

Welcome HAIO Surge Solutions Task Force Participants and Other Recipients of HAIO Materials:

The Hospital Acquired Infections Organization (HAIO) was founded in 2013 to explore facilities improvements for infection control through a collaborative design environment, involving multiple Architecture, Engineering and Construction (AEC) companies, and healthcare systems, in a collaborative, non-competitive design and innovation environment.

In March 2020, HAIO initiated a Task Force to provide a forum for sharing information, and to develop best practices for Covid-19 surge solutions for Post-Acute Care patients. Over 140 participants from over 10 healthcare systems and 40 AEC companies donated their time to five Task Force remote meetings, and the numerous remote meetings of the four sub-committees. The HAIO Task Force achieved four goals:

1. Extensive Discussion of the Real-time Needs and Experiences of Health Systems for Rapid Feedback and Information Sharing during the height of the COVID-19 crisis. This was achieved through a Hospital-leaders Round Table discussion during each of the five Task Force meetings, and resulted in extensive discussion between Hospital systems on common needs and different approaches to address those needs.
2. HAIO Surge Solutions Covid-19 Library. The library, organized by relevant facilities topics, was developed as a repository of information on Covid-19 facilities issues, and is accessible with the following link: https://www.dropbox.com/sh/kpx07e3dv8yymxl/AADhxvqzM_IT21hDNw485gmoa?dl=0
3. HAIO Surge Solutions Facilities Best Practice Assessments (see following document). Four Architecture, Engineering and Contractor (AEC) Sub-committees were developed to review current state practice on the rapid deployment of post-acute care facilities solutions, including Existing Healthcare Facilities, Hotels and Dorms, Conference Centers and Sports Facilities, and Modular and Tent solutions. They then recommended assessment tools and best practices for the effective repositioning of those facilities types to best support post-acute care facilities solutions. The results of those four sub-committees is provided in the attached presentation.
4. Initial Discussion on How the Covid-19 Experience May Impact the Future of Healthcare Planning and Design. The fifth Task Force Round Table discussion addressed how the Covid-19 experience may impact long term facilities planning and design, once architects, engineers and health systems evaluate current design guidelines and best practice after this immediate crisis.

The HAIO Task Force has now reached a seminal milestone with the release of the attached presentation, which includes the final report of the four HAIO Surge Solutions Sub-Committees.

We request that you send these materials to contacts in a position to influence healthcare facilities decision making, including hospital, government, and association leaders. Please also send the report to other professional colleagues that might benefit from these insights. We ask that you inform us of who this is circulated to, so that we can follow-up with those individuals as further materials are developed. Thank you for your interest, and thank you to the multiple participants on this Task Force.

Sincerely,

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HAIIO Healthcare Surge Solutions

Creating Healthcare Settings
for Post Acute Care for Covid-19 Patients in
Non-Traditional Spaces

April 20, 2020

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Arup	Management	Shepley Bulfinch
Atrius Health	HC Tangram Design	SmithGroup
Baystate Health	HDR	Stamford Hospital
Beth Israel Deaconess Medical Center	HED	Steward Health
BI Lahey Health	Heywood Hospital	Stroudwater Associates
BR+A Consulting Engineers	HDS Architecture	Suffolk Construction
Boston Medical Center	HGA	Trinity Health of New England
Boston Children’s Hospital	Indigo	Thompson Consultants, Inc.
Boston Society of Architects	The Innova Group	Tsoi Kobus Design
Brigham and Women’s Hospital	Jensen Hughes	Turner Construction
CannonDesign	Lavallee Brensinger Architects	UMass Memorial Health Care
Colliers Project Leaders	Maine Medical Center	UMass Medical School
Commodore Builders	Margulies Perruzzi Architects	Walsh Brothers
Connecticut Children’s Hospital	Massachusetts General Hospital	Winchester Hospital
Consigli	McGovern Foundation	Wise Construction
Creative Office Pavilion	Navilean	Yale New Haven Hospital
Dartmouth Hitchcock Hospital	NBBJ	
e4h architecture	New England Life Care	
FGI - Facilities Guidelines Institute	Partners HC	
Gensler	Payette	
Harvard University Capital Project	Perkins and Will	

HAIO began in 2013, and is a collaborative nonprofit consisting of hospital professionals, infection control and environmental service representatives, project management teams, architects, engineers, and construction professionals, all with the mission to explore ways to reduce the spread of healthcare associated infections through the use of architecture, design and construction.

