HCAI Department of Health Care Access and Information
2020 West El Camino Avenue, Suite 800
Sacramento, CA 95833
hcai.ca.gov

Hospital Building Safety Board
Ad hoc "Designing for Resilience" Webinar Development Subcommittee

AGENDA
September 23, 2025
10:00 a.m. – 4:00 p.m.

The Subcommittee may not discuss or act on any matter raised during the public comment section that is not included on this agenda, except to place the matter on a future meeting agenda. (Government Code §§ 11125, 11125.7, subd. (a).)

Locations:
2020 West El Camino Ave, Conference Room 930, Sacramento, CA 95833
355 South Grand Avenue, Conference Room 2000, Los Angeles, CA 90071
Teams Meeting Access; Meeting ID: 281 736 714 060 2; Passcode: Ww3yk3JL
Call in: (916) 535-0978; Phone Conference ID: 294 719 513#

Item #1 Call to Order and Welcome
Facilitator: Teresa Endres, AIA, ACHA, EDA, AAH, Senior Associate, Medical Planning Director, Taylor Design; Subcommittee Chair (or designee)

Item #2 Roll Call and Meeting Advisories/Expectations
Facilitator: Veronica Yuke, HCAI; HBSB Executive Director (or designee)

Item #3 Review the *HCAI Design Guide for Planning and Preparing for Disasters* (or Design Guide), dated March 1, 2024, for an understanding of what HCAI has already published to address facility resiliency

- Review the chapters and references of the Design Guide
- Review the Design Guide presentation slides from the American Society for Health Care Engineering (ASHE) 2024 International Summit & Exhibition on Health Facility Planning, Design & Construction (PDC Summit), presented by Richard Tannahill, Gary Dunger, and Teresa Endres
- Discuss which chapters of the Design Guide should be included in the "Designing for Resilience" webinar

Item #1 Call to Order and Welcome

Facilitator: Teresa Endres, AIA, ACHA, EDA, AAH, Senior Associate, Medical Planning Director, Taylor Design: Subcommittee Chair (or designee)

Item #2 Roll Call and Meeting Advisories/Expectations

Facilitator: Veronica Yuke, HCAI; HBSB Executive Director (or designee)

Item #3

Review the HCAI Design Guide for Planning and Preparing for Disasters (or Design Guide), dated March 1, 2024, for an understanding of what HCAI has already published to address facility resiliency

- Review the chapters and references of the Design Guide
- Review the Design Guide presentation slides from the American Society for Health Care Engineering (ASHE) 2024 International Summit & Exhibition on Health Facility Planning, Design & Construction (PDC Summit), presented by Richard Tannahill, Gary Dunger, and Teresa Endres
- Discuss which chapters of the Design Guide should be included in the "Designing for Resilience" webinar
- Discuss referenced resources
- Discussion and public input

Facilitators: Richard Tannahill, Architect, Deputy Division Chief, HCAI; Gary Dunger, Executive Director, Design and Construction, Cedars-Sinai Health System; and Teresa Endres (or designees)

2024 PDC SUMMIT
March 17-20 San Diego

Resiliency Design for Health Care Facilities: Introducing the OSHPD Emergency Design Guide

AHA Events

Check-in Code: PDC1043

2024 PDC SUMMIT
March 17-20 San Diego

Evaluation & CECs

USING YOUR MOBILE APP

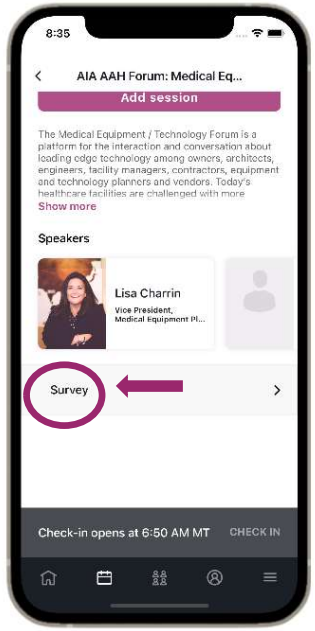
STEP 1
CHECK IN TO THE SESSION

STEP 2
ENTER CHECK IN CODE

STEP 3
COMPLETE THE EVALUATION

CHECK IN CODE:

PDC1043



AHA Events

Speakers

Richard Tannahill, Deputy Division Chief
Office of Hospital Planning & Development (OSHPD)
California Department of Health Care Access & Information (HCAI)

Teresa Endres, AIA, ACHA, EDAC, AAH
Director of Medical Planning, Taylor Design
Board Member, HCAI Hospital Building Safety Board (HBSB)

Gary Dunger, Executive Director
Cedars-Sinai Health System
Board Member, HCAI Hospital Building Safety Board (HBSB)

Session Codes

Each session will have a **UNIQUE SESSION CODE.**

- The session code will be used to check into each session attended.
- Found on the right-hand corner of each slide.
- Please make sure to keep the second slide on your presentation in order and the last two slides.
- **PLEASE REMIND ATTENDEES TO CHECK INTO TO THE SESSION BEFORE THE PRESENTATION AND AFTER.**

Learning Objectives

1. **Examine the challenges facing healthcare facilities in an emergency event** and how to create resilient facilities, with renovations to existing facilities and in the design of new facilities.
2. **Review the new Emergency Design Guide** facility best practices to better design for an emergency, including planning diagrams, resilient design approaches, and what a facility should not do when responding to an emergency event.
3. **Evaluate the lessons learned** in the development of the new Emergency Design Guide, including the design approaches which the California Department of Public Health (CDPH) would, and would not, allow under California's Title 22 regulations.
4. **Understand what is, and what is not**, included the new California Office of Statewide Hospital Planning and Development (OSHPD) Emergency Design Guide.

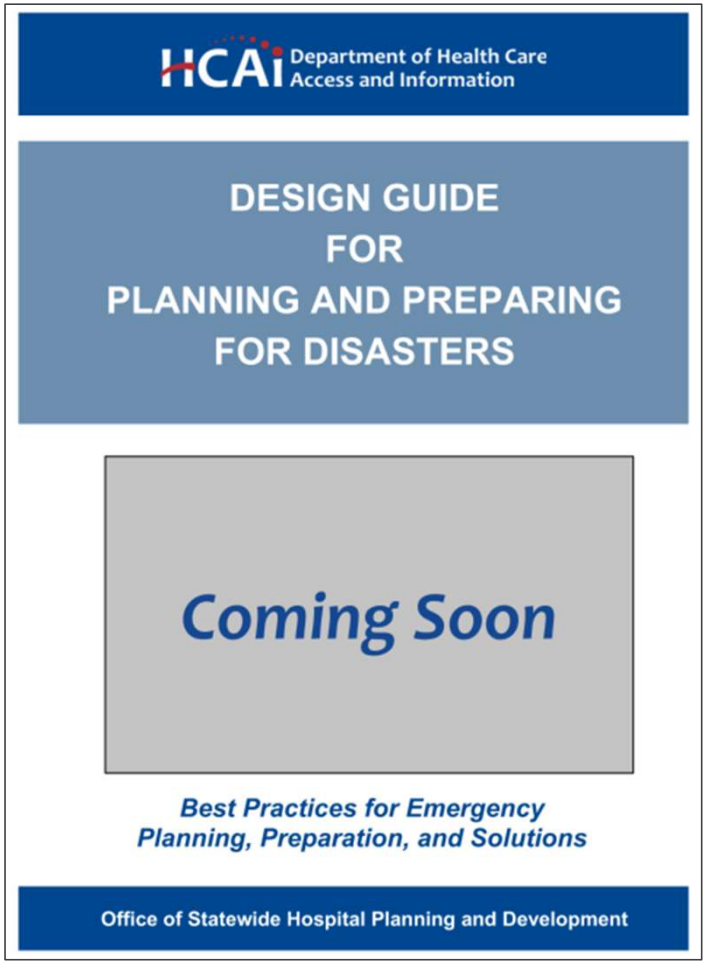
Agenda

1. Introduction
2. Emergency Patient Room Ventilation Conversion
3. Emergency Operations for Surge Capacity
4. HVAC System Considerations for Handling Smoke During Wildfire Events
5. How to Better Expedite Emergency Projects
6. Coordination with other Jurisdictions for Temporary Surge Facilities and Alternate Care Sites

HCAi
Department of Health Care Access and Information

Guide
for
Planning and Preparing for Disasters

Facility Best Practices
to Better Plan and Prepare for a Disaster



https://hcai.ca.gov/document/design-guide-for-planning-and-preparing-for-disasters/

PDC SUMMIT San Diego

Introduction

- Hospitals
- Emergencies
- Community Beacons
- Mass Casualties and Major Events
- Trial and Error
- Sharing of Information
- Future Code Changes?

TE1

Slide 12

TE1 Richard to simplify

Teresa Endres, 2024-02-08T20:30:30.359

MK1

Why A Guide?

- Facilities managers want to know what they can do to be prepared
- Provide a resource to help evaluate how past events could impact future regulations and design requirements
- Provide a repository of information during crucial times
  - The guide presents various scenarios and design options to aid facilities, staff, and design teams in understanding additions to facilities and planning for future flexibility effectively
- Limit “Anything Goes” policies!
- Best practices for facilities to be better prepared for a disaster
- About the authors

Slide 13

MK1 Teresa, is there something missing for the last bullet point (About the authors)?
Also, should the 4th bullet point be a sub-bullet or it's own? It doesn't seem to directly connect to the 3rd bullet point.
Melanie Keck, 2024-02-27T16:16:39.568

How to Apply the Guide

Alterations

- Planning for the unknown
- Providing flexibility in existing buildings
- What can be done ***now?***
- Adapting existing services and system
  - Facility access
  - Utility services
  - Emergency projects

New Facilities

- Planning for the unknown
- Go beyond code minimums during design
- Go beyond the code
- Include potential flexibility for future care types
- Identify options and provide best practices to allow for quick implementation

Emergency Patient Room Ventilation Conversion

Emergency Patient Room Ventilation Conversion

- Tuberculosis cases in the mid-1900s
- What was the healthcare response when COVID hit?
- Repurposing existing spaces
  - Was it practical and safe?

Repurposing Existing Spaces

Patient care was provided in:

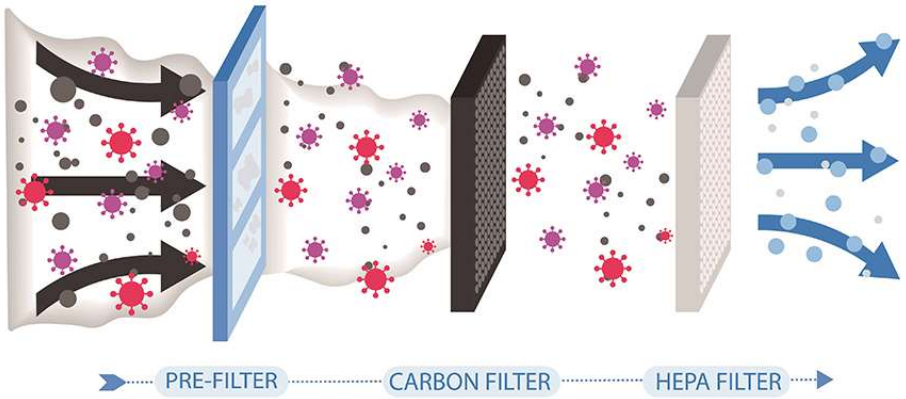
- Waiting rooms
- Gift shops
- Conference rooms
- Corridors
- Etc.

Air Handling Unit (AHU) Recommendations

- **Engineering AHUs to handle multiple conditions for heating and cooling**
  - Bringing outside air inside in a pandemic situation
  - Normal quantities of outside air intake for normal conditions
  - High volumes of outside air for pandemic and emergency conditions
  - Minimal outside air during wildfire events
- Standby cooling equipment should use chilled water-cooling systems if possible
- Air handling units designed to be switchable from a normal supply and recirculation to 100% outside air intake and 100% exhaust
- Hospitals should consider use of high intensity UV lights in the HVAC units

HEPA Filtration Recommendations

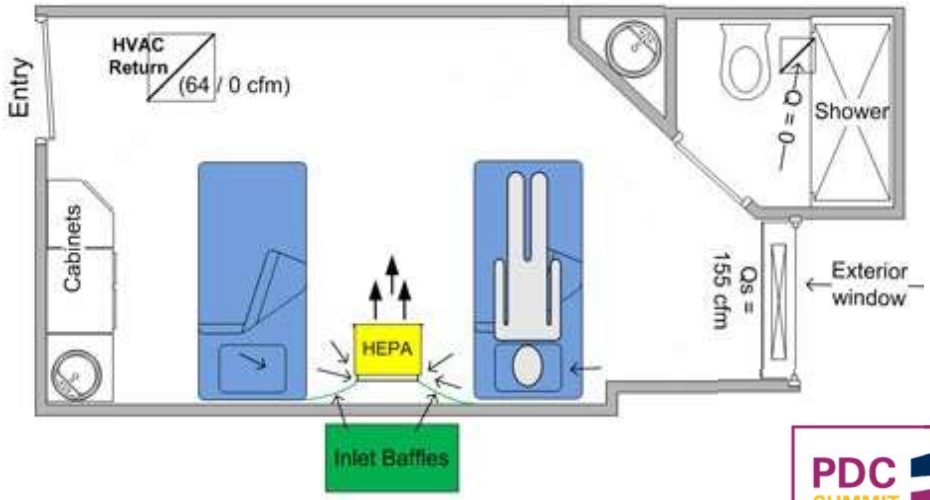
- Use of High-Efficiency Particulate Air (HEPA) filters is recommended
- Design HVAC system with enough fan power to support HEPA filters
- Install HEPA filter racks in air handlers with recirculating air that could be put into operation in a pandemic situation or airborne pathogen event.
- For existing facilities, flexible ducts and fans can be secured, sized, and tested to exhaust air to the exterior of the building and routing supply air through HEPA filter to create clean air environments in key departments or portions of the building



HEPA Filtration Recommendations

- A cleaner air space can be created using one or more portable air cleaners with a HEPA type filter in a closed room
- Discharged HEPA device directly to the outside for negative pressure
- Multiple devices may be needed for larger rooms
- The use of the portable filtration unit within the facility should be guided by a written policy from facility

- Do-it-yourself room air cleaners can be used consisting of a fan(s) and a MERV 13 filter to provide negative pressure and air cleaning



RT1

Return Air and Exhaust Air Recommendations

- Design medical/surgical patient room exhaust registers to be located on the wall behind the patient's head and located close to the floor

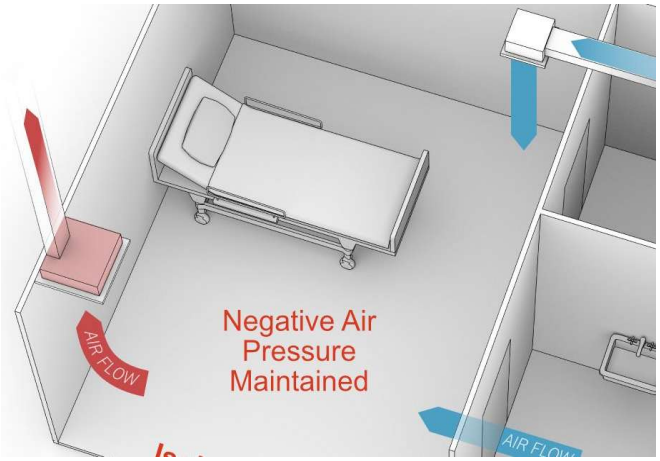
- Consider two return air grilles in patient rooms, one by the door and one by the bed, each sized for 100% airflow – this would allow the facility to isolate one of the grills depending on operational needs
- Doorway location is an important consideration for non-infected patients that are susceptible to being infected or immunosuppressed

Slide 21

RT1 Can we have a diagram showing the return grill lower at the head of the patient?
Tannahill, Richard@HCAI, 2024-02-10T02:47:03.905

Return Air and Exhaust Air Recommendations

Current code does not allow switching or changing the pressure relationship in a room from positive to negative or negative to positive.



