# Integrating Infection Prevention and Control Science into POD-based Planning

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Climate and Crisis Preparedness

# Purpose

**Purpose:** to increase awareness and integration of infection prevention and control (IPC) principles and environmental health and exposure sciences into rapid dispensing operations of any available medical countermeasure (including vaccine) to the population in need.

This training is not meant to be a comprehensive training for planning for and responding to a biothreat incident. It is meant to be a part of a collection of training to better prepare personnel expected to execute roles (leadership and otherwise) during an outbreak, pandemic, or other biothreat incident.

Suggested concurrent or pre-requisite material includes:

- FEMA IS 100, 200, 700, 800
- MGT 319 (delivered onsite by Texas A&M Engineering Extension Services - TEEX)
- AWR 314 (online via TEEX)

# Audience

Interested State, Tribal, Local, and Territorial public health and emergency management partners, including:

- Emergency managers, planners, and logisticians
- Public health emergency preparedness personnel
- State, regional, and local mass medical countermeasure dispensing planners and other community partners
- Emergency Support Function 8 (ESF-8) stakeholders
- Physicians, registered nurse / nurse practitioners, nurse technicians, licensed practical/vocational nurses, medical assistants
- Emergency Medical Services
- Law enforcement partners
- Others involved in countermeasure distribution and dispensing, including:
    - Pharmacists and pharmacy technicians
    - Physician assistants
    - Health educators and communications personnel
    - Epidemiologists
    - Environmental health scientists

# Case Study: SARS-CoV-2 and COVID-19

- This training will focus on the mass vaccination response to the COVID-19 pandemic caused by the virus known as SARS-CoV-2. The training will not detail differences across the virus lineage or variants researched and identified throughout the pandemic, but rather focus on the vaccination operations as a case study for future medical countermeasure distribution and dispensing planning.
- The COVID-19 pandemic presented real-life, complex challenges which taxed the traditional POD-based planning frameworks. This training will highlight key planning considerations and introduce infection prevention and control strategies to deploy in POD-based operations for future threats.

# Integrating Infection Prevention and Control Science into POD-based Planning

## **Module 1**: Introduction

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# Objectives

- Introduce basic medical countermeasure distribution/dispensing (MCM)
- Introduce POD concepts as a distribution/dispensing modality
- Introduce healthcare POD operations in the context of COVID-19

# Overview and Assumptions

- Point of Dispensing (POD) strategies may be operationalized during public health emergencies or more routine incidents impacting public health. PODs may be used for vaccinations or may be operationalized to dispense other medical countermeasures (MCMs) such as oral antibiotics.
- As of 2022, all 62 Public Health Emergency Preparedness (PHEP) cooperative recipients, as well as Cities Readiness Initiative (CRI) local planning jurisdictions, are expected to participate in the CDC's operational readiness review (ORR) aimed to assess a local jurisdiction's ability to execute a large response requiring MCM distribution and dispensing.
    - Hospitals and Healthcare entities are encouraged to develop, maintain, and exercise closed POD plans.
- During public health emergencies, healthcare entities may be expected to support community and mass vaccination sites.

# Types of Countermeasure Distribution Modalities

- PODs (Points of Distribution/Dispensing):

**Open PODs**: public visits pre-identified site(s) to receive or pick up pre-delivered countermeasure when available or as instructed by the authorities in an area receiving these countermeasures

  - As operationalized in the COVID19 pandemic, **Mass Vaccination Sites** are similar in scope and mission to the traditional POD system (which is deployed and operationalized under Federal programs, such as the Strategic National Stockpile and Cities readiness Initiative) for the distribution of a medical countermeasure

**Direct Delivery**: coordination to deliver specific countermeasures to specific location (as experienced in the COVID-19 response)

  - Ideal for: hospitals, nursing homes, assisted living, etc.
  - In many jurisdictions, these are also part of the Occupational or Closed PODs network

# Types of Countermeasure Distribution Modalities, (cont.)

**Occupational PODs or Closed PODs:** time is crucial in countermeasure distribution and dispensing efforts. The expected volume at Open PODs may prevent rapid uptake by the public, especially when physical distancing in a highly contagious, infectious disease pandemic is an ongoing threat. Private partnerships can accelerate local throughput and uptake by decompressing the volume at Open PODs and providing the appropriate MCMs at their occupational setting – these Occupational PODs are not always publicly known, but serve as a force-multiplier in getting the countermeasure to the public.

- Ideal for: larger employers, critical infrastructure stakeholders, first responders, etc.

- **Mobile Delivery:** countermeasure commodities are mobilized to specific areas or locations
  - Ideal for: rural areas, hard to reach or marginalized communities, areas directly impacted by a disaster with disrupted road infrastructure

# Hospital and Healthcare Distribution

- Hospital and healthcare POD distribution typically employs multiple delivery modalities.

  **COVID-19 example:**
  - Hospitals typically received vaccines either directly from the manufacturer or from the state allocation.
  - Facilities also utilized closed, on-site PODs for in-patient census and onsite personnel
  - Hospitals and healthcare agencies were also operating open community PODs (e.g., mass vaccination sites) as well as drive-thru PODs to dispense vaccines.

- The overall healthcare sector may be asked to support mass vaccination sites.
  - Healthcare entities have partnered with local public health and parish leadership to provide staff, space, planning guidance, and/or operational leadership and expertise to support mass vaccination events in that jurisdiction.

# Integrating Infection Prevention and Control Science into POD-based Planning

## **Module 2:** Site and Operations

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# Objectives

- Describe POD vaccination site modalities and considerations
- Summarize POD site set up, direction, and basic operations
- Examine real-life POD tips and lessons learned

**Goal: Expedite countermeasure dispensing**

# General POD-based Facilities

- Identifying and securing locations for MCM dispensing or vaccine administration can be challenging for local jurisdictions during an infectious disease pandemic
- Open POD sites should (among others):
  - be well-known to the population being served
  - be easily accessible for all population members
  - be able to accommodate large volumes of pedestrian traffic both inside and outside of the facility(-ies) as well as vehicle traffic and parking.
- Examples of Open POD sites include:
  - Convention Centers
  - High school gymnasiums
  - City-based recreation facilities

# Hospital and Clinic POD-based Operations

- Identifying internal space for vaccine administration can also be challenging in hospitals and clinics during an infectious disease pandemic
- For mass vaccination strategies, consider using:
  - Unused / underused wing of hospital
  - Hospital conference center
  - Parking lot for drive through (being careful not to disrupt emergency bays and access to the facility altogether)
  - Closed (even temporarily closed) waiting areas and lobbies
  - Adjacent, off-site spaces to decompress crowded clinic or hospital areas
    - Coordinate visits at shift-change for staff and providers, etc.

**Lobby area transformed into Observation Area during COVID-19 vaccination rollout at the JBJ Research Building for Tulane Health Sciences**

Credit: Tulane News | Photo by Paula Burch-Celentano
https://news.tulane.edu/news/photos-tulane-rolls-out-covid-19-vaccine

# Set-up and operational considerations – processes are our friend

- **Map the process and actual flow** – from site receipt of vaccines / countermeasures to the individual exiting the POD / site.
  - Resource supply and re-supply are crucial require real-time monitoring and accurate forecasting
  - For a vaccination example: map the entire MCM delivery process — from “vaccine arrival in pharmacy” to “vaccine delivery to the POD” — outlining this with a process map will allow the operational team members to visualize potential obstacles, define roles, and plan efficient storage and preparation of the vaccine.
  - Consider exercising the operational model – tabletop/guided discussion, functional, for perhaps full-scale (as many performed using the flu vaccine in advanced of COVID-19 vaccine rollout)

# Set-up and operational considerations – processes are our friend, cont.

- **“Signs, signs, everywhere signs”** – provide more than enough to eliminate confusion regarding POD flow and progression to different areas
  - Signs should reflect languages commonly spoken by population served

- **Time is your enemy – minimize wasted time**
  - Consider stocking each visitor vaccine administration area with standard supplies and a printed set-up *diagram* to hang in each. Vaccinators will likely rotate, so this will make it easy for the people on duty to assemble the space and maximize time while there.