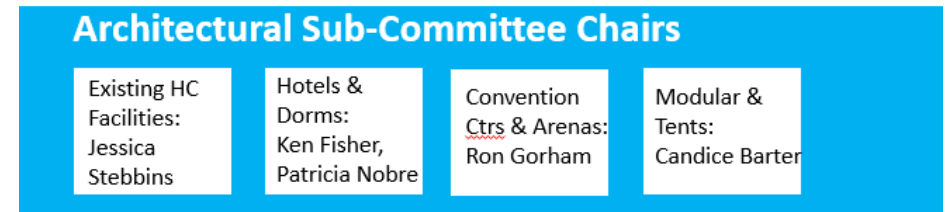
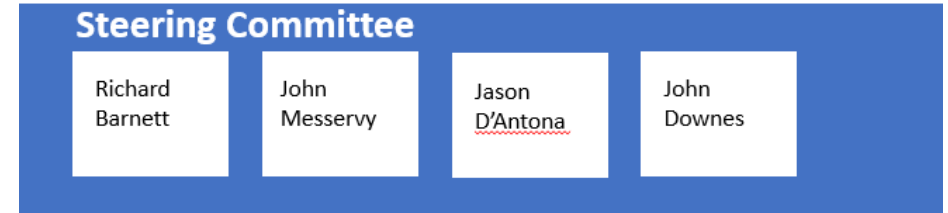
Since 2015, the HAIO group has been actively working with two Boston area hospitals as they redesign current inpatient rooms to reduce the risk of patient infection

Our mission: to listen and help healthcare organizations respond to crisis conditions as they identify their needs.

Our role: to manage the assessment of options, and deployment of immediate response action contingency plans, to provide surge space solutions to healthcare organizations in response to crisis conditions.

The committee structure has been formed to channel the resources of HAIO towards providing collaborative, specific responses as requested.

HAIO – Healthcare Surge Solutions Structure



HAIO - Designing for Surge Capacity

Lessons Learned from Roundtable Discussions for Post Acute Care

Thank you to our roundtable participants:

Walter Armstrong, Beth Israel Deaconess Medical Center

Win Brown, Heywood Hospital

Domenic Ciavarro, Trinity Health

Tom Goins, Dartmouth Hitchcock Health

Patrick Jordan, Dartmouth Hitchcock Health

Kris Kennedy, Baystate Health

Michael Knapik, Baystate Health

Dr. Mark Klempner, Univ. of Massachusetts Medical School

Jennifer McCarthy, Maine Medical Center

Vincent McDermott, Newton Wellesley Hospital

John Messervy, Partners HealthCare

Dr. Peter Slavin, Massachusetts General Hospital

Dr. Steven Stroudwater, Atrius Health

Dana Swenson, Umass Memorial Health Care

Kirsten Waltz, Baystate Health

Dr. Rick Weiner, Winchester Hospital

Brendan Whalen, Boston Medical Center

Lessons Learned – Considerations for Future Planning and Design

A. Building design/renovation

1. Consider adding operable windows to older buildings so can attain negative pressure by addition of exhaust fans.
2. Flexible construction that allows conversion of med/surg beds to ICUs (sufficient clearance and med gases).
3. Consider inclusion of non-invasive procedure rooms with negative pressure.
4. Consider providing additional infrastructure to some non-clinical areas (e.g. conference centers) so that more areas can be adapted for patient care.
5. Application of the known infection prevention strategies for the built environment (e.g. hands-free door openers) to stop transmission.
6. Allocate special rooms for disinfection of PPE (or at least be able assign space to this function at time of emergency).
7. Provide additional warehousing for storing PPE, so not so dependent on supply chains.
8. Spaces for staff respite: with all staff in full PPE, they need to be able to take breaks near their clinical units, decompress, while maintaining social distancing.
9. Provision of maker spaces with 3D printing capability – to respond to immediate needs.

B. Regulatory

1. Perhaps FGI might consider allowing “switchable” pressurization of rooms (i.e., from positive to negative pressure)?
2. Should it be mandatory that facilities have a plan for using exterior space for setting up mobile sites? Regulations to include requirements for building pads (e.g. utilities, med gases).

C. Mechanical Systems

1. Provide HEPA filtration everywhere in IP settings.
2. Consider oxygen capacity – size for potential respiratory pandemics.
3. Build in ability to convert more rooms to negative pressure.

