Procurement Services
- FEMA Integration Team
- FEMA Region 10
- Governor's Office
- Office of Emergency Management
- Office of the State Treasurer
- Oregon Department of Forestry
- Oregon Department of Human Services
- Oregon Health Authority
- Oregon Military Department
- Oregon National Guard
- Oregon Office of State Fire Marshal
- Oregon Youth Authority
- U.S. Department of Health and Human Services

The following stakeholders responded to the survey outreach during this project:

Oregon State Agencies

Surveys sent to 124 contacts – 38 responded
Response rate: 31%

- Department of Administrative Services
- Department of Administrative Services Procurement Services
- Department of Consumer and Business Services
- Enterprise Information Services
- Governor's Office
- Office of Emergency Management
- Oregon Department of Forestry
- Oregon Department of Human Services
- Oregon Department of Transportation
- Oregon Health Authority
- Oregon Judicial Department
- Oregon Military Department
- Oregon National Guard

Oregon State Agencies

Surveys sent to 124 contacts – 38 responded
Response rate: 31%

- Oregon Department of Corrections
- Oregon Department of Corrections Health Services
- Oregon Department of Education
- Oregon Office of State Fire Marshal
- Oregon State Police
- Oregon Treasury
- Oregon Youth Authority

Tribal Nations—Tribal Leaders, Emergency Management, and Public Health

Surveys sent to 32 contacts – 10 responded
Response rate: 31%

- Burns Paiute Tribe
- Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians
- Confederated Tribes of Grand Ronde
- Confederated Tribes of Siletz Indians
- Confederated Tribes of Warm Springs
- Coquille Indian Tribe
- Cow Creek Band of Umpqua Tribe of Indians
- Siletz Community Health Clinic

Cities and Counties—Emergency Management, Public Health, Hospitals, and Health Systems

Surveys sent to 267 contacts – 66 responded
Response rate: 25%

- Asante Health System
- Benton County
- Benton County Emergency Management
- Benton County Health Department
- City of Tigard, Washington County
- Clackamas County
- Columbia County Emergency Management
- Columbia Memorial Hospital
- Coos County Sheriff's Office
- Corvallis, Oregon
- Crook County Health Department
- Curry County
- Curry County Emergency Management
- Deschutes County Sheriff's Office
- Mid-Columbia Medical Center
- Multnomah County
- Northwest Oregon Health Preparedness Organization
- Polk County Emergency Management
- Polk County Health Services
- Polk County Sheriff's Office
- Portland Emergency Management
- Providence Health & Services
- Providence Medford Medical Center
- Public Health MAC group
- Saint Alphonsus Medical Center, Baker City
- Salem Health Hospitals and Clinics
- Samaritan Albany General Hospital
- Samaritan North Lincoln Hospital
- Sherman County

Cities and Counties—Emergency Management, Public Health, Hospitals, and Health Systems

Surveys sent to 267 contacts – 66 responded
Response rate: 25%

- Gilliam Co. Emergency Management
- Grant County Health Department
- Grant County Public Health Department
- Harney County
- Hood River County Health Department
- Jefferson County Public Health
- Jefferson County Sheriff's Office
- Klamath County Public Health
- Lake County Public Health
- Lane County
- Lane County Public Health
- Legacy Health
- Lincoln County
- Linn County Public Health
- Malheur County Emergency Management
- Malheur County Health Department
- Marion County
- Marion County Emergency Management
- Shriners Hospital for Children, Portland
- St. Anthony Hospital
- St. Charles Health System
- Tillamook County Emergency Management
- Union County Emergency Services
- Veterans Affairs Medical Hospital
- Wallowa Memorial Hospital
- Wasco County Emergency Management
- Washington County Emergency Operations Center
- Wheeler County Public Health
- Willamette Valley Medical Center
- Yamhill County
- Yamhill County Emergency Management
- Yamhill County Public Health

Community Action Partnership of Oregon

Surveys sent to 19 contacts – 6 responded
Response rate: 32%

- Community Action Program of East Central Oregon
- Community Action
- Community Action Team, Inc.
- Klamath and Lake Community Action Services
- United Community Action Network

Agricultural Producers and Processors, and Support Organizations

Surveys sent to 48 contacts – 8 responded
Response rate: 17%

- Columbia Gorge Fruit Growers
- Consejo Hispano
- FOOD for Lane County
- Northeast Oregon Network
- Northwest Early Learning Hub
- One Community Health
- Organic Redneck Growers
- Virginia Garcia Memorial Health Center