An **Alternate Method of Compliance** (AMC) for these emergency situations is allowed if strict and specific procedures are implemented at switchover.

The rooms are not actively switched back & forth.

- Switching room pressure relationships needs to be a structured process reviewed with the hospital
- Implemented only by the hospital engineers
- Authorized by the code authorities
- Performed as specified in an approved emergency response plan

Emergency Operations Planning to Accommodate Surge Capacity

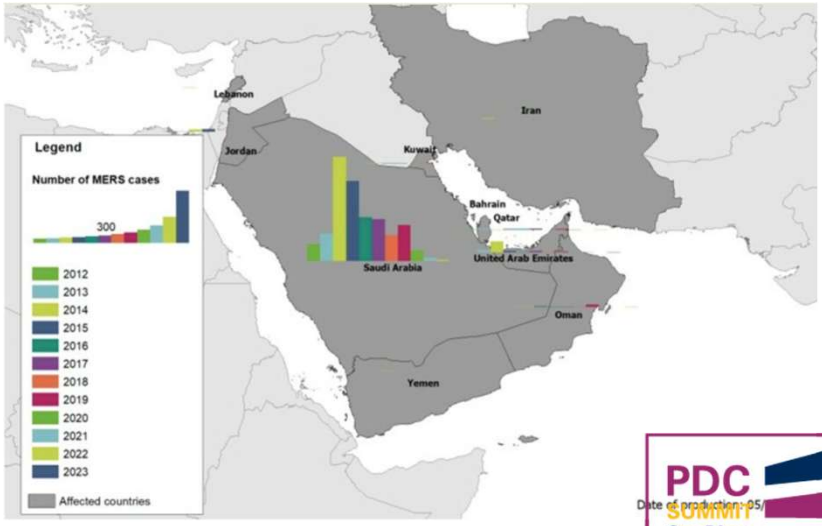
Planning Diagrams History

- The Emergency Design Task Force looked to countries with previous SARS/MERS pandemics
- **SARS pandemic 2003:** Asia (China, Hong Kong, Taiwan, Singapore, Vietnam, Philippines & Thailand), and Canada
- **MERS pandemic 2012**
- Singapore Ministry of Health 2014 Pandemic Readiness and Response Plan for Influenza and Other Acute Respiratory Diseases + DORSCON Matrix
- Pandemic patient units developed in Canada & Asia in response to 2003 SARS pandemic

Resources:

Factors Influencing the Response to Infectious Diseases: Focusing on the Case of SARS and MERS in South Korea - PubMed (nih.gov)

SARS: LESSONS FROM TORONTO - Learning from SARS - NCBI Bookshelf (nih.gov)



European Center for Disease Prevention and Control

Planning Diagrams History

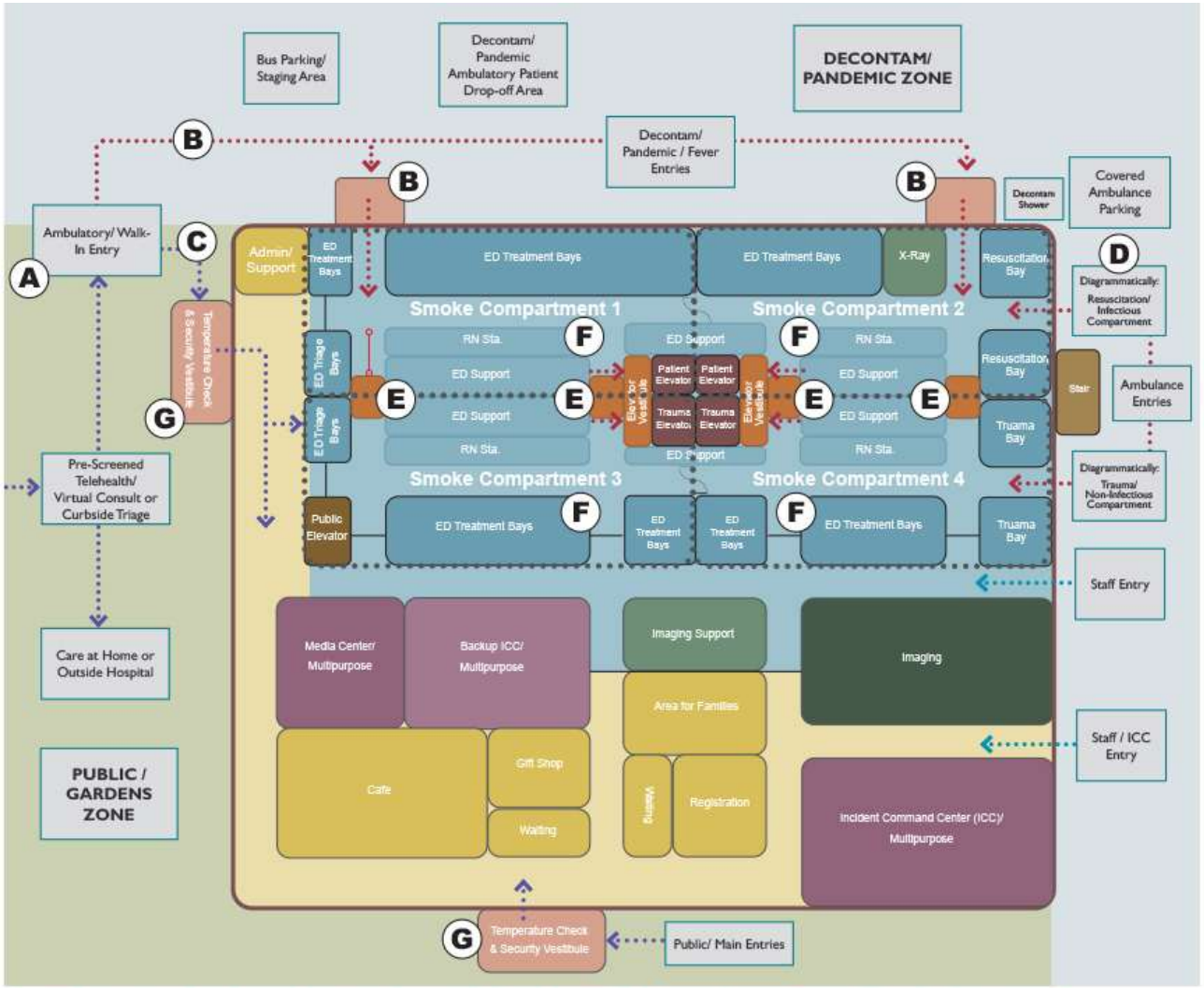
Summary tables for response measures under the DORSCON matrix

Possible scenarios	Applicable response phases	Border Control	Public health measures						
			Temperature screening in institutions / buildings	Social distancing	School closures	Contact tracing	Phone surveillance or quarantine	Antivirals for influenza	Vaccination
GREEN - Negligible to low public health impact									
• **High virulence** • **No or limited H-H transmission** • **Disease mainly overseas**	Alert (with containment of imported cases)	Health Advisory Notices (HANs) (Posters, Cards)	No	No	No	Yes, if cases are imported	Consider to implement depending on risk	Treatment of case where necessary	No
• **Similar or lower virulence and transmissibility as seasonal flu**	Mitigation	No	Consider to implement if necessary			No	No		Vaccination for high risk groups, if available
YELLOW									
• **High virulence but low transmissibility** • **Disease mainly overseas**	Alert (with containment of imported cases)	HANs Health Declaration Cards (HDCs) and temperature screening of inbound passengers, if necessary	No	No	No	Yes, if cases are imported	Consider to implement depending on risk	Treatment of cases where necessary	Procure and offer vaccine when available
• **Local epidemic with low virulence but high transmissibility**	Mitigation	HANs	Consider to implement if necessary			No	No		
• **High virulence and transmissibility, but vaccine available**	Mitigation		No						Distribute vaccine to mitigate impact
ORANGE									
• **High virulence and transmissibility** • **Disease mainly overseas**	Alert	HANs HDCs and temperature screening of inbound passengers, if necessary	No	No	No	Yes, if cases are imported	Quarantine	Treatment of cases, consider limited prophylaxis of personnel providing	Procure and offer vaccine when available
• **High virulence and transmissibility** • **Disease in Singapore**	Containment				Yes, selective closures if cases	Yes, as far as operationally feasible	Quarantine, as far as operationally feasible		

Singapore Ministry of Health Pandemic Readiness and Response Plan for Influenza and Other Respiratory Diseases design & operations guide
Disease Outbreak Response System Condition (DORSCON) Matrix

Planning for Surge

- Provide adequate medical evaluation and care
- The ability to survive a hazard impact and maintain or rapidly recover operations that were compromised
- Plan for large-scale events that affect many people, **which may include** chemical, biological, radiological, earthquakes, other natural or human-caused disasters
- Large hospitals typically operate at or near capacity
- Smaller hospitals faced with limited availability of resources and outside support
- When designing for resiliency, **consider designing beyond the code minimums**



EMERGENCY RESPONSE DIAGRAM | **NEW** EMERGENCY DEPARTMENT & ENTRY LEVEL

HCAi
Department of Health Care Access and Information

LEGEND:

- Emergency Department
- Imaging Department
- Public Space
- Multipurpose Space
- Patient Elevators
- Public Elevators
- Service Elevators
- Public Flow
- Patient Flow
- Staff Flow
- Material Flow
- Do Not Exceed 20', Typical of Vestibules/ Rooms

The intent of the planning diagrams is to provide options for individual features / concepts

KEYNOTES:

A Patients triaged via telehealth/virtual care or curbside/outside the hospital & directed to most appropriate entry. "Emergency Event" triage include temperature check & questionaire regarding travel, exposure, etc.

B Symptomatic patients are directed to Emergency Department fever entry/entries

C Non-symptomatic ambulatory patients enter for additional/typical triage through Ambulatory Entry

D Ambulance patients are triaged off-site/en route with option to enter the "Decontam/Pandemic" compartment

E Anteroom or vestibule (created with two sets of corridor doors) to each Emergency Department compartment, which allows each compartment to be locked and isolated with one-way flow (donning & doffing through separate vestibules)

F Emergency Department contains two or more compartments that have separate, dedicated & redundant building systems which allows each unit to be locked & become a "Decontam/Pandemic" compartment. One-way flow in & out of each compartment through donning & doffing anteroom/corridor vestibule (anteroom vs. corridor vestibule is based on facility operational model).

G Fever check at the front door. No one with a fever would be allowed to enter the facility.

The diagrams assume new facilities are designed based on a modular approach. The planning/layout concepts apply to any layout for a new facility

EMERGENCY RESPONSE SPACES:

Support spaces that can flex into Emergency Response spaces. Typically these spaces are conference (expandable), classrooms, workrooms, etc. that are multi-purpose rooms which flex to Emergency Response uses during an emergency event:

Incident Command Center (ICC) - ideal to have dedicated kitchenette and separate entry/exit directly to outdoors

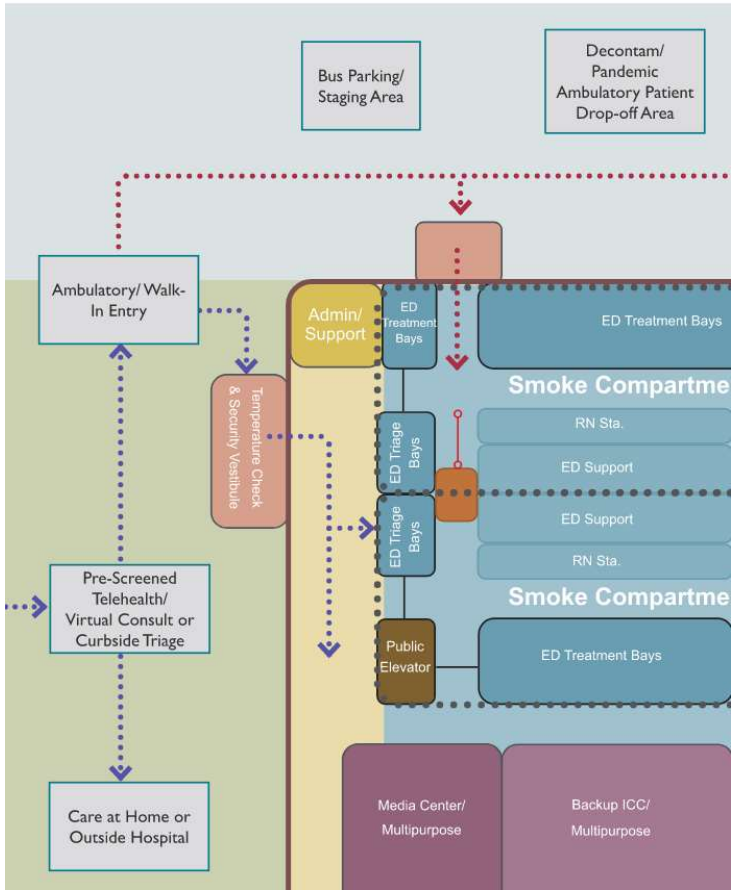
Backup ICC - for secondary ICC overflow

Media Center - a location for media to gather and receive updates from emergency response, hospital & public health staff

Areas for Families - this space serves as a location for families to gather away from the media and public view, typically used for mass casualty events

PDC SUMMIT San Diego

Patient Arrival



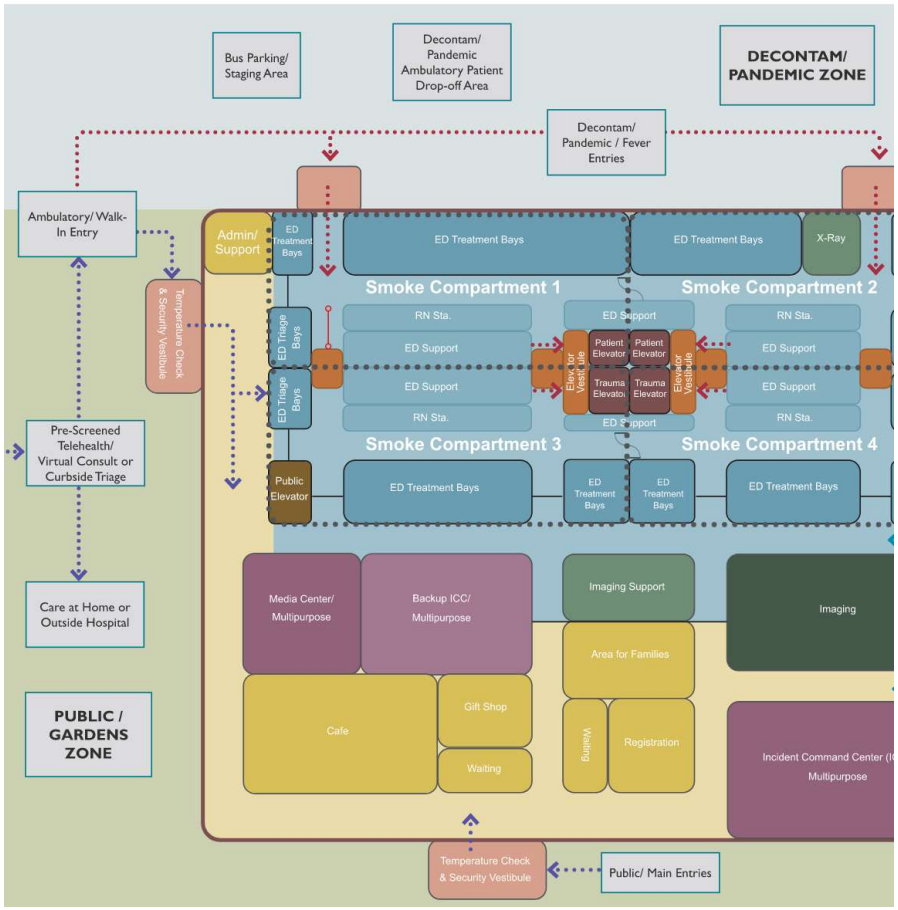
Parking & patient triage

- Ability to accommodate emergency conditions
- Virtual & curb-side patient triage