# When MCMs (and time) are limited…

- Consider templates to document countermeasure counts and train everyone on what they are, and how they are to be used
- For vaccines:
  - Consider counting syringes (POD manager) each time they are received from the pharmacist; both verify the count number and document this in a log (ICS 214 possibly )
  - Consider permitting a fixed number of syringes at a time for each vaccinator
- Have dedicated staff track and compare the number of doses or regimens given with the number remaining in the locked cabinet or refrigeration several times each day

# When MCMs (and time) are limited…(cont.)

- Establish coordinated process for estimating the amount available each day so MCM is not wasted
- Understand and rehearse specific storage requirements among all POD staff and consider expiration dates of specific lot numbers, using first-to-expire first
- In planning the POD operations, consider prioritization of who receives the MCM (e.g., most likely to be exposed such as healthcare workers, high risk healthcare workers or community members due to preexisting medical conditions, frontline responders, etc.)

# Example of Mass Vaccination Operations: General Core Stations

### Queue Management

- Maintain safe distancing with stanchions, etc.
- Try to avoid early arrivals and close queuing if possible
- Staff adequately for control and have flex staff ready to address issues.

### Check-in or Registration

- Online pre-registration works best with QR code to be scanned at arrival.
- Phone-in pre-registration
- Maintain safety while queuing and proceeding to next area.

### Vaccination / Treatment

- Ensure enough vaccine stations and healthcare providers are available to avoid bottle necking and queuing.
- Consider software programs to assist through state and/or healthcare coalitions
- Solicit examples from successful sites and operations

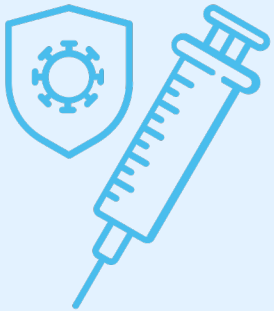
### Observation Area

- If using a multi-dose vaccine, schedule the follow-up visit during this time
- Provide ample seating and staff for observation
- Apply recommended observation waiting period per Federal or manufacturer guidance.

### Discharge / Exit

***Maintain safety and Infection Prevention and Control protocols!***

# Mass Vaccination Operations: Larger Sites and Community Vaccination Sites



# Vaccination Facilities – Community Vaccination Sites

Facilities can be pre-existing and outfitted for vaccination, or new facilities can be established.

Possible modalities:

- Fixed Facility
- Drive Through Facility
- Mobile Vaccination Clinic

| Examples of Facility Size Models | | | | | |
|---|---|---|---|---|---|
| | **Type 1** | **Type 2** | **Type 3** | **Type 4** | **Type 5 (mobile)** |
| *Capacity (doses/day)* | 6000 | 3000 | 1000 | 250 | 250 |
| *Size (sq. ft.)* | 15,000 | 7500 | 4500 | 2500 | 2500 |
| *Available Parking* | 800 | 600 | 250 | 130 | 130 |

*Source: FEMA, Community Vaccination Centers Playbook*

# Logistics and Site Set-Up

Be sure to designate areas for the following (away and secure from those without approved clearance):

- **Vaccine receiving / Supply line:** supply unloading and resupply areas
- **Vaccine Storage (onsite)**: supplies kept in climate-controlled storage
- **Vehicle line and parking**: where the public drives and parks to receive supplies
- **Walk-up and entry lines**: where the public queues at pre-registered times to receive the vaccine

Signs and traffic cones are used to define areas and direct traffic accordingly to prevent traffic flow concerns regarding arrival of vaccine/resupply and population traffic receiving vaccines.

# Operations: General Core Stations

### Queue Management

- Maintain safe distancing with stanchions, etc.
- Try to avoid early arrivals and close queuing if possible
- Staff adequately for control and have flex staff ready to address issues.

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# Set-Up: Reducing Exposure Risk for Clients in Contagious Infectious Diseases

- Pre-register individuals to arrival time slots
  - Prevent bottlenecking
- Create line of flow
  - Separate entrance and exit
  - Avoid congregation/turning past one another in potentially cramped areas
- Stagger stations
  - Improves visibility
  - Improves physical distancing
- Ample space for individuals waiting/filling out paperwork to safely distance
- Safely distanced observation area

# Set-Up: Reducing Exposure Risk for Clients in Contagious Infectious Diseases (cont.)

- Safety equipment
  - Multiple hands-free hand sanitizer locations
  - Spray/wipes for surfaces including electronic scanning devices (tablet, etc.), pens for registration, tables, etc.
- Separation of materials
  - Reuse v. decontamination pen baskets
  - Extra clipboards/cardboard pieces for writing surfaces
- Proper signage, such as:
  - Masks required
  - Physical distancing stanchions and/or tape/floors signs

# Set-up: Tips and Lessons Learned

- Pre-register individuals to 15-minute time slots to reduce bottlenecking
- Stagger interior receiving tables in a chevron model
    - This allows people to see which stations are open (improves throughput and reduces bottlenecking)

# Set-up: Tips and Lessons Learned

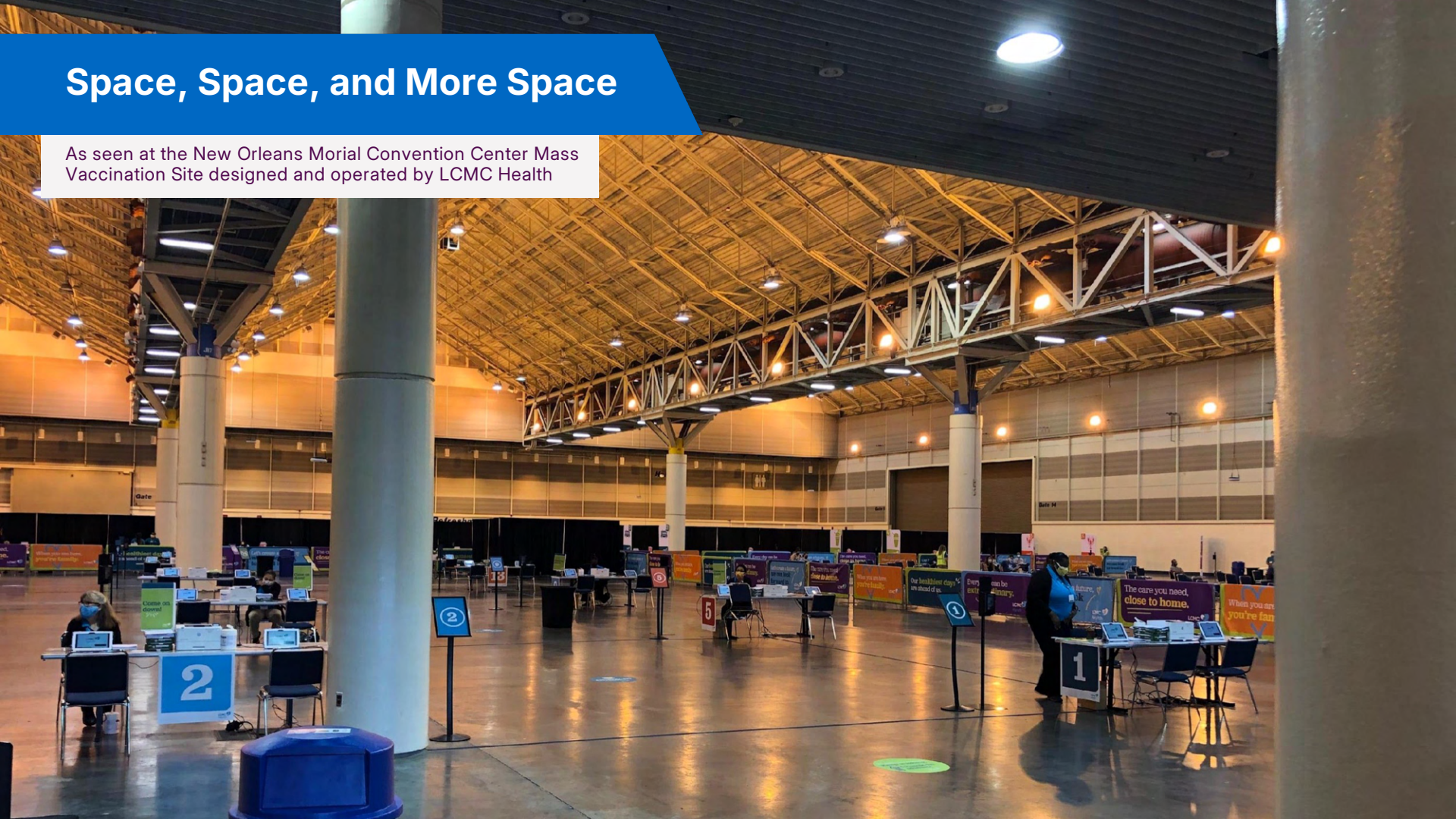
- Avoid overcrowding and bottlenecking
  - Interior operations
    - Functional and well-spaced layout is paramount
  - Exterior queuing and crowd management strategies must prevent situations like the one depicted here, which is typical of traditional POD-based operations since most of these have been based on a non-communicable disease threat such as *Bacillus anthracis* (which causes Anthrax)