Long-term Care Facilities

Surveys sent to 673 contacts – 167 responded
Response rate: 25%

- Adeo In Home Care
- Aging Wisely with Heartfelt Hands
- Aidan Senior Living at Reedsport
- Alderwood Assisted Living
- Always At Homecare
- Asa Care Inc. DBA Hope N Care
- Ashley Manor
- Avamere
- Avamere - Hillsboro CBC
- Avamere At Cascadia Village
- Avamere at Seaside
- Avamere at St. Helens
- Avamere Court at Keizer
- Avamere Crestview
- Avamere Oswego Grove
- Avamere Rehab of Coos Bay
- Avamere Rehabilitation of Newport
- Avamere Riverpark
- Azalea Gardens
- Bayside Terrace
- Bend Transitional Care
- Blue Haven Memory Care
- Blue Haven Memory Care, Dallas
- Bonaventure of Medford
- Brookdale Forest Grove
- Brookdale Hillside
- Marquis Piedmont Assisted Living
- Marquis Piedmont Post-Acute
- Marquis Vermont Hills
- Meadow Creek Village
- Meadow Park
- Meadowbrook Place
- Memory Lane Homes
- Mennonite Home
- Milton Freewater Health and Rehab
- Mirabella Portland
- Miramont Pointe
- MorningStar of Happy Valley
- Mountain Park Memory Care
- Mountain View Residential Care Facility
- Mt. Scott Residential Care Facility
- Nehalem Valley Care Center
- Nyssa Gardens Assisted Living
- Oak Lane Retirement
- Pacific Health and Rehabilitation
- Pacifica Senior Living Klamath Falls
- Parkview Assisted Living
- Pelican Pointe Assisted Living and Memory Care
- Pheasant Pointe Senior Living
- Pilot Butte Rehab Center

Long-term Care Facilities

Surveys sent to 673 contacts – 167 responded
Response rate: 25%

- Brookdale McMinnville Town Center
- Brookdale Roseburg
- Brookside Memory Care
- Brookside Place
- Caring for the Coast
- Cascade Living Group
- Cascade Living Group - The Village Assisted Living
- Cascade Manor
- Cascades of Bend
- Celia's House in Holmes Park
- Cherry Park Plaza Senior Living
- Cherrywood Memory Care
- Clatsop Care Retirement Village
- Comfort Care / Home Care Inc.
- Corvallis Manor
- Crystal Terrace Senior Living
- Dallas Retirement Village Memory Care
- Davenport
- Deerfield Village Assisted Living
- Desire for Healing, Inc.
- East Cascade Retirement
- East Portland Care Center
- Elderly Care Home
- EmpRes Hillsboro Health and Rehabilitation Center
- Enlivant
- Farmington Square Salem
- Fieldstone Cornell Landing
- Fox Hollow Independent and Assisted Living
- French Prairie Nursing and Rehab
- Friendship Health Center
- Frontier Management
- Golden Age Living Residential Care Facility
- Good Samaritan – Curry Village
- Pioneer Place
- Pioneer Place Nursing and Rehabilitation
- Portland Health and Rehab
- Powell Valley Living
- Prairie House Assisted Living
- Prestige Care and Rehabilitation of Reedwood
- Princeton Village Assisted Living
- Providence Benedictine
- Providence Brookside Manor
- Providence Elderplace at Glendoveer
- Redwood Heights
- Regency Pacific
- Regency Redmond Rehab and Nursing Center
- Regency Woodland
- Regent Court
- Rose Linn Care Center
- Rose Villa Senior Living
- Rosewood Park Retirement and Assisted Living
- Salem Transitional Care
- Sapphire Health Services
- Secora Rehabilitation of Cascadia
- Senior Resource Group - SpringRidge
- Skylark Assisted Living and Memory Care
- Spring Valley Assisted Living
- Spruce Point Assisted Living
- Spruce Point Memory Care
- Sunnyside Meadows Memory Care
- Sunset Estates
- Sweet Bye N Bye, Inc
- Sylvia's Legacy, DBA Cherry Blossom Cottage
- Terwilliger plaza
- The Aspens

Long-term Care Facilities

Surveys sent to 673 contacts – 167 responded
Response rate: 25%

- Gracelen Terrace Long-term Care Facility
- Grande Ronde Retirement
- Harmony Living
- Harvest Homes
- Hawks Ridge Assisted Living Facility
- Hawthorne House of Salem
- Hearthstone at Murrayhill
- Heartwood Place Memory Care
- Heirloom Living Centers
- Heron Pointe Senior Living
- Hillside Heights Rehab Center
- Independence Health and Rehabilitation
- IVY COURT SENIOR LIVING
- Juniper Springs Senior Living
- Kilchis House
- Lancaster Village
- Life Care Center of Coos Bay
- Maple Ridge Senior Living
- Maple Valley Memory Care
- Markham House
- Marquis Centennial
- Marquis Forest Grove Post Acute Rehab
- Marquis Marian Estates
- The Bridge Assisted Living
- The Forum at Town Center
- The Oaks at Lebanon
- The Springs at Mill Creek
- The Springs at Wilsonville
- The Taft Home
- The Village at Keizer Ridge
- Timber Pointe Senior Living
- Timberhill Place
- Timberview Care Center
- Touchmark at Mt. Bachelor Village
- Turner Retirement Homes
- Umpqua Valley Nursing and Rehabilitation
- United Homecare Services
- Village at Valley View
- Vineyard Heights Assisted Living
- Wallowa Valley Senior Living
- Waverly Place Assisted Living
- Wiley Creek Community
- Willamette Manor Assisted Living Facility
- Willow Place
- Windsor Health and Rehabilitation Center
- Woodland Heights LLC