Patient waiting

- Exterior triage, waiting, and queuing areas are necessary during surge events
- Provide exterior safe & comfortable triage & waiting
- Differentiate between confirmed exposed patients, possibly exposed patients, and non-pandemic related emergencies
- Consider covered parking structures, tents, quick deployment trailers or modular
- **Consider designing beyond the code minimums**

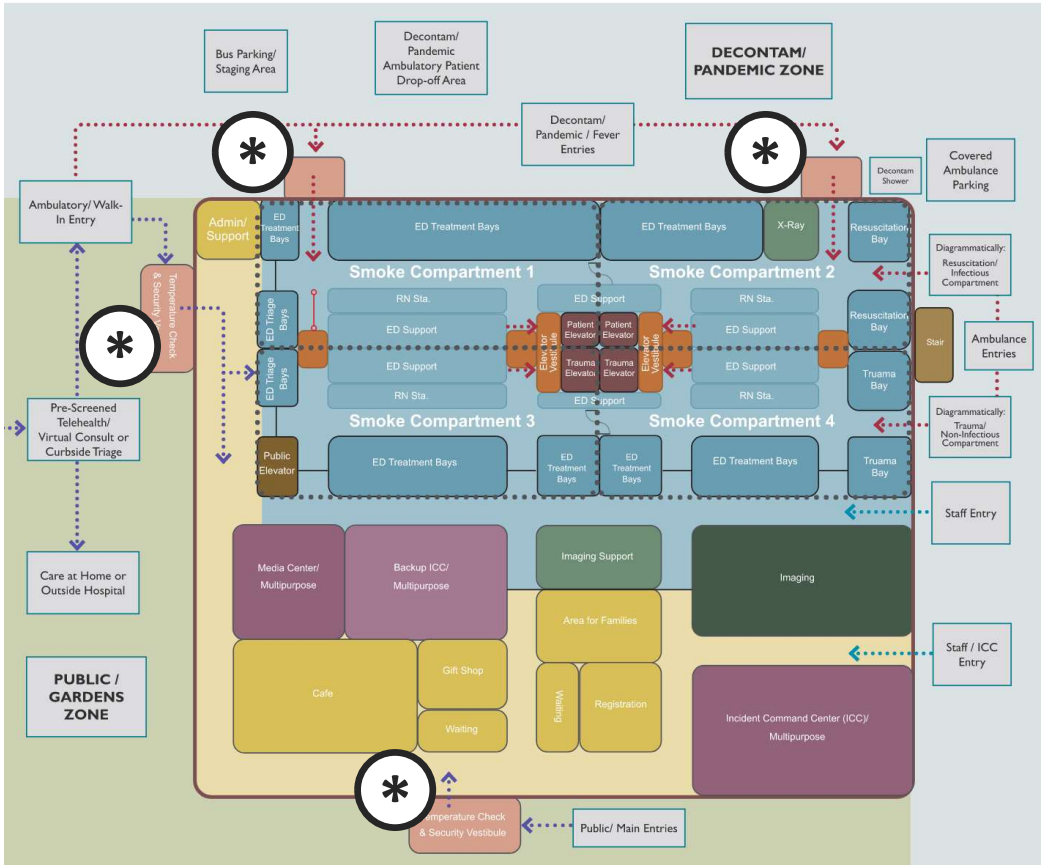
Patient Arrival



Decontamination

- Drop-off in a location separate from designated parking areas
- Provide dedicated entry vestibules designated for decontamination that can be used as an air lock
- Beyond code minimums: decontamination showers
- Provide PPE donning/doffing areas/supplies immediately available
- Can be used for secondary screening or security screening
- Decontamination entry vestibules immediately outside of each pandemic/infection compartment in the Emergency Department
- OSHPD PIN 35 Healthcare Decontamination Facilities
- **Consider designing beyond the code minimums**

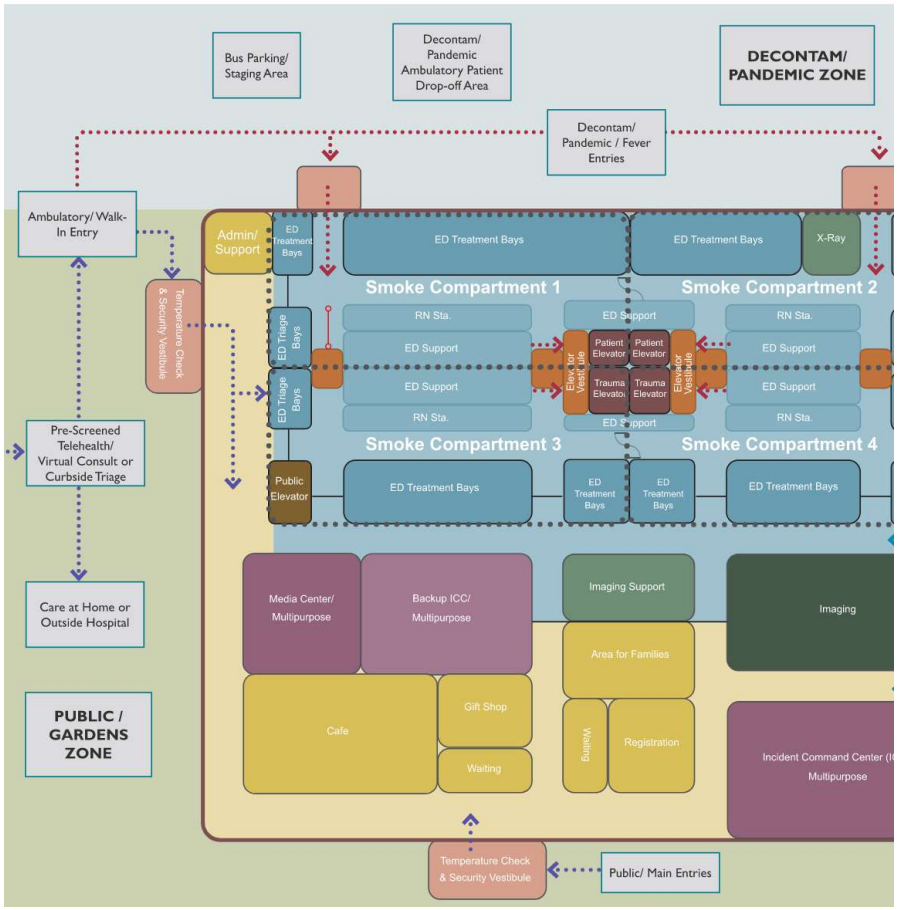
Entry in Hospital



Recommendations for the Entry Level

- Evaluate each entry for appropriateness
- Entries should be clearly identified with instructions
- Entries for staff only should be identified & locked to prevent unauthorized access
- All public entries should be provided with symptom checkpoints and security
- Vestibules provide secondary opportunity to screen patients and public
- Screening prevents exposing staff & other patients
- Size public entry vestibules to accommodate secondary screening & security checks
- **Consider designing beyond the code minimums**

Emergency Department: Ambulatory Pre-Screening



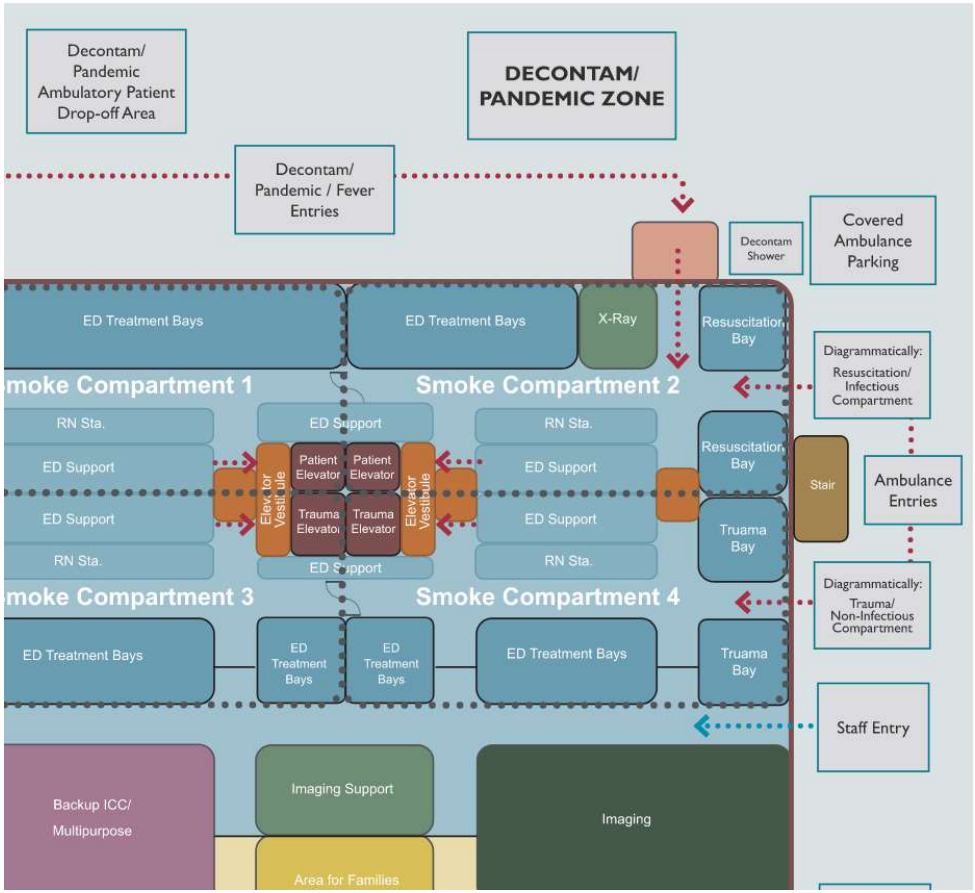
Entering the ED

- Prior to arrival leverage telehealth or virtual care
- In the parking lot utilize curbside/outside screening
- Provide predetermined walk-up screening locations outside of the ED

After screening is completed

- Direct patients to the appropriate entrance based on their symptoms
- Provide separate pandemic/infectious or non-pandemic/non-infectious entrances
- **Consider designing beyond the code minimums**

Emergency Department: Ambulance Entries

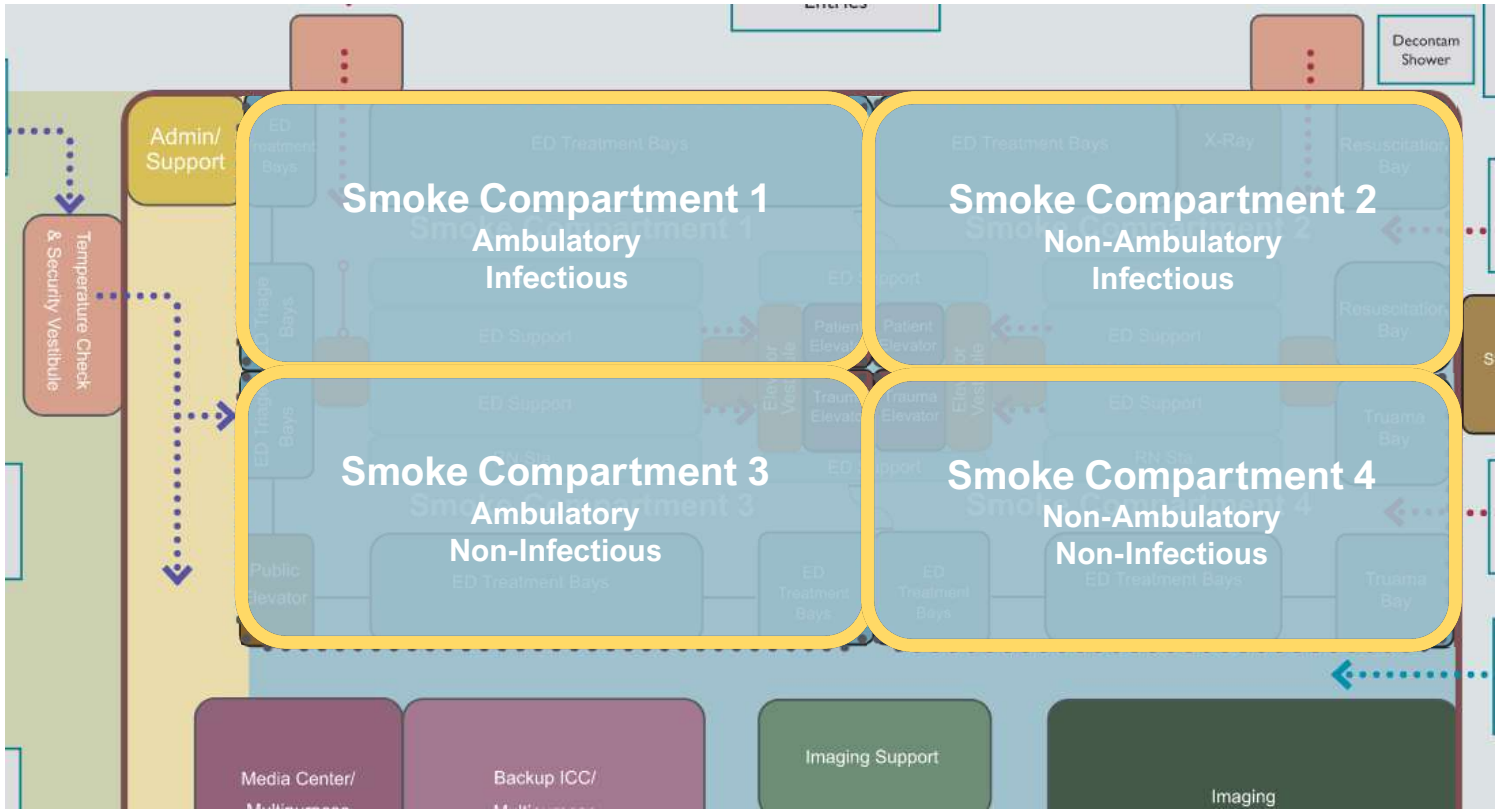


Separate ambulance entry

- Separate ambulance traffic from other patient areas
- Consider additional safeguards for pandemic, or hazardous materials exposure
- Consider separate dedicated ambulance entries into:
- **Infectious disease/resuscitation** compartment
- **Non-infectious/trauma** compartment
- **Consider designing beyond the code minimums**

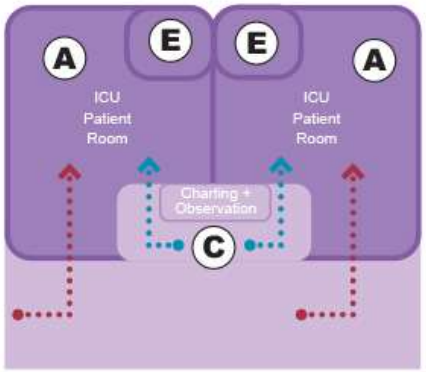
ED Compartmentation

Dedicated **infectious disease/resuscitation** and **non-infectious/trauma** compartments.

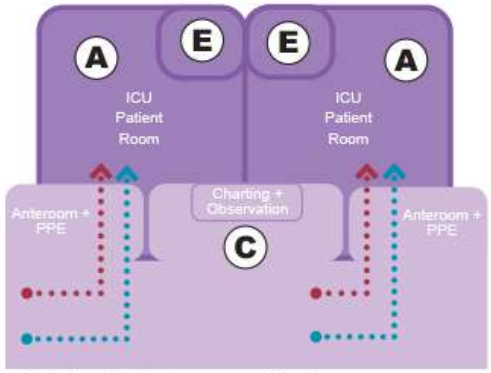


California Acuity-Adjustable Patient Units

- California's Title 22 does not provide for acuity-adaptable patient rooms where a patient steps down in the same room
- California Department of Public Health will allow an entire unit to flex
- New facilities consider using the "Acuity-Adjustable" model to provide future flexibility during patient surges
- Existing units can be adapted to surge as needed
- Acuity-adjustable patient units (AAU) allow care to flex to a higher level as needed in the same room/unit
- AAUs are well-suited for pandemics and other large-scale emergencies
- **Consider design beyond the code minimums**



Option A: Flexible Anteroom



Option B: Anteroom + Charting

Options: Flexible Anteroom or Anteroom + Charting

Provides an alcove for PPE and medical equipment that supports the patient room during **pandemic mode**. The intent is to ensure corridors remain uncluttered during **pandemic mode** and ease of donning/doffing PPE.