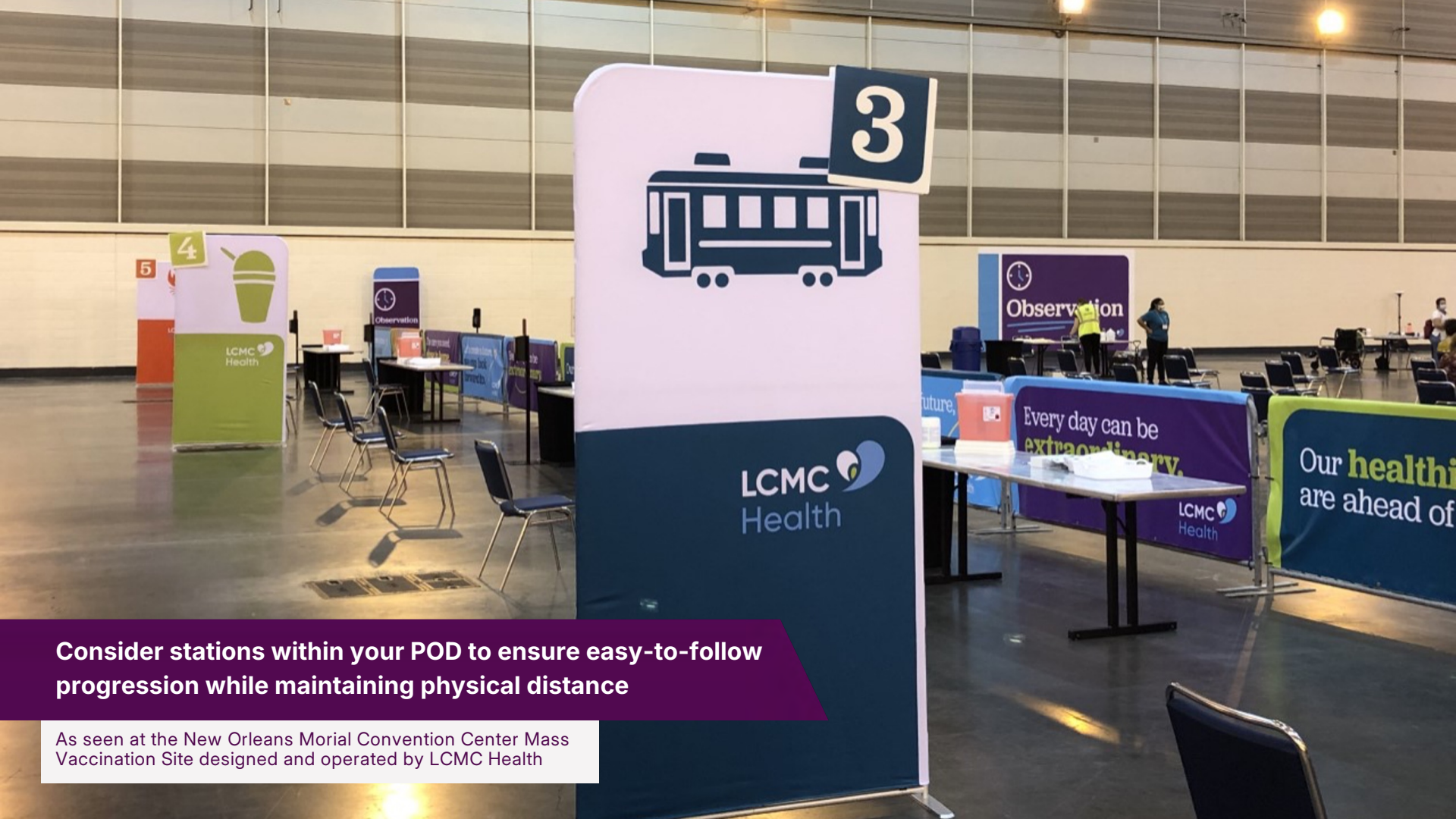

# Controlled entry in conjunction with pre-registration

As seen at the New Orleans Morial Convention Center Mass Vaccination Site designed and operated by LCMC Health

# Space, Space, and More Space

As seen at the New Orleans Morial Convention Center Mass Vaccination Site designed and operated by LCMC Health






**Consider stations within your POD to ensure easy-to-follow progression while maintaining physical distance**

As seen at the New Orleans Morial Convention Center Mass Vaccination Site designed and operated by LCMC Health

Spacing and rapid vaccine administration are cornerstones of a successful mass vaccination site, as seen here at the Mercedes Benz Superdome in Atlanta, GA, where a record 12,726 vaccines were administered in a single day in 2021 (served as FEMA Type I CVC).