D. Access/Patient Flow

1. Consider Disney-like flow into hospitals/clinics, allowing for space for social distancing; providing positive distraction to help with the wait times for screening or security.
2. Separate entry points for staff vs. patients/visitors; how to separate well patients exiting the facility from potentially sick/infectious patients arriving?

E. Operational Change

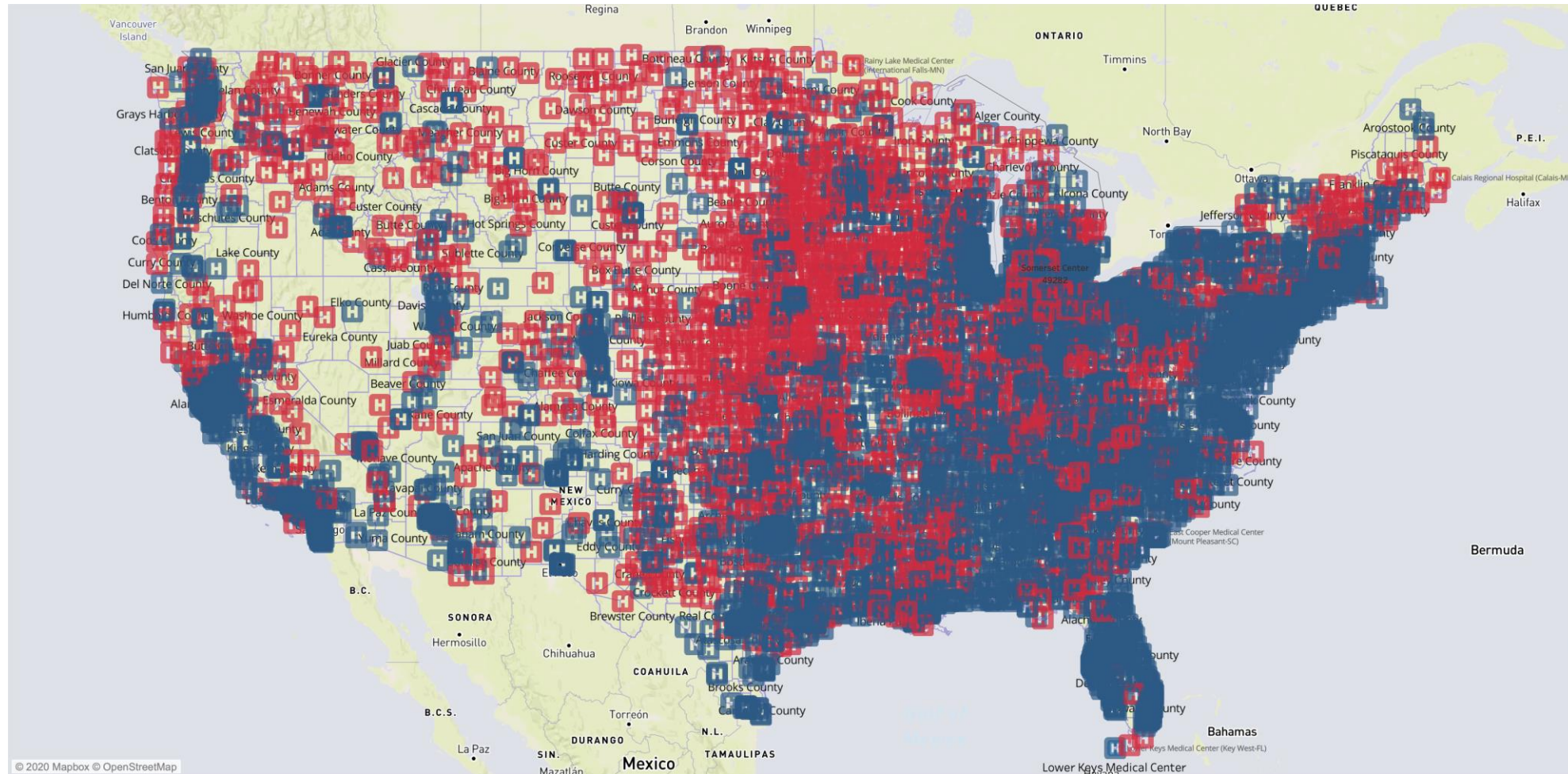
1. For hospital networks, level loading of patient care within the system is a successful strategy for expanding capacity.
2. Continuous masking be the norm.
3. Greater use of hydrogen peroxide “bombing” of rooms and equipment.