The intent of the alcove options is to provide health facilities with options to quickly respond to pandemic and other emergency conditions.

Alcove for patient's medical equipment outside of the patient room. Staff can continue to frequently monitor the patient vitals while reducing exposure to possible unknown within the patient room.

HCAi
Department of Health Care Access and Information

LEGEND:

- MED / SURG Department
- ICU Department
- Public Space
- Multipurpose Space
- Patient Elevators
- Public Elevators
- Service Elevators
- Public Flow
- Patient Flow
- Staff Flow
- Material Flow
- Do Not Exceed 20', Typical of Vestibules/ Rooms

The intent of the planning diagrams is to provide options for individual features / concepts

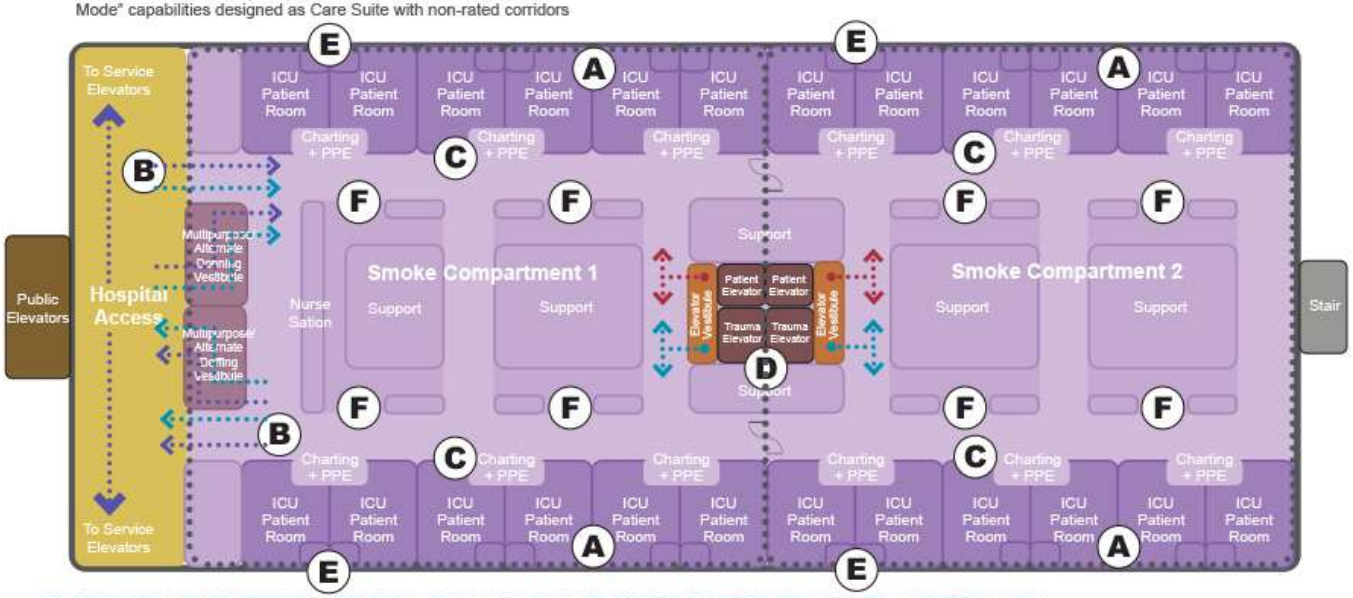
KEYNOTES:

- **A** Patient rooms are neutral or negative - refer to Chapter 2
- **B** One-way flow of patients, staff, and materials are recommended, where possible
- **C** Charting + PPE/Equipment Alcove: hand washing station recommended - anterooms shall comply with code requirements
- **D** During "Pandemic Mode" implement operational model to limit access to the Pandemic Patient Unit from the patient and trauma elevators
- **E** Patient Toilet Room - health facilities to determine in-board vs. out-board toilet rooms vs. side-by-side
- **F** Health facilities to determine centralized vs. decentralized nurse stations

Intent is to recommend that health fascilities identify and design specific units that can flex into "Pandmeic Mode" when needed. These Pandmeic Patient Units would operate as typical ICU during "Non-Pandemic Mode".

Assumptions:

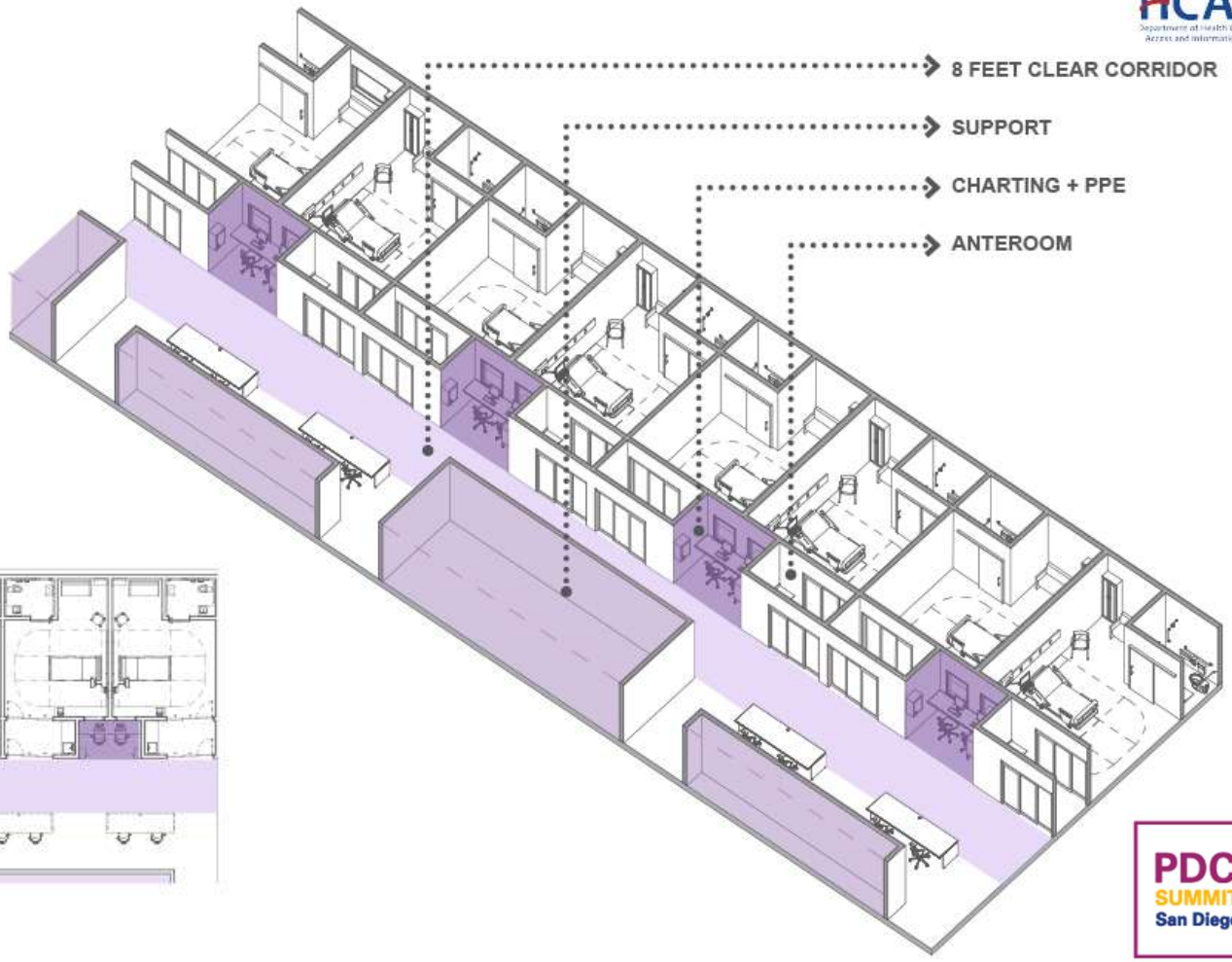
Pandemic Patient Unit (PPU): ICU Patient Unit with "Pandemic Mode" capabilities designed as Care Suite with non-rated corridors