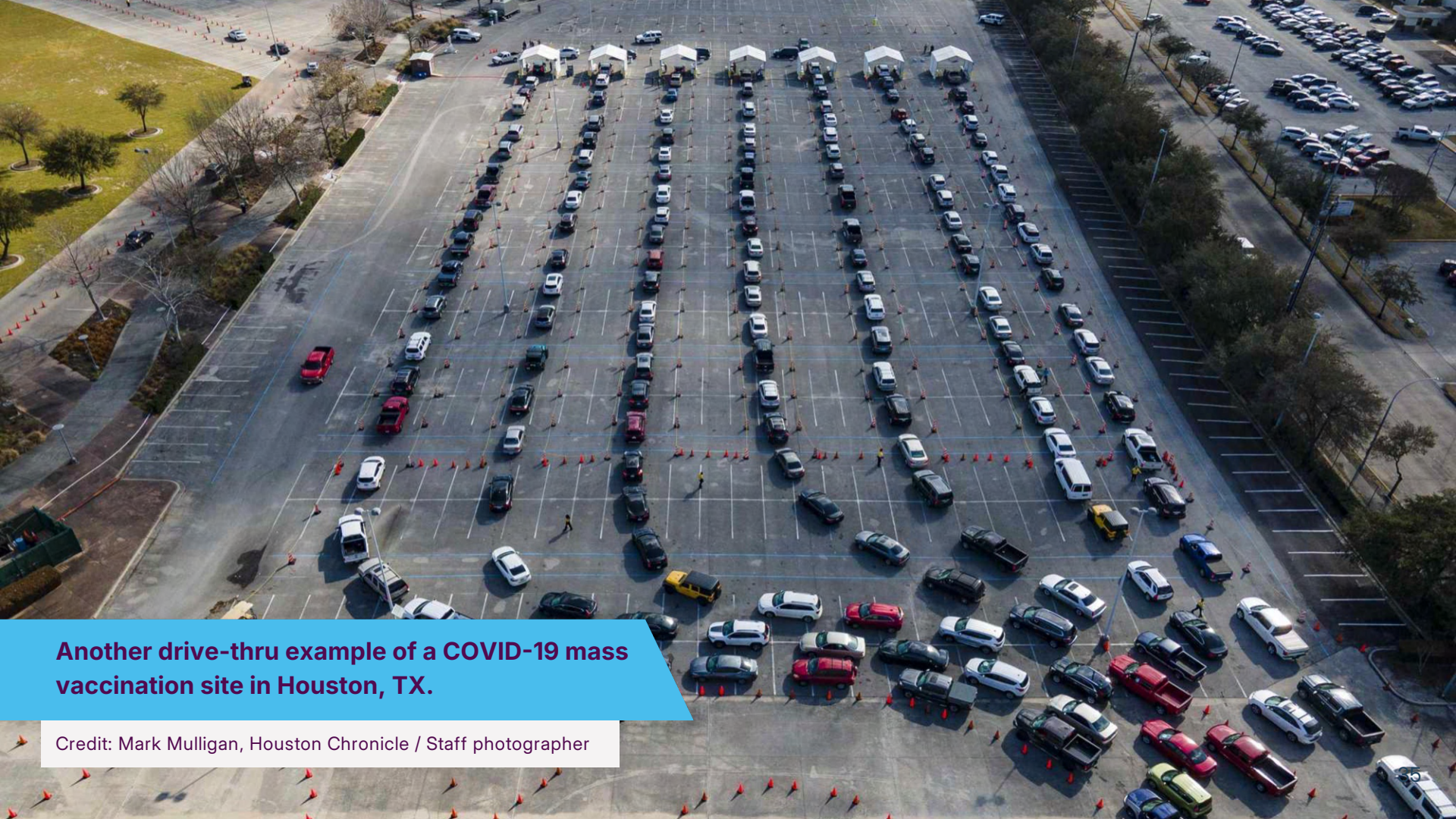
## Innovation is welcomed – drive-through PODs can be an effective strategy to deploy to accelerate your countermeasures

Photo: Terrebonne Parish, LA during the COVID-19 mass vaccination rollout


## Innovation is welcomed – drive-through PODs can be an effective strategy to deploy to accelerate your countermeasures

Photo by Lady of the Sea in Louisiana for the COVID-19 mass vaccination rollout

**NOTE:** Outdoor operations require advanced planning for weather-related threats. Beyond the logistical challenges experienced with COVID-19 vaccine (re)supplies, site operations might encounter flash flooding, high winds which could impact tent-based structures, wintry weather mix which can cause icy road conditions, etc. Beyond contingency planning for these threats, establish strong communications with the national weather service (for example), and the emergency operations centers supporting the site(s).



**Another drive-thru example of a COVID-19 mass vaccination site in Houston, TX.**

Credit: Mark Mulligan, Houston Chronicle / Staff photographer

# Innovation

- Pandemics are challenging situations
- Preparedness plans are likely more of a guide rather than tactical or operational response protocols due to the novel situation caused by the pathogen, etc.
- Don’t panic
- Stay focused
- Get creative with how your agency/department and/or facility can be best positioned to fulfill the mission
    - Coordinate with POD-planning stakeholders to offer your locations, as appropriate
    - Utilize internal subject matter experts in your own closed POD
    - Offer SMEs to assist other POD-based planning or operations in your jurisdiction

# General: Tips and Lessons Learned

- Practice, practice, practice!
- Stadiums make great PODs and mass vaccination sites because they are designed for moving large numbers of people
- Large distribution operations should align well with public transit routes
  - Consider establishing vouchers with driver-services like Uber for example
- Volunteers are crucial to successful POD-based operations
- Students are an untapped resource

# General: Tips and Lessons Learned

- Drive-through PODs have proven effective
  - Factor in winds and confined spaces, as vehicle exhaust could be an issue
  - It will potentially be hot or rainy – shelter for those receiving the countermeasure
    - Protect the countermeasure too!
  - Communication and traffic patterns are paramount
    - Cones and easy-to-follow progression – consider dedicated staff to oversee traffic
    - Disruption to local daily commerce?
    - Disruption to daily operations onsite?
  - Sharps and hazardous waste onsite – proper disposal and pick-up strategies
  - Cold chain concerns, if applicable
    - Early stages of the COVID-19 mRNA vaccines indicated an extensive cold chain challenge
    - Distribution site capable of keeping countermeasures safe? Power needs – onsite and/or portable?

# Integrating Infection Prevention and Control Science into POD-based Planning

## **Module 3:** POD Support Functions

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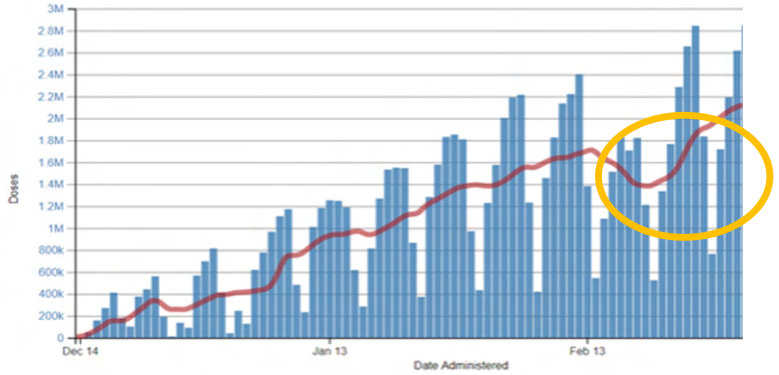
# Objectives

- Highlight key POD logistical considerations
- Describe and define typical support roles within the POD operation
- Describe POD support operations and actions

**Goal: Sustain ongoing POD operations**

# Vaccine and MCM Readiness and Supply



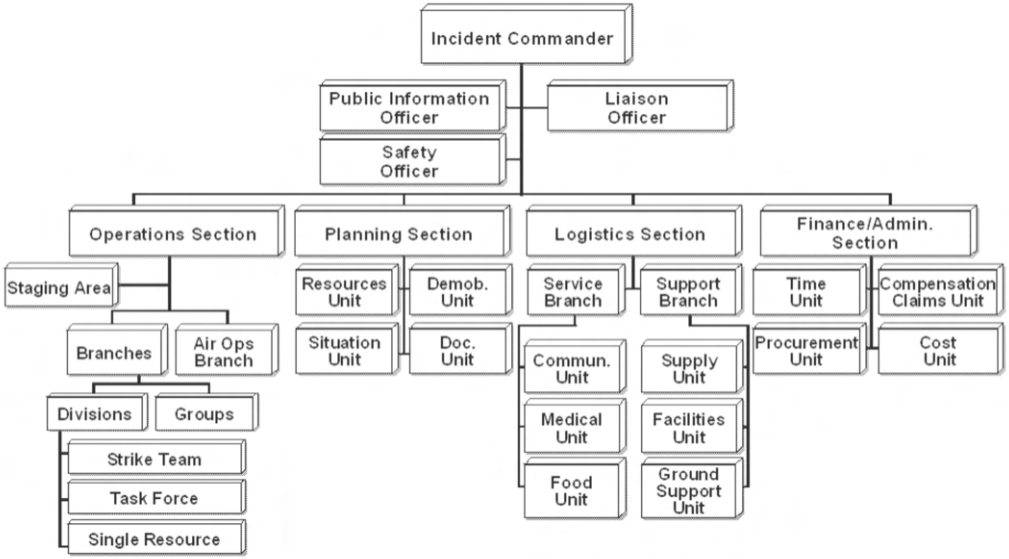

- Ensure the available (and expected) vaccine doses or countermeasures meet the expected volume of daily throughput
- Supplies, including vaccines/countermeasures, might be inconsistent and vary from day-today or week-to-week due to:
  - Nationwide weather (highlighted dip during wintry weather in Feb. 2021)
  - Statewide weather
  - Vaccine and countermeasure allocations to the state
- If short, be sure to alert all inbound individuals and prepare a statement showing transparency and solutions going forward
- Note: Remember, the Strategic National Stockpile (SNS) only contains specific vaccines for known threats (new pandemic threats are not part of the SNS formulary). It also contains countermeasures for known CBRN threats

# Communications

**Ensure a communications plan is well-drafted pre-event and flexible to address any of these complications**

**Communication considerations should include:**

- Communications directly to the population
- Communications to and from the ESF-8 network
- Communications to the state and local Emergency Operations Centers




**Will need strong, clear guidance from IPC expertise**

**Additional and unique example and structure of a Healthcare / Hospital-based POD site** (for illustrative purposes only – this is an example)

NOTE: These examples fall under the traditional ICS / HICS organizational structure, which should remain as command and general staff positions of your operations.

*Source: FEMA; ICS Organizational Structure and Elements*

# Examples of Vaccination Center Operational Roles

Roles are assigned as necessary. Some roles may overlap or be filled by the same person depending on the scenario. Roles are likely to follow ICS/HICS nomenclature, but that might vary due to size of location and staffing numbers.

- Clinic or POD Manager
- Pharmacy Branch
  - Vaccinators
  - Vaccination Preparation Group
  - Prophylaxis Prep Group
- Registered Nurses
- Safety Coordinator and staff
- Medical Screeners
- Registration staff
- Observation Area Manager
- Volunteer Staff
- Volunteer Coordinator
- IT Support
- Traffic Control (and parking)
- Language Translator(s)
- Floaters (cross-trained on select roles to troubleshoot and ensure adequate throughput and flow)

# Supporting Functions to Consider

- **Medical Evaluation**
  - Work with individuals needing additional evaluation (prevent natural POD flow from slowing)
- **Observation Staff** (if needed depending on countermeasure deployed)
- **EMS/First Aid**
  - Immediate medical attention
- **Mental Health Support**
  - Additional support for individuals and families – both onsite as well as directions for longer term
- **Safety Officer**
  - Maintain order inside and outside of POD-based operations and overall site (hospital, clinic, etc.)
- **Health Educator** (and translator as needed)
  - To help reassure population on vaccine or countermeasure side effects, creation/hesitancy, etc.
  - Different than the vaccinators to keep the operations moving

# Example: Facility Support Daily Operational Actions

- Conduct a pre-opening facility sweep to ensure that all safety and sanitization procedures have been followed and are in place
- Ensure staffing, work assignments, and schedule are established for the day
- Ensure traffic/access control process is in place for the facility and the parking lot
- Conduct appropriate Safety Briefing with all site staff prior to opening the site and operational shifts
- Establish the day's battle rhythm and ensure all site staff are aware of it
- Review and understand Essential Elements of Information (EEIs) and other reporting requirements for all appropriate stakeholders and entities

# Example: Facility Support Daily Operational Actions, (cont.)

- Ensure multilingual signage is posted that describes the vaccine recipient flow starting from outside the facility including the Check-In/Screening Area, and all the way to Observation Area
- Stage Pre-Waiting Area where vaccine/countermeasure recipients wait to be sent to a vaccination station
- Ensure an area is set aside for staff to take break(s)
- Verify all personnel are in place and all stations are ready to process vaccine/countermeasure recipients prior to opening the facility
- Ensure a process is in place for regular disinfecting of the POD
- Pre-screening of vaccine/countermeasure recipients at the Check-In/Screening Area using a temperature screening and symptom and exposure questionnaire

# Example: Facility Support Daily Operational Actions, (cont.)

- Ensure process is in place to monitor and track facility supplies and track daily burn rates
- Monitor occupancy levels in the observation area to prevent over-crowding
- Establish a staff accountability process to include a sign in and sign out process
- Ensure a process is in place for proper handling/disposal of medical waste
- Ensure a process is in place for general facility waste handling
- Ensure ventilation, air changes, and any additional filtration (e.g., HEPA air devices) are operating as expected

# Integrating Infection Prevention and Control Science into POD-based Planning

## **Module 4:** POD Exposure and Safety Module

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# Objectives

- Introduce practices to reduce exposure risk and maintain safe environment
  - Transmission-based considerations
  - Hierarchy of Controls

**Goal: Continuity of safe POD operations**

# Bioaerosols and Respiratory Droplets

- Produced when exhaling (speaking, coughing, sneezing, breathing)
- Two general categories:
  - larger droplets fall out of the air (**droplet transmission; direct transmission due to close proximity)**
  - smaller droplets are suspended in the air (generally speaking, **“airborne” transmission)**
- Although the fate of these droplets largely depends on environmental factors such as humidity, temperature, etc., in general, the larger droplets settle due to gravity and do not generally travel distances more than approximately 6 feet. However, due to a litany of factors, it is plausible these larger droplets can travel further due to expulsion rate from the infected person (e.g., cough expulsion is greater than speaking), airflow, and other environmental factors.
- Generally speaking, bioaerosols remain suspended in the air for longer durations due to their smaller size and can play a key role in spreading infection. The smaller particle size does not always indicate smaller amounts of infectious virus.

*Source: CDC; American Chemical Society*

# Bioaerosols and Respiratory Droplets

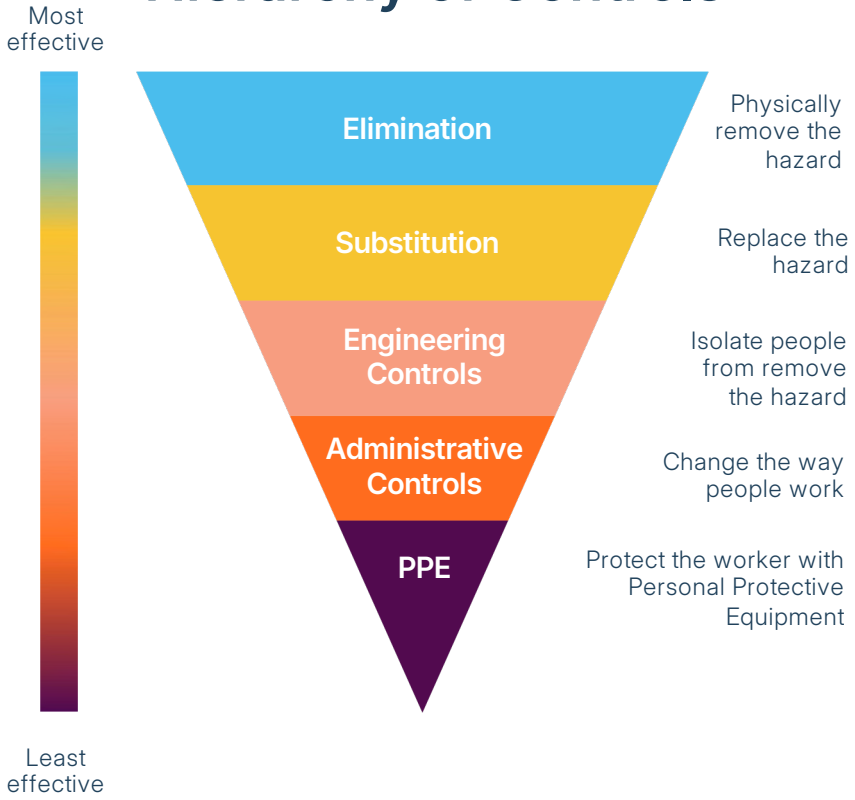
- Enclosed indoor spaces, extended exposure, inadequate ventilation are risk factors amplifying potential exposure and risk of infection.
- Per published reports, factors that increase the risk of SARS-CoV-2 infection under these circumstances include:
    - **Enclosed spaces with inadequate ventilation, air change rates, or air handling** within which the concentration of exhaled respiratory fluids, especially very fine droplets and aerosol particles, can build-up in the air space.
    - **Increased exhalation** of respiratory fluids if the infectious person is engaged in physical exertion or raises their voice (e.g., exercising, shouting, singing).
    - **Prolonged exposure** to these conditions, which is typically more than 15 minutes.