EMERGENCY RESPONSE DIAGRAM | PANDEMIC PATIENT UNIT - **NEW** ICU

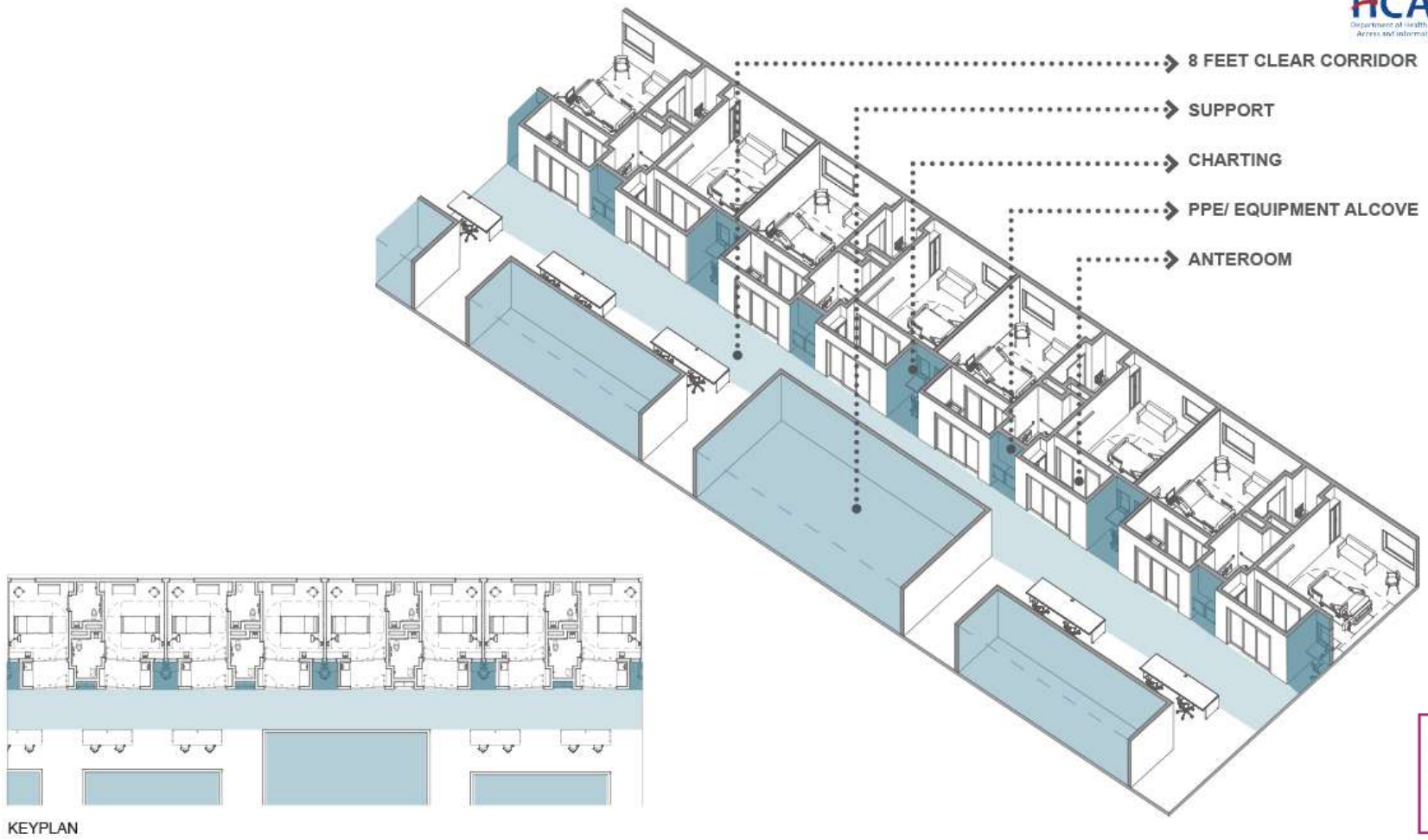
PDC SUMMIT San Diego

Pandemic/Isolation Patient Units



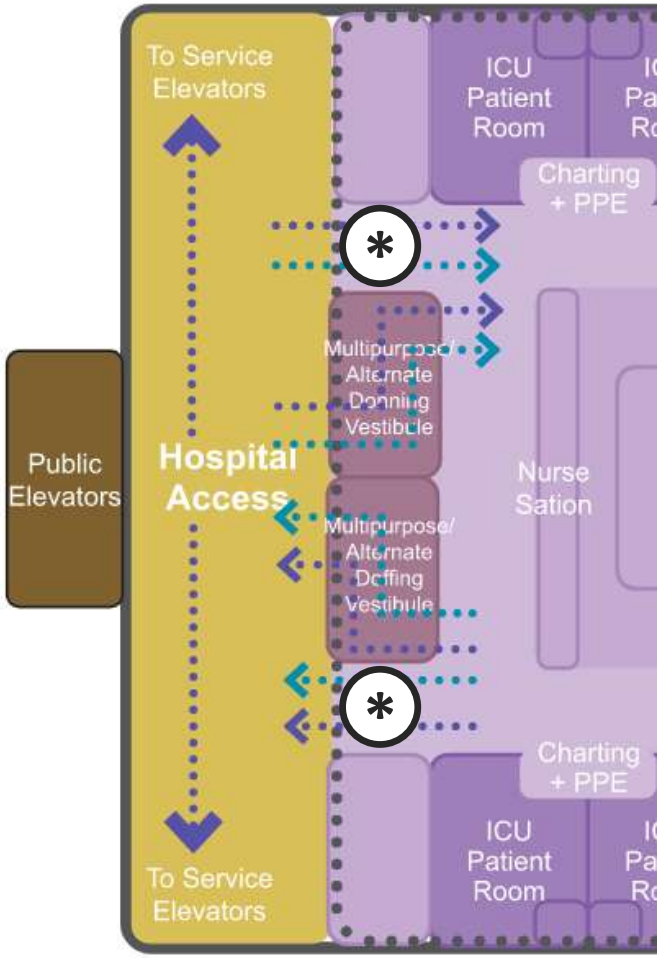
KEYPLAN

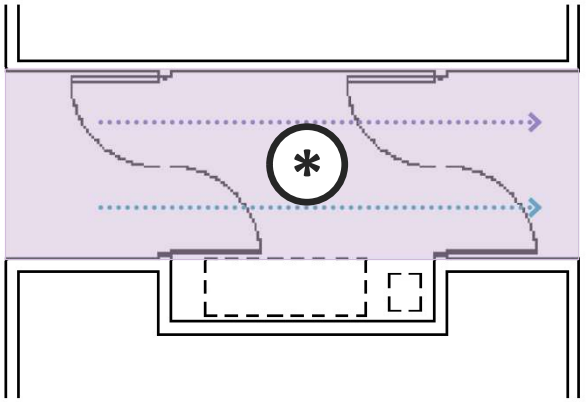
Pandemic/Isolation Patient Units



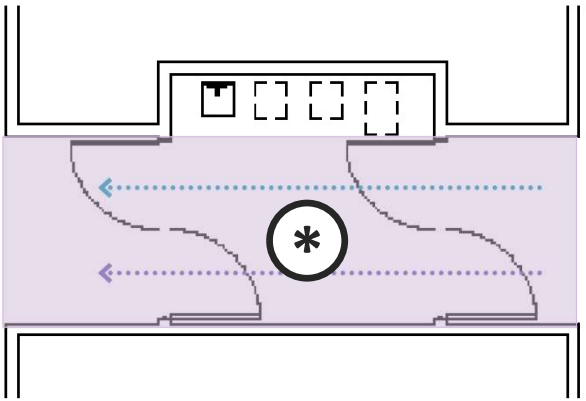
KEYPLAN

PPU Donning/Doffing Options





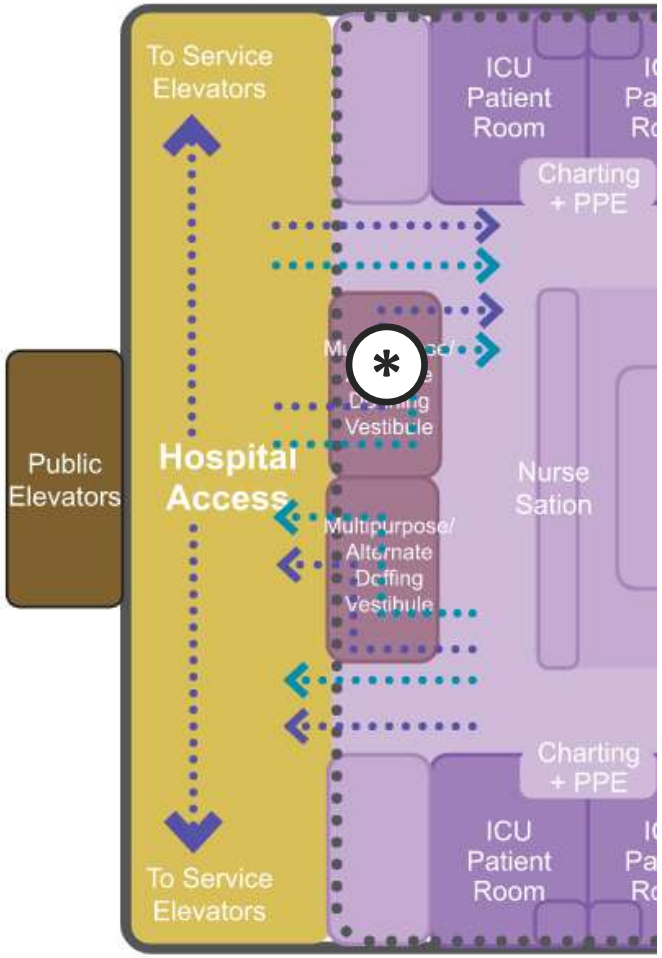
DONNING - DEPARTMENTAL ENTRY

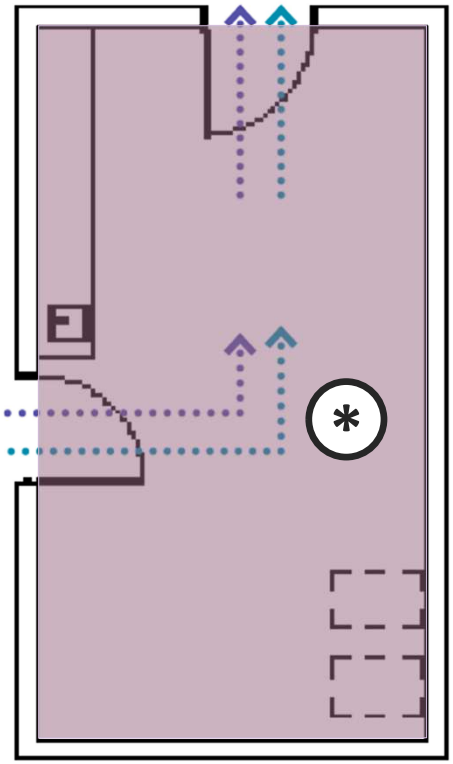


DOFFING - DEPARTMENTAL EXIT

- Donning & doffing at patient unit entry was explored with California Department of Public Health (CDPH)
- Internation PPU:
  - PPE donning alcove at PPU entry to unit
  - PPE doffing alcove w/ trash receptacle + hand washing station at exit of unit
- **Consider design beyond the code minimums**

PPU Donning/Doffing Options





- CDPH requires donning & doffing at **patient room entry**, as opposed to unit entry
- The Guide includes donning & doffing at patient unit entry as an option
- Donning/doffing multipurpose room(s):
  - Dedicated donning & doffing
  - Combined donning/doffing
- **Consider design beyond the code minimums**

Use of Interior Spaces

Staff Spaces

- Provide in or adjacent to departments most utilized during emergency conditions
- During emergency conditions
  - Staff may not be able to leave the facility
  - Will be working significantly extended hours
- **Lesson learned + beyond code minimum**
- Staff lounge is not an appropriate area for staff in need of a quiet contemplative space to decompress or grieve
- Consider respite & recharge rooms
- Provide access to natural daylight and views
- Where dedicated respite spaces cannot be provided
  - Provide flex space to accommodate staff respite during emergency conditions

HVAC System Considerations for Handling Smoke during Wildfire Events

Purpose

Best practices for heating, ventilation, and air conditioning (HVAC) design and building measures to minimize occupant exposures and health impacts from smoke during wildfires and prescribed burn smoke events.

Section 2: Develop a Smoke Readiness Plan

1. Smoke Preparation Supplies
2. Upgrade HVAC System Recirculation Filter(s)
3. Maintenance of the HVAC System
4. Optimization of System Airflows
5. Supplement Filtration
6. Assessing Filter Conditions
7. Limit Smoke Intrusion
8. Indoor Air Monitoring
9. Temporary Cleaner Air Spaces
10. Anticipate Sources of Inhalable Particulate Matter (also referred to as PM or particle pollution)

Section 2: Develop a Smoke Readiness Plan

Section 2.1: Checklist to Determine if the HVAC System is Ready for Smoke

- Make sure equipment is working as designed prior to an event.
- Confirm equipment will perform as desired with high-efficiency filters
- Test the system in advance of an event

Section 2.2: Special Note on Economizers

- Economizers can bring in large amounts of smoke and particulate matter into a building during smoke events
- Find effective workarounds to temporarily limit the economizer damper operation in response to smoke scenarios

Section 2: Develop a Smoke Readiness Plan

Section 2.3:
Considerations for SARS and Covid

- A low outdoor air rate is desirable for smoke control and a high rate is desirable for removal of virus particles

Section 2.4:
Activated Carbon Air Filters

- HEPA filters do not remove the gasses and odors found in wildfire smoke and additional filtering may be warranted for certain areas or facilities.
- Carbon filters are designed to filter organic compounds found in wildfire smoke much more thoroughly.

Section 2: Develop a Smoke Readiness Plan

Section 2.5: Use of Portable Air Cleaners

If the HVAC system is not able to reduce the smoke particulate concentrations sufficiently throughout the building, a cleaner air space can be created using one or more portable air cleaners with a HEPA filter (or other high efficiency filter) in a closed room.

Section 3: Test HVAC System in Smoke Ready Mode

- Test the HVAC system with the additional filtration and adjusted flow settings.
- There may be several non-functioning items that will take more time to fix than emergency conditions allow.

Section 4: Implement the Smoke Readiness Plan

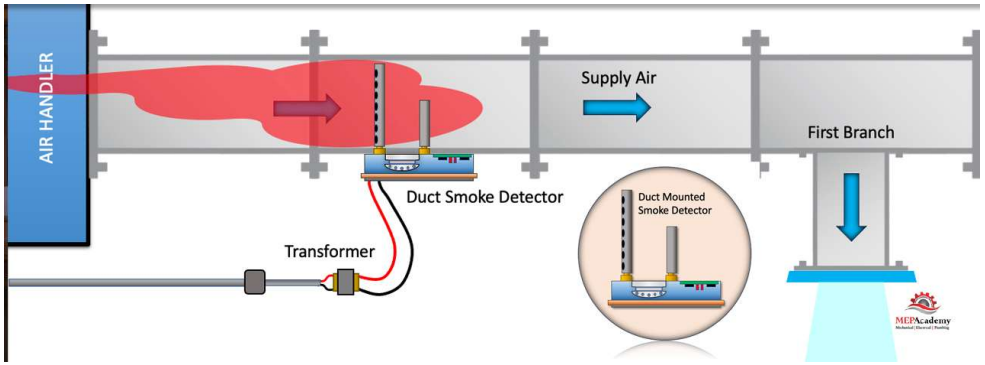
- Be ready to implement the plan when smoke mitigation is needed.
- Use the operations checklist that is in your plan.

Section 5: Monitor Effectiveness of Plan and Make Adjustments

- Once the plan is implemented, use the data from an indoor PM2.5 air quality monitor to determine whether the actions taken have reduced the smoke particulate levels.
- In sudden, relative short duration fire events, temporarily reducing the amount of ventilation air or shutting air off altogether may be considered but will almost always create unexpected conditions.
- In healthcare facilities, positive and negative air pressure relationships are of critical importance for infection control.

Section 6: In-Duct Smoke Detectors

- Can the in-duct smoke detectors be bypassed or disabled?
- Generally, the amount of dilution of smoke in the airstream is so great, the in-duct detectors and sampling tube detectors do not register the smoke until the quantity is significant.
- If the amount of smoke entering the building from outside air intake ducts, the HVAC system should shut down to protect the occupants.



Section 7: Adjust the Plan

After implementing the plan, incorporate any adjustments and lessons learned into your Smoke Readiness Plan prior to the next wildfire season.

HVAC System is Ready for Smoke Checklist

1. Do the outdoor air dampers function correctly?
2. Are the damper blades, linkage, and edge seals in good condition?
3. Does the building have a commercial thermostat or control system that allows the outdoor air dampers to remain closed when the system is set for an unoccupied state?
4. Are there record drawings, blower door tests, commissioning reports, equipment installation and service manuals, or other details available?
5. Does the outdoor air economizer work correctly?
6. Can the minimum damper set point be changed, and the economizer function be temporarily shut off? How is this accomplished for each air handler?
7. Is it possible to disable or reduce the relief fan air flow?

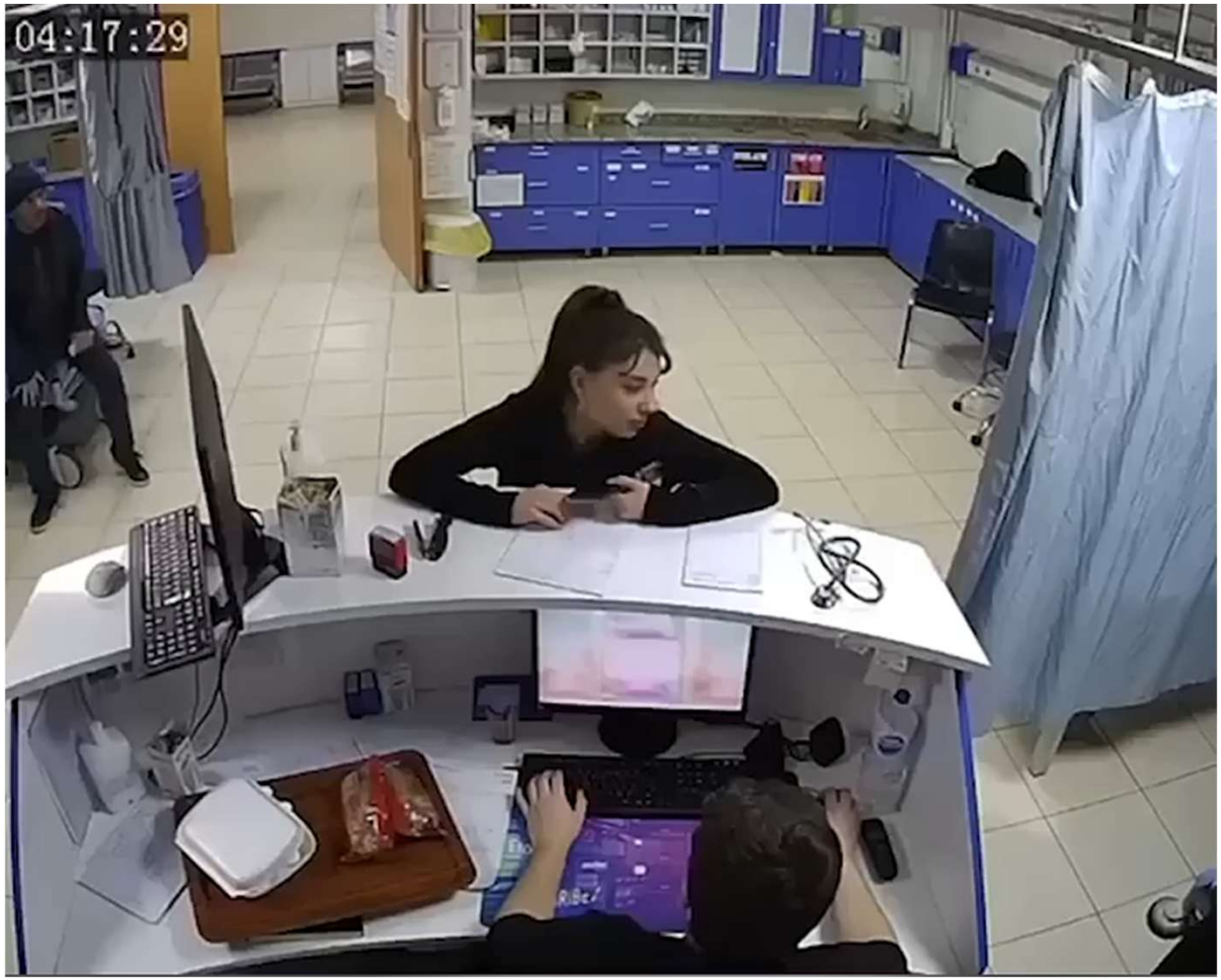
HVAC System is Ready for Smoke Checklist

8. Can the unit use MERV 13 or higher filters? If system cannot use MERV 13, use the highest MERV rated filter possible. There are alternative filtration technologies that allow filtration at a range of pressure drops.
9. An HVAC air balancing technician will be able to evaluate if installing MERV 13 filters will cause too much pressure drop for the system. Beyond the filters in the unit, system characteristics such as the duct configuration and dirt on air coils can also affect pressure drop.
10. Confirm that all filters are properly seated, and edges are sealed. Air leakage around the filters will greatly reduce their ability to clean the air.
11. Check that the filter and fan access doors are fastened and sealed.

HVAC System is Ready for Smoke Checklist

12. Have the building envelope, doors and windows been weatherized to reduce infiltration?
13. Where are the exhaust fans and how are they controlled?
14. Which exhaust fans are critical for safety? Examples are those serving isolation rooms, commercial kitchen hoods, oxygen storage rooms and other hazardous locations.
15. Where are the locations of exhaust grills? Can they be partially blocked to reduce flow?
16. If the building has more than one air handler or rooftop AC unit, can some of them be set to recirculation and a small number used to provide filtered outdoor air?
17. Does the building have an air conditioning system or portable cooling units to prevent heat-related illness?