(Source: CDC)

# Case Study: SARS-CoV-2 and Bioaerosol Threats

- SARS-CoV-2 has been confirmed to spread through droplet transmission.
- Transmission of SARS-CoV-2 through small bioaerosols suspended in the air is highly plausible (and likely) and remains a topic of research and discussion among experts and policy makers.
- Exposure risk consists of these modalities (per CDC):
  1. Inhalation of fine bioaerosols
  2. Deposition of virus carried in exhaled droplets and particles onto exposed mucous membranes (i.e., “splashes and sprays”, such as being coughed on). Risk of transmission is likewise greatest close to an infectious source where the concentration of these exhaled droplets and particles is greatest
  3. Touching of mucous membranes with hands soiled by fluids containing virus
- How to reduce exposure risks in POD sites?

# Hierarchy of Controls




*Source: CDC*

- Risk and exposure management control strategies
- Engineering controls
  - Ventilation
  - Filtration
  - Isolation
- Administrative controls
  - Personnel management
    - Remain physically distant
- Personal Protective Equipment
  - Respiratory
  - Cutaneous
  - Injury protection

# Engineering Controls

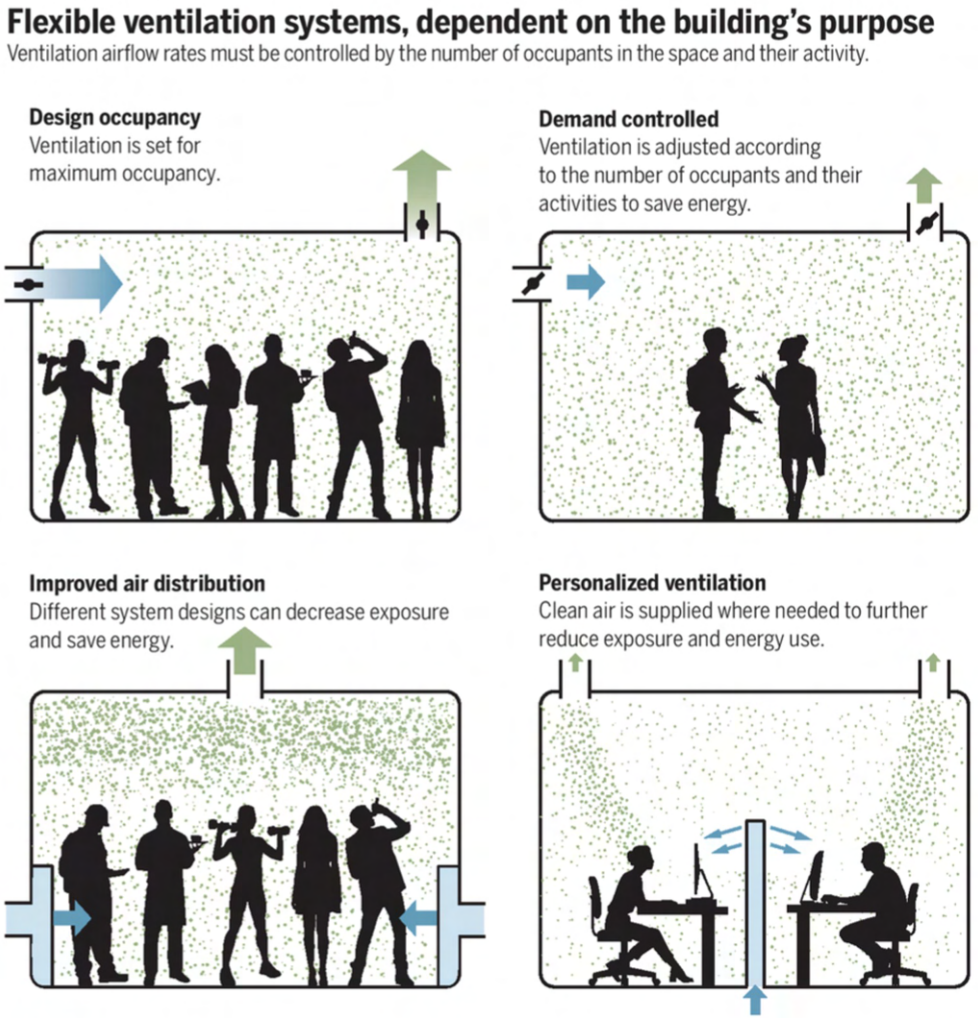
- Ventilation systems
- High-capacity HEPA filtration units (standalone purifiers)
- Ropes, belt barriers/stanchions, or other distancing measures to avoid congregation
- Spacing for dispensing or vaccine administration tables
- Barriers between workers and public (plexiglass) although not as effective as others unless barrier covers 100% of space between the worker and public

- Recirculated air run through a combination of filters and cleaners or increase outdoor air if systems can handle it
- MERV 13+ filter recommendation for HVAC recirculated air
  - MERV = Minimum Efficiency Reporting Value
  - Describes mechanical filter efficiency
  - HVAC systems designed/installed at MERV 6 - MERV 8
- Ensure current systems are capable of functioning at higher levels
- If directional airflow is not an option, best to mix space air
  - Low levels (avoid strong air currents that could increase transmission by pushing bioaerosols across breathing zones)
- HVAC Systems: maintain temperature and humidity points

*Source: OSHA, ASHRAE*

# Ventilation matters

***Source:***
Morawska L, et al A paradigm shift to combat indoor respiratory infection. Science. 2021 May 14;372(6543):689-691. doi: 10.1126/science.abg2025. PMID: 33986171.