How to Better Expedite Emergency Projects



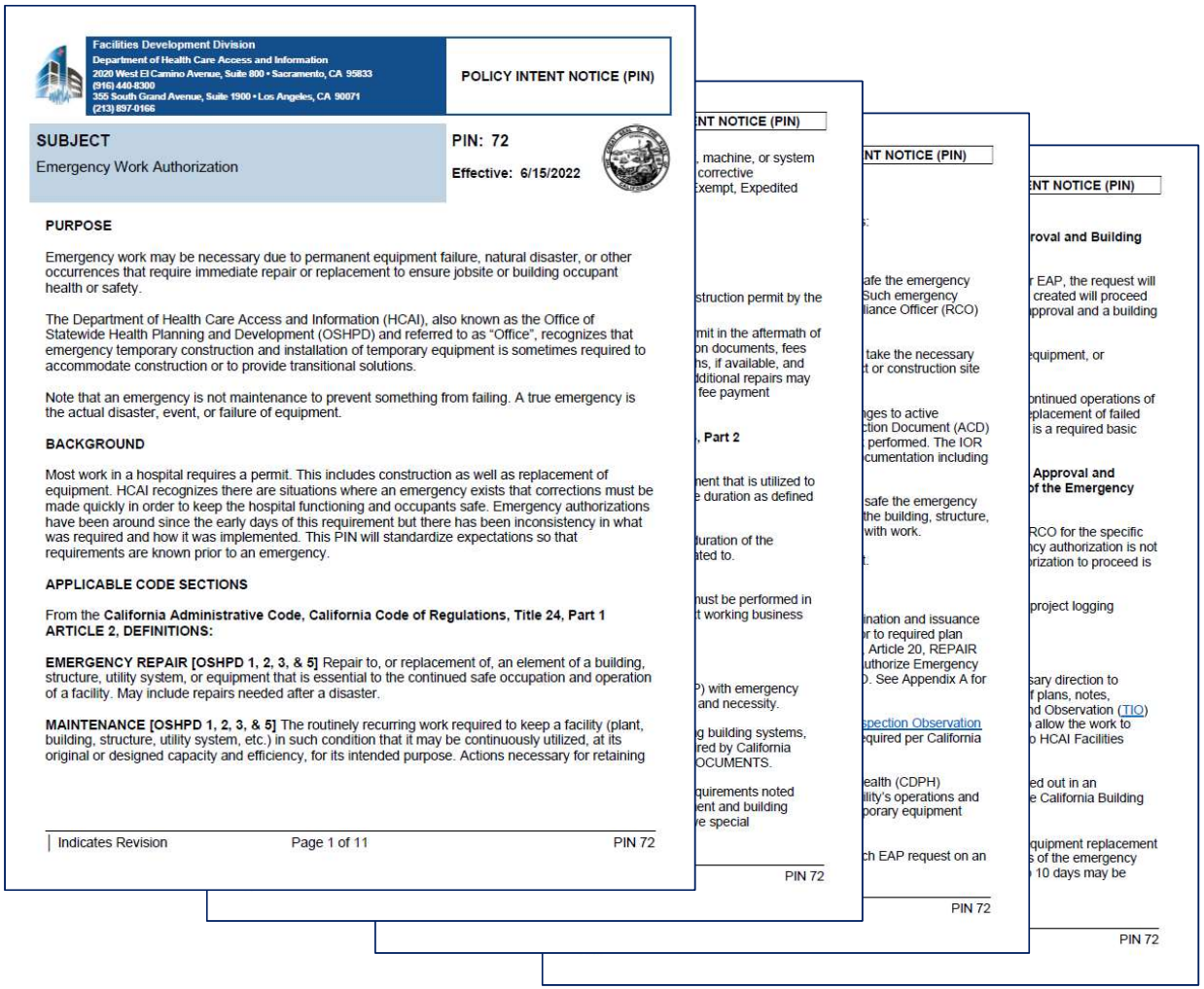
Emergency Projects

What actions do you take during an earthquake?

Emergency Projects

What actions can you take to repair damage after an earthquake?

PDC SUMMIT San Diego



Facilities Development Division
Department of Health Care Access and Information
2020 West El Camino Avenue, Suite 800 • Sacramento, CA 95833
(916) 440-8300
355 South Grand Avenue, Suite 1900 • Los Angeles, CA 90071
(213) 897-0166

POLICY INTENT NOTICE (PIN)

SUBJECT
Emergency Work Authorization

PIN: 72
Effective: 6/15/2022

PURPOSE

Emergency work may be necessary due to permanent equipment failure, natural disaster, or other occurrences that require immediate repair or replacement to ensure jobsite or building occupant health or safety.

The Department of Health Care Access and Information (HCAI), also known as the Office of Statewide Health Planning and Development (OSHPD) and referred to as "Office", recognizes that emergency temporary construction and installation of temporary equipment is sometimes required to accommodate construction or to provide transitional solutions.

Note that an emergency is not maintenance to prevent something from failing. A true emergency is the actual disaster, event, or failure of equipment.

BACKGROUND

Most work in a hospital requires a permit. This includes construction as well as replacement of equipment. HCAI recognizes there are situations where an emergency exists that corrections must be made quickly in order to keep the hospital functioning and occupants safe. Emergency authorizations have been around since the early days of this requirement but there has been inconsistency in what was required and how it was implemented. This PIN will standardize expectations so that requirements are known prior to an emergency.

APPLICABLE CODE SECTIONS

From the **California Administrative Code, California Code of Regulations, Title 24, Part 1 ARTICLE 2, DEFINITIONS:**

EMERGENCY REPAIR [OSHPD 1, 2, 3, & 5] Repair to, or replacement of, an element of a building, structure, utility system, or equipment that is essential to the continued safe occupation and operation of a facility. May include repairs needed after a disaster.

MAINTENANCE [OSHPD 1, 2, 3, & 5] The routinely recurring work required to keep a facility (plant, building, structure, utility system, etc.) in such condition that it may be continuously utilized, at its original or designed capacity and efficiency, for its intended purpose. Actions necessary for retaining

| Indicates Revision Page 1 of 11 PIN 72

PIN 72

PIN 72

PIN 72

Emergency Projects

OSHPD Policy Intent Notice (PIN) 72 Emergency Work Authorization

PDC SUMMIT San Diego

Emergency Projects Procedure

- Immediate Action
- Notification to OSHPD and Request for Emergency Authorization to Proceed (EAP)
- If EAP is Denied
- If EAP is Approved

Special Considerations

- All emergency temporary equipment is required to be removed prior to project closure.
- Special consideration must be given to additional electrical load on the emergency power supply system.
- The RCO may exempt the submittal of plans for temporary equipment when it will in place less than 30 days.
- If conditions approved under an EAP are not addressed in accordance with the CBSC and PIN 72, an Unauthorized Construction Project investigation will be initiated.

TE1

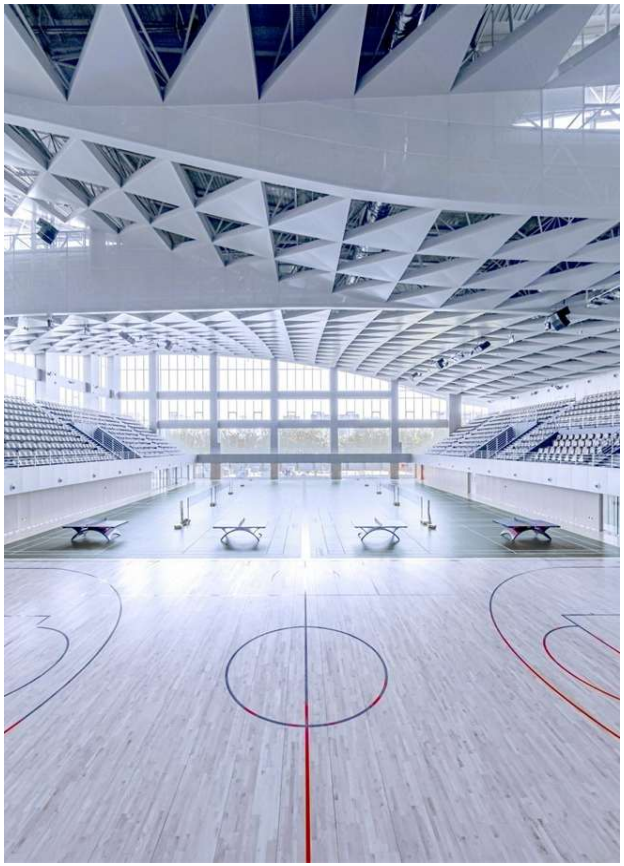
Coordination with Other Jurisdictions for Temporary Surge Facilities and Alternate Care Suites

Slide 61

TE1 Richard to edit quantity of slide & verbiage

Teresa Endres, 2024-02-08T21:00:35.440

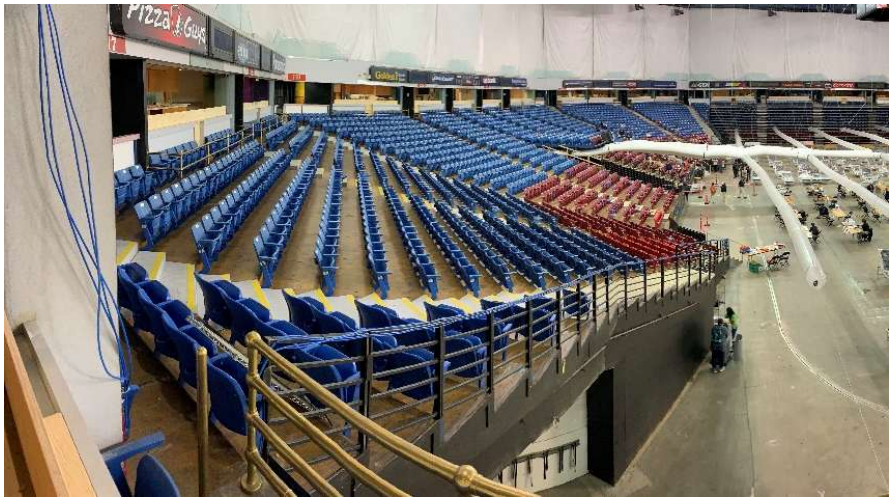
Locations and/or Buildings to Consider



- The primary decision factors should be space, availability, adequate infrastructure and utilities, and proximity to the healthcare facilities
- With small scale emergencies, tents, or even hotels, can accommodate a minor surge
- Sports arenas and convention or conference centers are good examples of buildings or areas that can be converted for large scale uses
- Temporary or mobile utilities can be brought in to meet needed

Locations and/or Buildings to Consider

- Evaluate infrastructure for utilities and placement of generators or equipment, routing of cabling and ducts through the facility, and maintaining egress with these obstructions in place.
- Agencies, facilities and venues should work closely together so that plans are coordinated and expedient.
- Many local jurisdictions do not have the experience handling emergencies and OSHPD remains a good resource to assist with implementation of use for temporary facilities.



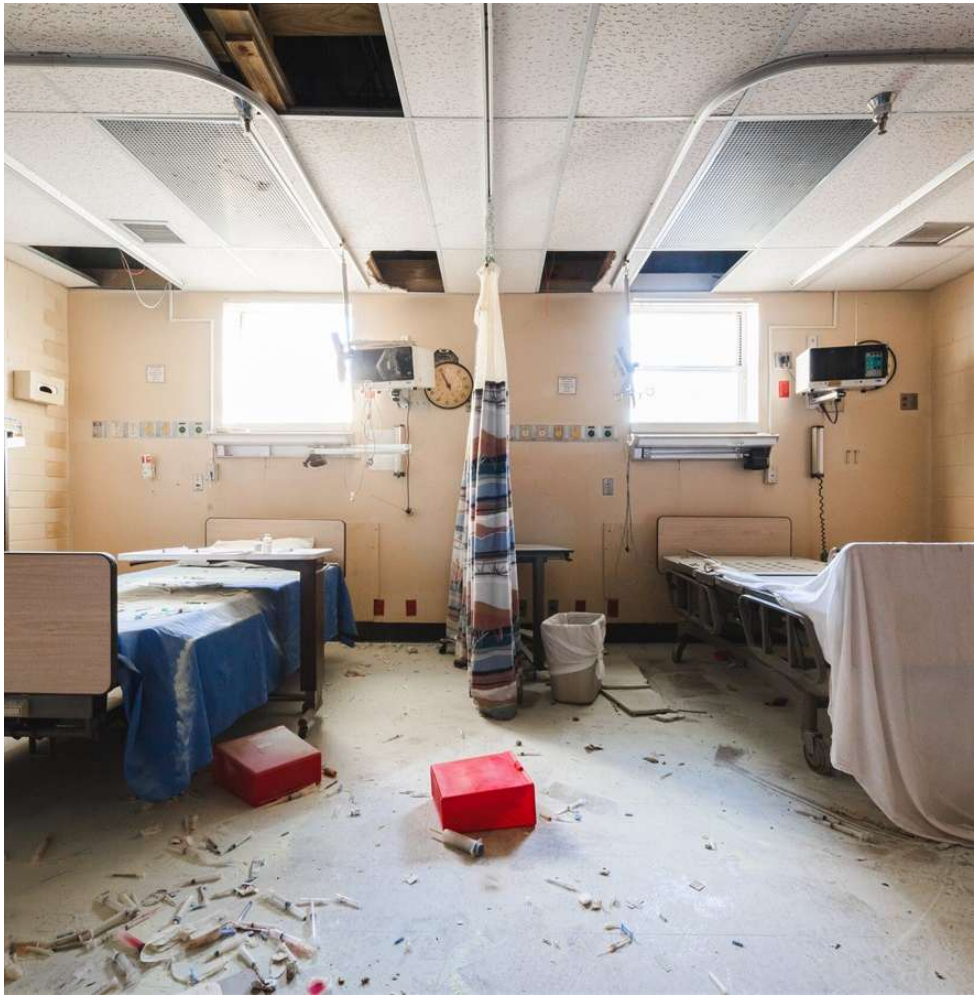
Sleep Train Area

In Sacramento, California, the Sleep Train Arena facility was surveyed for potential use, and it was determined that not only could the main floor be used, but several of the upper levels surrounding the main arena could be set up for patient care.

Using Existing Hospital Resources

In the hospital

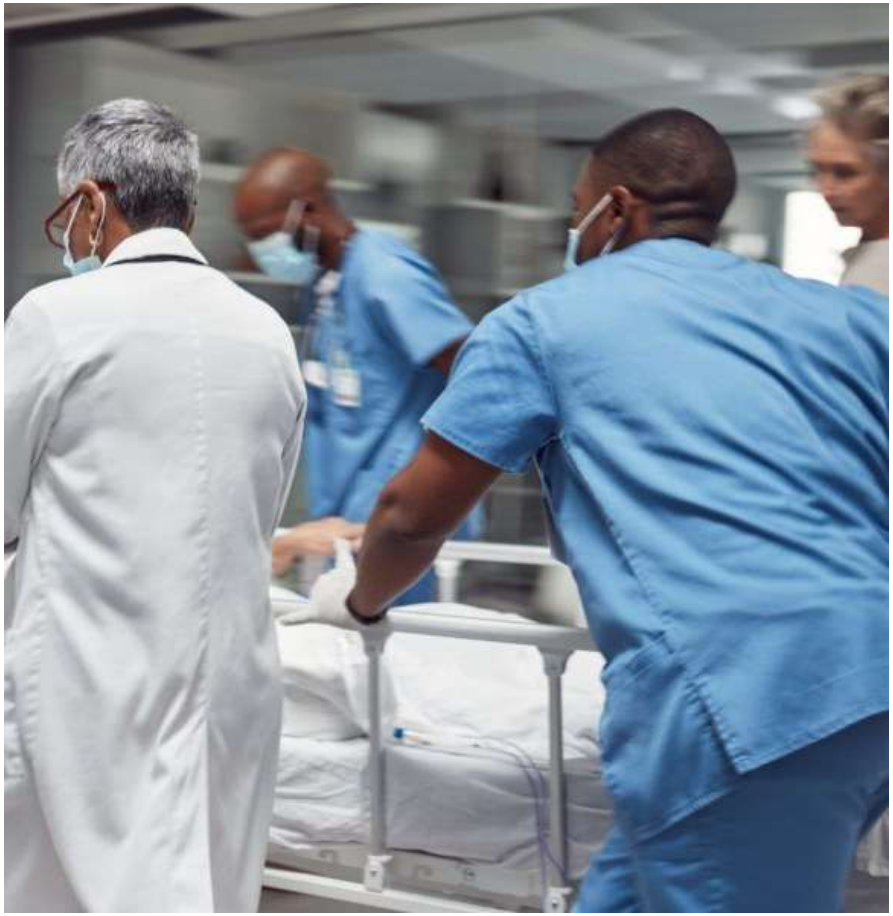
- Shell space
- Vacant patient rooms
- Adding beds to existing patient rooms
- Nurse call
- Med gases
- Bed clearances
- Bulk oxygen storage