Vanderbilt MC pre-ED Screening in open air parking garage

Consider exhaust discharge locations – direct away from people and outside air intakes

Bottom opening exhausted to create front to back airflow across patient

Credit: ASHRAE

# Administrative Controls

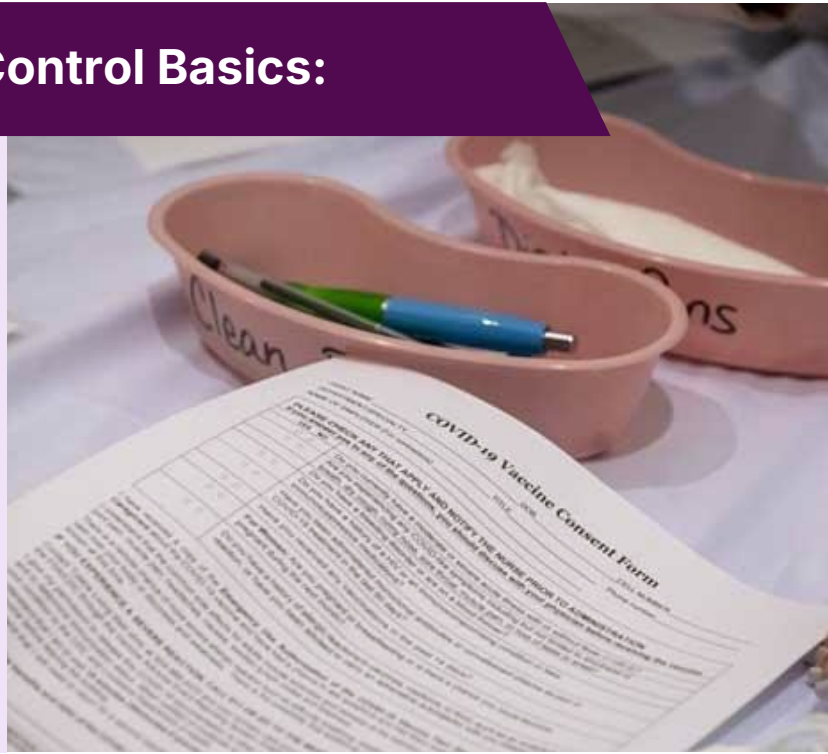
- Behavioral-based solutions
- Spaced arrival of pre-registered individuals
- Safely spaced stations
- Avoid extra workers “hanging around”
- Proper signage
- Trainings & guidance
- Frequent cleaning & sanitizing
- Requiring masks
- Enforcement of protective equipment and protocols

*Source: OSHA*

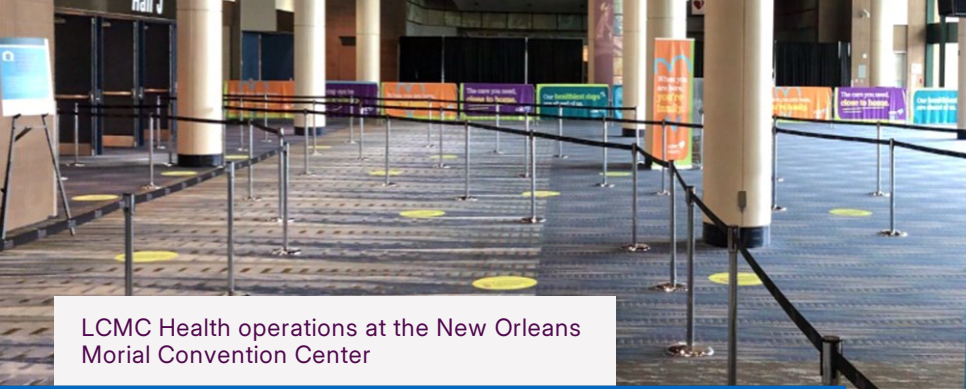
# Don’t Overlook Infection Prevention and Control Basics:

Fomite transmission will always be a concern during highly contagious infectious disease pandemics.

Consider disinfection of high-touch surfaces and any items that will be shared from person to person (e.g., pens at registration). Clearly delineate clean items from dirty items.




Credit: Tulane News | Photo by Paula Burch-Celentano
https://news.tulane.edu/news/photos-tulane-rolls-out-covid-19-vaccine



LCMC Health operations at the New Orleans Morial Convention Center

**Stanchions and floor stickers make distancing and queueing easier to follow**

**Administrative signage to promote safety and compliance (behavioral changes/adoption)**

As seen on Tulane University campuses


**Make signage for easy-to-follow progression to maintain desired flow and safety**

LCMC Health operations at the New Orleans Morial Convention Center

# Personal Protective Equipment (PPE)

## Do you know the difference between PPE and CPE?

Clothing/equipment that creates a barrier and protects the individual wearing it from becoming at higher risk of exposure from an environmental threat such as a pathogen (e.g., SARS-CoV2).

Typically, potential high-risk contact includes:

- Inhalation of respiratory secretions or aerosols
- Contact with non-respiratory secretions (vomit, feces, urine, blood, etc.)

The type of contact and specific characteristics of the threat will impact the type and amount of PPE worn. These will vary across roles within the vaccination sites.

# Personal Protective Equipment (PPE)

- Specialized equipment to prevent exposure
- Users **must** be fit-tested for proper protection
- Users must be trained in donning/doffing
  - Proper use results in user protection from exposure
  - Also serves as source control – protects others
- Examples include filtering facepiece respirators (FFRs), like N95 respirators
- **NOTE:** *Properly worn surgical masks are meant to help block large-particle droplets, splashes, sprays, or splatter that may contain germs (viruses and bacteria), keeping it from reaching the wearer's mouth and nose. Surgical masks also act as source control, just as any other mask. Surgical masks are not designed to filter or block very small particles from the air that the wearer is breathing. Unlike respirators when worn correctly, they do not provide complete protection because they do not form a tight seal against the wearer's face.*

# Community Protective Equipment

- No fit-testing requirements
- Not considered PPE, even if using an N95 without proper fit-testing and seal
- Serves as source control – protects others
  - Decreases probability of transmission from the wearer (who could be asymptomatic) to those in proximity
  - Provides minimal exposure aerosol protection for users - NOT A FUNCTIONAL BARRIER
- Most do, however, provide protection at levels that are not insignificant
  - Tighter woven fabrics serve as a good protective barrier – up to 50% filtration across the 10 nm – 6 µm particle size range
  - A four-layer silk (used, for instance, as a scarf) can be surprisingly effective with an average efficiency of >85% across the 10 nm – 6 µm particle size range.

*Source: Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks. Abhiteja Konda, Abhinav Prakash, Gregory A. Moss, Michael Schmoldt, Gregory D. Grant, and Supratik Guha. ACS Nano 2020 14 (5), 6339-6347. DOI: 10.1021/acsnano.0c03252*

# COVID-19 Case Study: Workers Need Respirators

| Infected individual (source) is wearing | Susceptible individual is wearing | | | | | |
|---|---|---|---|---|---|---|
| | | Nothing | Cloth Mask | Surgical Mask | N95 FFR (10%) | N95 FFR (1%) |
| | Nothing | 15 min | 20 min | 30 min | 2.5 HR | 25 HR |
| | Cloth Mask | 20 min | 27 min | 40 min | 3.3 HR | 33 HR |
| | Surgical Mask | 30 min | 40 min | 60 min | 5 HR | 50 HR |
| | N95 FFR (10%) | 2.5 HR | 3.3 HR | 5 HR | 25 HR | 250 HR |
| | N95 FFR (1%) | 25 HR | 33 HR | 50 HR | 250 HR | 2,500 HR |

*Source: American Conference of Governmental Industrial Hygienists (ACGIH)*
*https://www.acgih.org/covid-19-fact-sheet-worker-resp/*