Using Existing Hospital Resources

Off-site

- Reopening closed facilities
  - General Acute Care Hospitals
  - Skilled Nursing Facilities

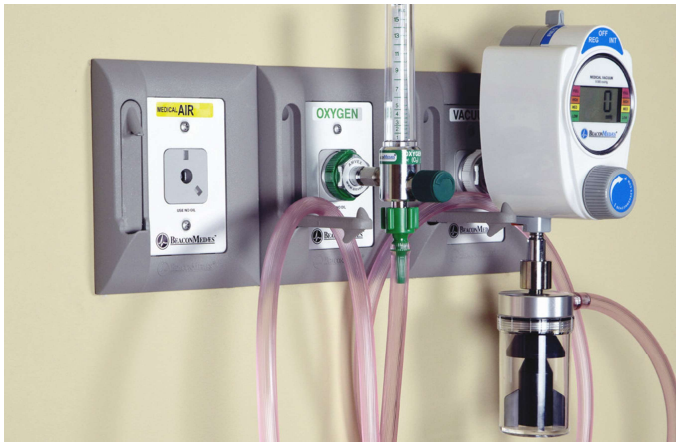


Returning to Pre-event/ Emergency State

Returning to Normal

- Document what changes were made
- Plan to return to normal
- Keeping emergency conditions in place
- Are changes going to be required?
- Is construction required?
- Contact your licensing agency and building department

Keeping Emergency Conditions in Place



- Many temporary conditions were allowed by way of an executive order or a waiver
- Due to there being very little, if any, oversight of what was being installed, many applications are a temporary solution and not compliant with any regulations or building standards
  - Running extension cords down corridors or across floors
  - Adding medical gas outlets in non-patient care areas with no supervising physician
  - Cutting holes in windows or walls to provide direct exhaust from patient care areas
- If a facility wishes to make temporary changes permanent, they will need to submit a project so that the installation will be code compliant
- Work with your building department to ensure a compliant condition

Conclusion

- Very little code requirements were changed
- Many emergency preparedness solutions are optional
- Work with resources provided by local agencies
- Coordinate with local governments and agencies for aid
- Coordinate with OSHPD/CDPH for acuity-adjustable patient units
- For resiliency, considering designing beyond code minimums; beyond code
- The Guide is recommended best practices, not mandatory
- Alternations require review and approval by Authorities Having Jurisdiction

https://hcai.ca.gov/document/design-guide-for-planning-and-preparing-for-disasters/

2024 PDC SUMMIT
March 17-20 San Diego

Evaluation & CECs

USING YOUR MOBILE APP

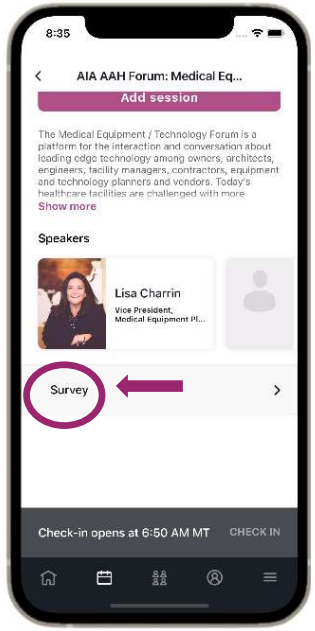
STEP 1
CHECK IN TO THE SESSION

STEP 2
ENTER CHECK IN CODE

STEP 3
COMPLETE THE EVALUATION

CHECK IN CODE:

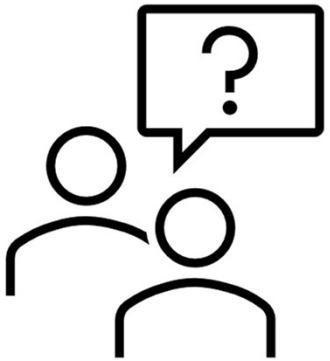
PDC1043



AHA Events

2024 PDC SUMMIT
March 17-20 San Diego

Questions?



Thank you for attending!

Please remember to check in to the session and complete the evaluation to receive CEC.

AHA Events

Check-in Code: PDC1043

Item #4

Review criteria for the “Designing for Resilience” webinar to address extreme natural hazard events that are not currently included in the Design Guide

- Confirm purpose of webinar
- Confirm webinar topics:
  - Power independence
  - Air quality issues (addressing fire and smoke) not already included in the Design Guide
  - Design approaches to dealing with wildfires not already included in the Design Guide
  - Relevant Hazard Vulnerability Assessments not already included in the Design Guide
  - Island hospital concept for resiliency
  - Any other resiliency topics not included in the Design Guide
- Discussion and public input

Facilitator: Teresa Endres (or designee)

Department of Health Care Access and Information

HCAI Design Guide for Planning and Preparing for Disasters

Design Guide for Planning and Preparing for Disasters

1. Introduction
2. Planning, Preparing, and Implementing Solutions for a Seismic Event
3. Emergency Patient Room Ventilation Conversion
4. Emergency Operation for Surge Capacity
5. Spaces That Can be Split into Multiple Zones
6. Other Considerations for Surge Capacity
7. HVAC System Considerations for Handling Smoke During Wildfires
8. Upgrading Air Filters
9. How to Expedite Projects
10. OSHPD's Responses to Disasters
11. Coordination for Temporary Surge Facilities and Alternate Care Sites

HCAi
Department of Health Care Access and Information

Designing for Resilience Webinar

Confirm Webinar Topics

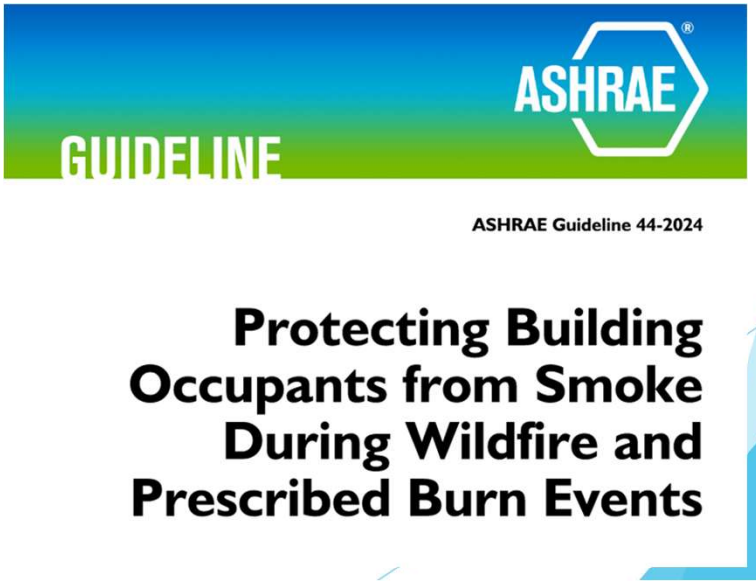
- Power independence
- Air quality issues (addressing fire and smoke) not already included in the Design Guide
- Design approaches to dealing with wildfires not already included in the Design Guide
- Relevant Hazard Vulnerability Assessments not already included in the Design Guide
- Island hospital concept for resiliency
- Any other resiliency topics not included in the Design Guide

HCAi
Department of Health Care Access and Information

AHSRAE Standards 241 & Guideline 44

HBSB Resiliency Ad Hoc ASHRAE Standards 241 and Guideline 44

By Abdel K. Darwich, PE, HFDP



BACKGROUND

Work on OSHPD Emergency design Complete

ASHRAE Standard 241-2023
Control of Infectious Aerosols

Purpose

- ASHRAE 241 establishes minimum requirements for controlling infectious aerosols to reduce disease transmission risk in new and existing buildings and major renovations, covering air system design, installation, operation, and maintenance.

1. Infection Risk Management Mode (IRMM)

The mode of operation in which measures to reduce infectious aerosol exposure documented in a building readiness plan are active

Decision on IRMM Enable / Disable: Not specified in 241

- Public health official
- Owner
- Occupant

Why not all the time?

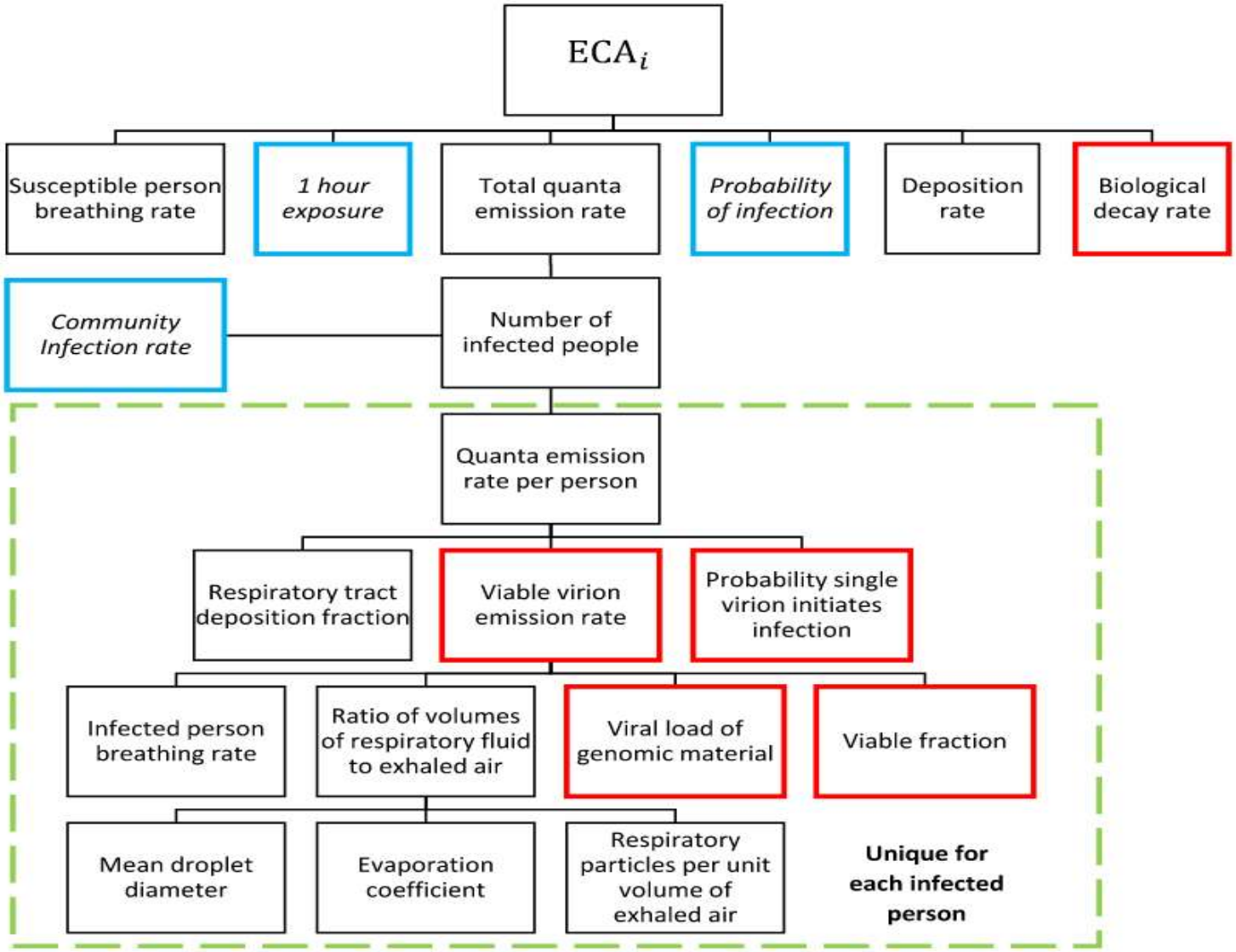
- Potential Energy use and cost increase
- Infection risk and consequences of infection vary over a wide range

An example of resilience applied to IAQ

2. Equivalent Clean Airflow-Infection (ECAi)

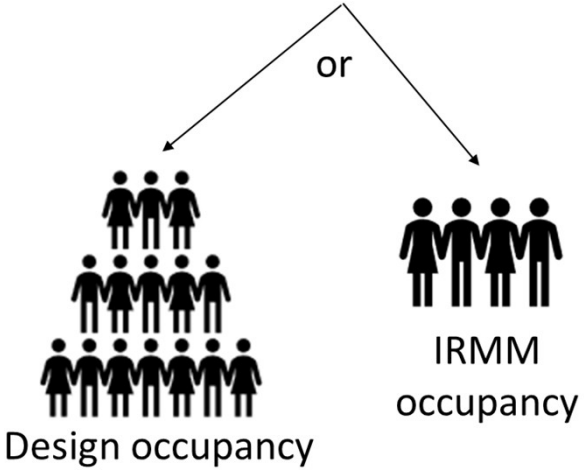
The flow rate of pathogen-free air that, if distributed uniformly within the breathing zone, would have the same effect on infectious aerosol concentration as the sum of actual outdoor airflow, filtered airflow, and inactivation of infectious aerosols

1. Concept on which the entire standard depends
2. Quantity of air (ACH) not sufficient alone anymore. Quality of air important.
2. Negative pressure –no credit


ECA_i
Susceptible person breathing rate
1 hour exposure
Total quanta emission rate
Probability of infection
Deposition rate
Biological decay rate
Community Infection rate
Number of infected people
Quanta emission rate per person
Respiratory tract deposition fraction
Viable virion emission rate
Probability single virion initiates infection
Infected person breathing rate
Ratio of volumes of respiratory fluid to exhaled air
Viral load of genomic material
Viable fraction
Mean droplet diameter
Evaporation coefficient
Respiratory particles per unit volume of exhaled air
Unique for each infected person

ECAi depends on space type, number of people, activity

$$V_{ECAi} = ECAi \times P_{Z,IRMM}$$

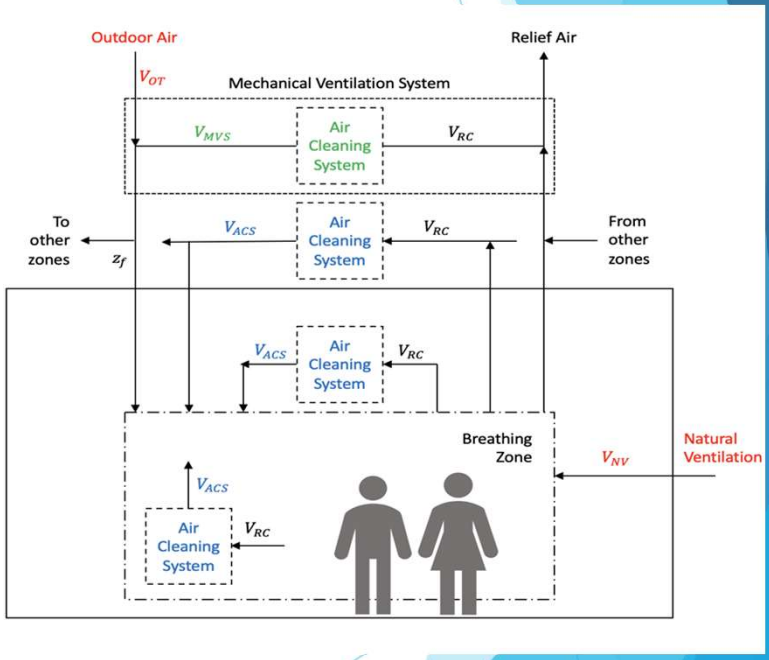


Occupancy Category	ECAi cfm/person	ECAi L/s/person
Correctional Facilities		
Cell	30	15
Dayroom	40	20
Commercial/Retail		
Food and beverage facilities	60	30
Gym	80	40
Office	30	15
Retail	40	20
Transportation waiting	60	30
Educational Facilities		
Classroom	40	20
Lecture hall	50	25
Industrial		
Manufacturing	50	25
Sorting, packing, light assembly	20	10
Warehouse	20	10
Health Care		
Exam room	40	20
Group treatment area	70	35
Patient room	70	35
Resident room	50	25
Waiting room	90	45
Public Assembly/Sports and Entertainment		
Auditorium	50	25
Place of religious worship	50	25
Museum	60	30
Convention	60	30
Spectator area	50	25
Lobbies	50	25
Residential		
Common space	50	25
Dwelling unit	30	15

Meeting the ECAi target

Clean “Pathogen free” air can be :

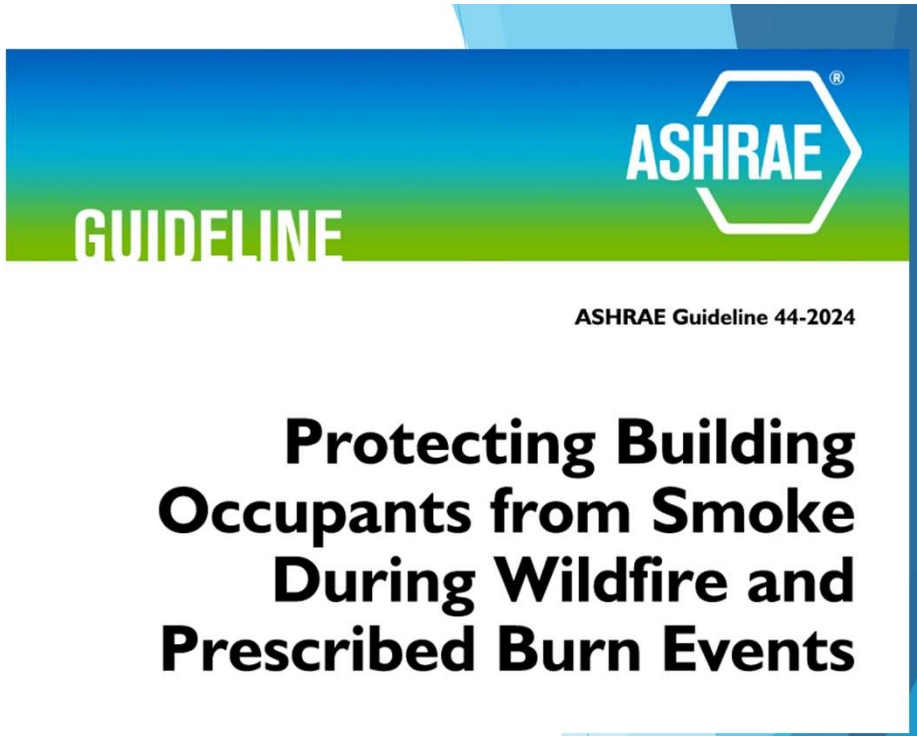
- Outside air
- Filtered air
- Cleaned air

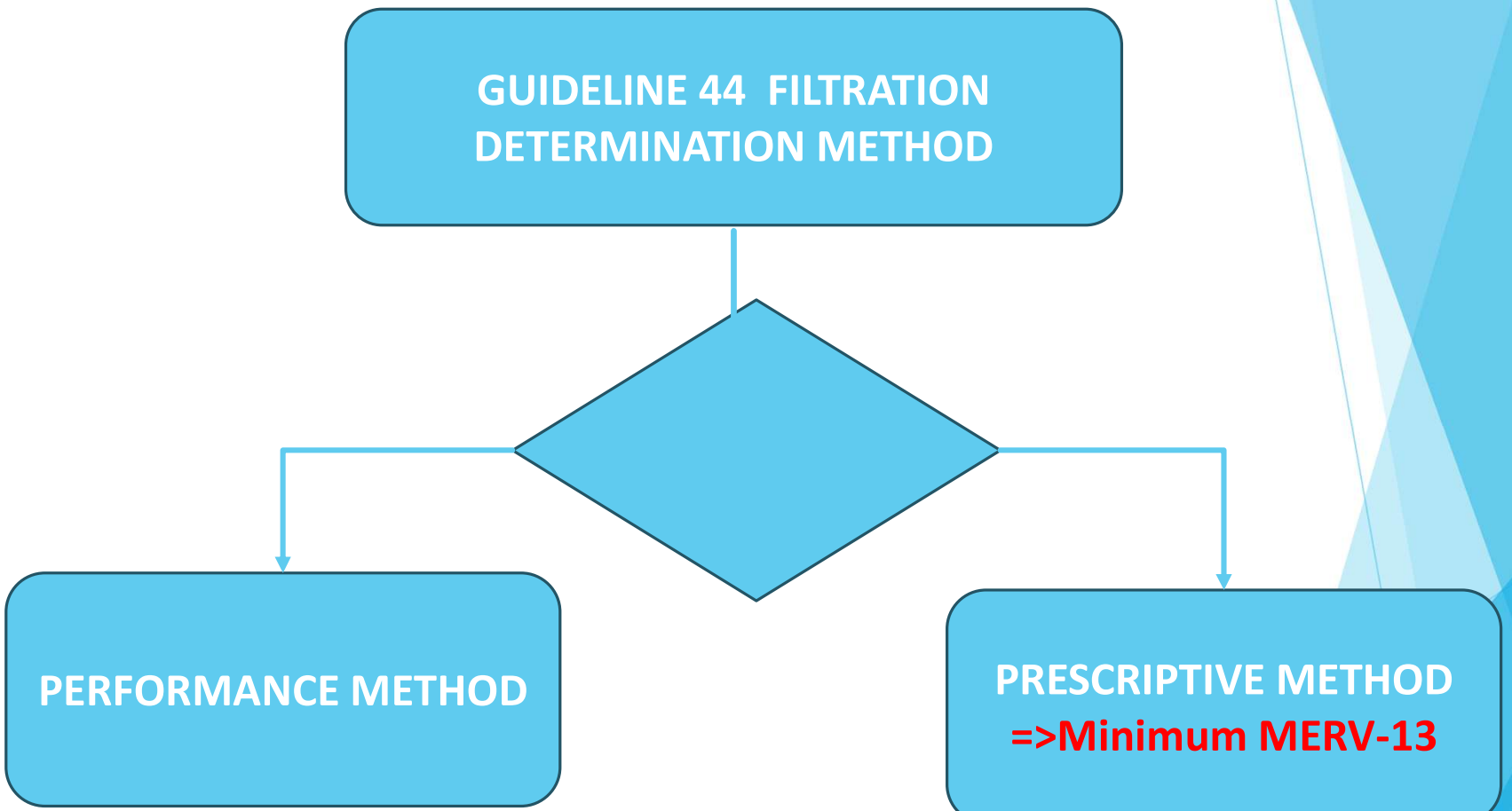


Phase of the Process		Assessment	Planning	Planning	Planning
Name of Space / AHU / Building	Units	EXISTING	Option 1	Option 2	Option 3
Description of system or Option		AHU with X,Y,Z	Description	Description	Description
Space Type from Standard 241	Type	Healthcare: Waiting room	Healthcare: Waiting room	Healthcare: Waiting room	Healthcare: Waiting room
Target ECAi from Standard 241 (From Table 5-1 on Instructions Tab)	CFM / Person	90	90	90	90
Area	Sq Ft	1,500	1,500	1,500	1,500
Average Ceiling Height	Ft	10	10	10	10
Volume	Cu Ft	15,000	15,000	15,000	15,000
CMC/170 ACH		**12**	**12**	**12**	**15**
Total Supply Air	CFM	2,300	2,300	2,300	**3,200**
Total Outdoor Air	CFM	400	400	400	400
Occupancy - Design (Pz)	people	50	50	50	50
Occupancy - IRMM Target ($P_{z,IRMM}$)	people	50	**30**	**25**	**30**
$V_{ECAi,t,Des}$ Airflow Target - Design Occupancy	CFM	4,500	4,500	4,500	4,500
$V_{ECAi,t,IRMM}$ Airflow Target - IRMM Target Occ.	CFM	4,500	2,700	2,250	2,700
Air Cleaning (Section 7)					
Central AHU Filter MERV Rating	MERV	14	HEPA	14	14
Filter Pathogen Removal Efficiency	εPR	88%	99%	88%	88%
UV in HVAC - Single Pass Inactivation	%	0%	0%	0%	0%
Air Treatment in HVAC (Impacts Space)	CFM	0	0	0	0
Air Treatment Device in Space	CFM	0	0	0	0
Number of Air Treatment Devices in Space	Quantity	0	0	0	0
In Room UV	CFM	0	0	**100**	0
Number of In Room UV Type	Quantity	0	0	**1**	0
In Room Air Cleaner (Fan Filter Type) (See Eq 7-4 in Instructions Tab)	CFM	0	0	**100**	0
Number of In Room Air Cleaners (Fan Filter type)	Quantity	0	0	**1**	0
Total Equivalent Clean Air ($V_{ECAi,existing}$)	CFM	2,072	2,281	2,272	2,864
Occupant Count Method (Design or IRMM)	Method	IRMM	IRMM	IRMM	IRMM
ECAi Provided by the Option	**CFM/person**	**41.4**	**76.0**	**90.9**	**95.5**
Does $V_{ECAi,existing}$ meet $V_{ECAi,target}$?		No	No	Meets 241	Meets 241

ASHRAE Guideline 44

- Committee started July 2021
- Detour : Published a white paper in 2022. Used as a basis for OSHDP Emergency Desing Guide .
- Published Guideline 44 in January 2025
- 7 Chapters
  - 1 Purpose
  - 2 Scope
  - 3 Definitions and Symbols
  - 4 Background
  - 5 Design and Commissioning
  - 6 Operation During a Wild Fire Event
  - 7 References
- Free access after LA and Canadian fires

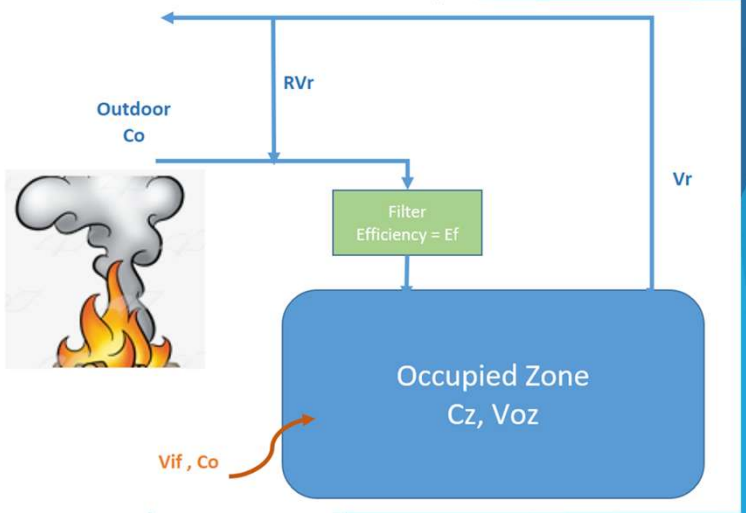



GUIDELINE 44 FILTRATION DETERMINATION METHOD
PERFORMANCE METHOD
PRESCRIPTIVE METHOD
=>Minimum MERV-13

Filter efficiency PERFORMANCE method

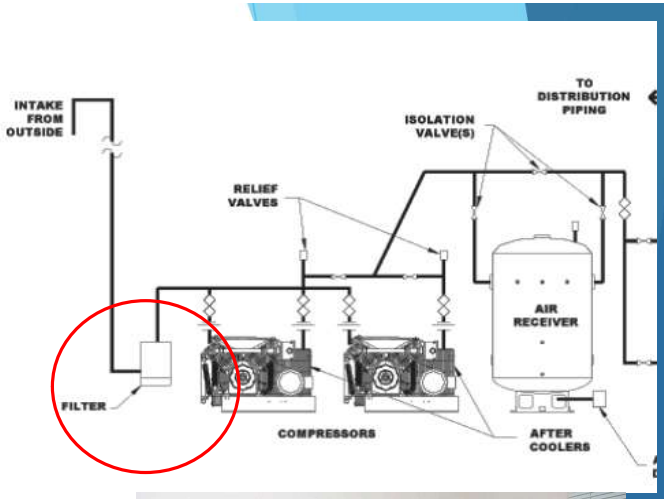
- Variables:
  - Outdoor PM2.5 concentration
  - Leakage
  - Airflow
  - Recirculation rate
  - Indoor PM2.5 concentration – ALARA- As Low As Reasonably Achievable – 20% of outdoor
  - Filter removal efficiency

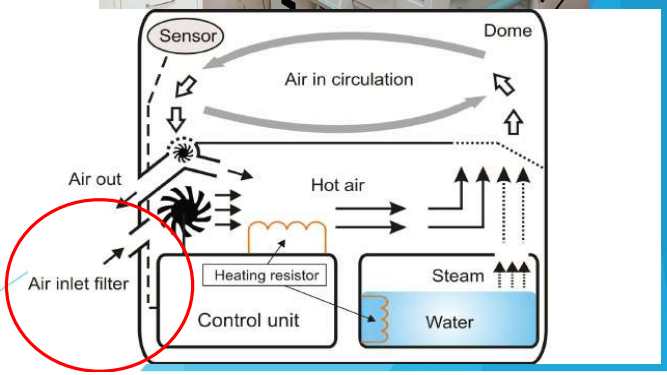
$$Cz = \frac{VifCo + Voz(1 - Ef)Co}{Voz + FrRVrEf}$$



Healthcare specific recommendation in G44

- Non-HVAC filters will also load up from wildfire smoke
- Medical Air Compressor – Filter on air intake
- Filter in medical equipment like NICU incubators
- Have a full inventory and lots of spare





How easy / difficult Table in G44?

Table 3 Application of Measures to Mitigate Wildfire Smoke

Measure	System							
	Large Chilled-Water AHUs with Supply VAVs	Large Chilled-Water AHUs with Supply VAVs and Return Airflow Control	Large Rooftop Package Units (more than 5 tons)	Small Rooftop Package Units (5 tons and smaller)	Radiant Systems with DOAS	Chilled Beams with DOAS	Ducted VRF with DOAS	Ductless VRF with DOAS
Add PM2.5 sensors	1	1	1	1	1	1	1	1
Add building pressure sensors	1	1	1	1	1	1	1	1
Reduce/shutdown outdoor air	1	1	1	2	2	2	2	2
Disable economizers and/or DCV	1	1	2	2	N/A	N/A	N/A	N/A
Maintain positive pressure between building and outside	1	1	1	1	1	1	1	1
Maintain positive pressure across zones inside building	3	1	3	3	3	3	3	3
Include vestibules/entryways	2	2	2	2	2	2	2	2
Add air curtains	1	1	1	1	1	1	1	1
Tighten duct and dampers after leak test	1	1	1	2	1	1	1	2
MERV 13 filters on recirculating and outdoor air	1	1	1	2	3	3	2	3
MERV 13 filters on outdoor air only	1	1	1	2	2	2	2	2
Fan sizing for filter loading	1	1	1	3	2	2	2	2
Add PACs	1	1	1	1	1	1	1	1

Item #5 Schedule the next committee meeting

- Discussion and public input

Facilitator: Teresa Endres (or designee)

Possible dates in 2025:

- Tuesday, October 15*
- Wednesday. October 16*
- Thursday, November 20**

*Need to submit the agenda by this Thursday, September 25

**This date's meeting report would be too late to include in the December 10 – 11 Full Board meeting agenda; the meeting can be reviewed/presented at the FB, but the meeting report won't be available to review/approve until 2026)

Item #6 Comments from the Public/Subcommittee Members on Issues not on this Agenda

The Subcommittee will receive comments from the Public/Subcommittee Members. Matters raised at this time may be taken under consideration for placement on a subsequent agenda.

Facilitator: Teresa Endres (or designee)

No future Ad hoc Designing for Resilience Webinar Development Subcommittee meetings scheduled at this time.

Item #7 Adjournment