# Integrating Infection Prevention and Control Science into POD-based Planning

**Module 5**: Product Management Module

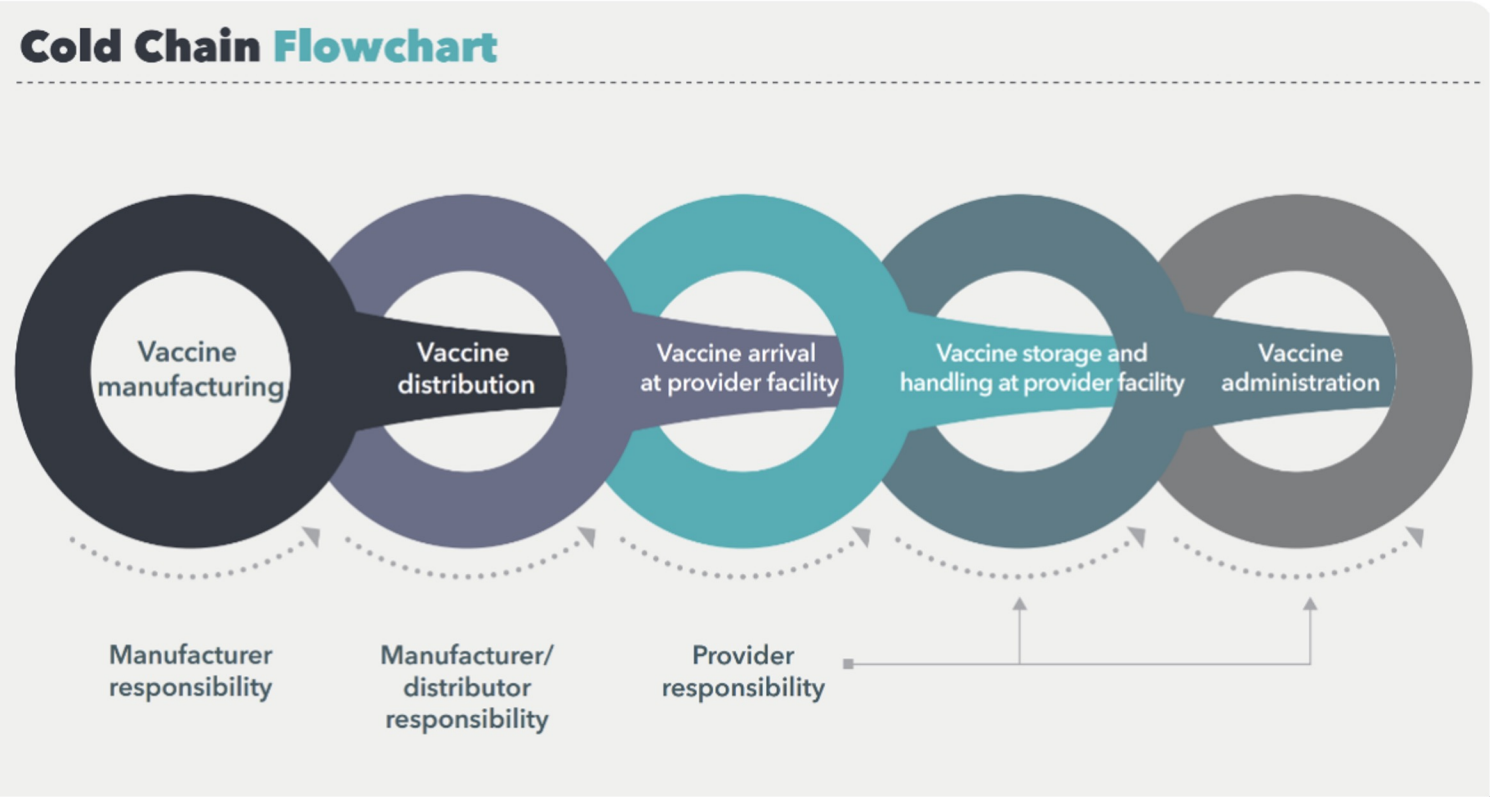
NNPHI™
Climate and Crisis Preparedness

# Objectives

- Outline typical considerations for storage and handlings of medical countermeasure and vaccines
  - Usage, storage, handling, and cold chain considerations
  - Additional safety considerations and security

**Goal: Effectively manage countermeasures**

The cold chain is crucial in ensuring vaccines are properly stored and remain useable.




*Source: HHS, Vaccine Storage and Handling Toolkit*

# What is Dry Ice?

- Dry ice is frozen carbon dioxide ($CO_2$) , usually available as a block or in pellets.
- Frozen $CO_2$ has a temperature of -79° C (-109° F) and will keep the vaccine frozen.
- $CO_2$ goes directly from the solid form to gaseous state (sublimes). Since there is no liquid produced as it 'melts', it is well suited for shipping and storage at very low temperatures since it will not give off moisture.
- Dry ice is non-combustible or flammable, which makes safer to transport and store.

*Source: Region VI Public Health Training Center / Tulane School of Public Health & Tropical Medicine*

# Dry Ice? Why was it considered part of the COVID-19 vaccine safety and handling protocol?

- Initially, vaccines being deployed under Emergency Use Authorization (EUA) required a cold chain for proper storage to ensure efficacy. The CDC recommended that the Pfizer vaccine be stored between **-80 ˚C and -60 ˚C**; and the Moderna vaccine be stored between **-25 ˚C and -15 ˚C.**
- Since typical refrigerators and freezers may not maintain these very low temperatures, **dry ice served a convenient way to transport and store the vaccines** at ultra-cold temps to facilitate the mass deployment of vaccines requiring delicate and rigorous cold temperature chain protocols.
- While this recommendation was removed soon after the initial COVID-19 vaccination operations, it is worth noting as an example of challenges we may face in the future. Remain informed through state and federal contacts regardless of countermeasure requirements.

# What Do I Need to Know About Storage of Dry Ice?

- NEVER store dry ice in tightly sealed devices such as an ultra-low freezer or plastic/glass container.
  - Store in a Styrofoam chest or insulated cooler designed for dry ice.
  - As dry ice vaporizes, it expands and can lead to an explosion if in a tightly sealed container.

- Always Ventilate Storage Areas
  - Dry Ice sublimes to $CO_2$ quickly displaces oxygen quickly in an enclosed space. Lack of $O_2$ in the space may act as a simple asphyxiant. Ventilate before entering a dry ice storage area.
  - $CO_2$ gas is heavier than air and accumulates in low areas of the surrounding space.

*Source: Region VI Public Health Training Center / Tulane School of Public Health & Tropical Medicine*

# What Do I Need to Know About Storage Of Dry Ice?

- Plan purchases of dry ice as close as possible to the time when needed, and replace dry ice when necessary, for vaccine storage.
- Dry ice will sublimate quickly over time and temperature.

*Source: Region VI Public Health Training Center / Tulane School of Public Health & Tropical Medicine*

# Dry Ice: Handling Hazards and Protective Equipment

| Hazard | Explanation | Protection |
|---|---|---|
| *Contact Hazard* | The temperature of dry ice at -109 °F (-79°C) will cause severe frostbite to the skin cells, and they will freeze very quickly. | Wear protective gloves – preferably loose-fitting thermally-insulated gloves. |
| *Asphyxiation Hazard* | In unventilated areas, the lack of O2 can cause dizziness, headaches, difficulty breathing, loss of consciousness, and potentially death. | Ventilate before entering dry ice storage areas. |
| *Over-pressurization Hazard* | While CO2 itself is not combustible, sublimation of CO2 will build up gas in a tightly sealed container. This could result in the over-pressurization and violent rupture of the container. | Always store dry ice in an appropriate Styrofoam or CO2 designated container where the CO2 gas is released.<br>Wear safety glasses when packing or storing dry ice. |

*Source: Region VI Public Health Training Center / Tulane School of Public Health & Tropical Medicine*

# Cold Chain and POD-based Operations

- Be aware of temperature requirements according to manufacturer guidelines

  Plans must consider:

  - How long an MCM can remain viable without refrigeration
  - Does the POD locations and operations have adequate electric amperage and plugs
  - Consider whether you'll deploy multiple mini-refrigerators and/or a larger, central refrigerator
  - Be aware of your jurisdictional weather patterns. If inclement weather is possible, be sure to consider redundant power sources for your MCMs so they remain viable

# For more information and training on Infection and Prevention Control, visit *ipc.nnphi.org*.

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