F. Preparing for mobile sites – building extensions

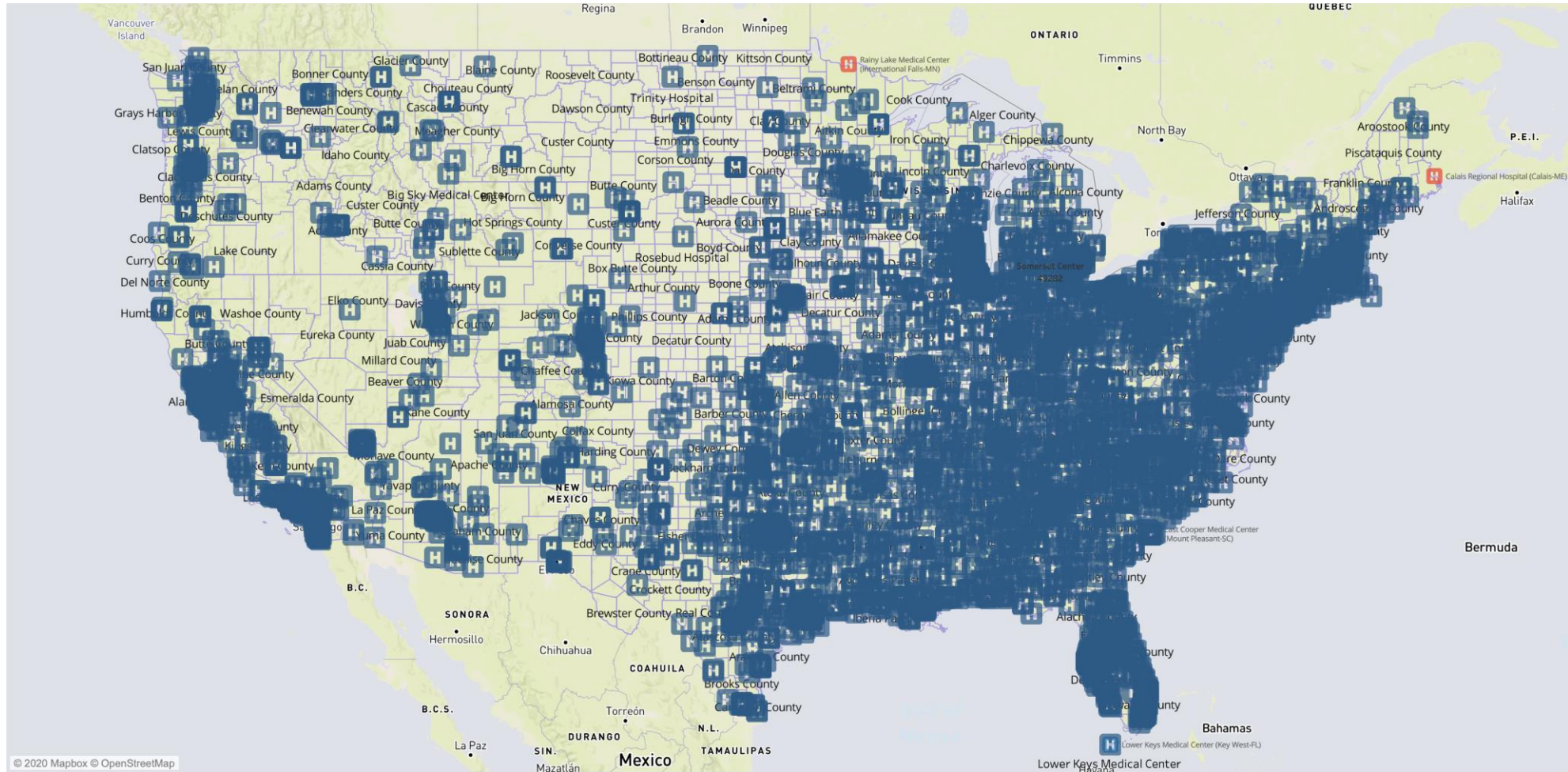
1. Hospital/healthcare facilities should have plans and infrastructure set up to support mobile sites/tents that allow for surge capacities, equipped with utilities, med gases.

G. Emergency Planning

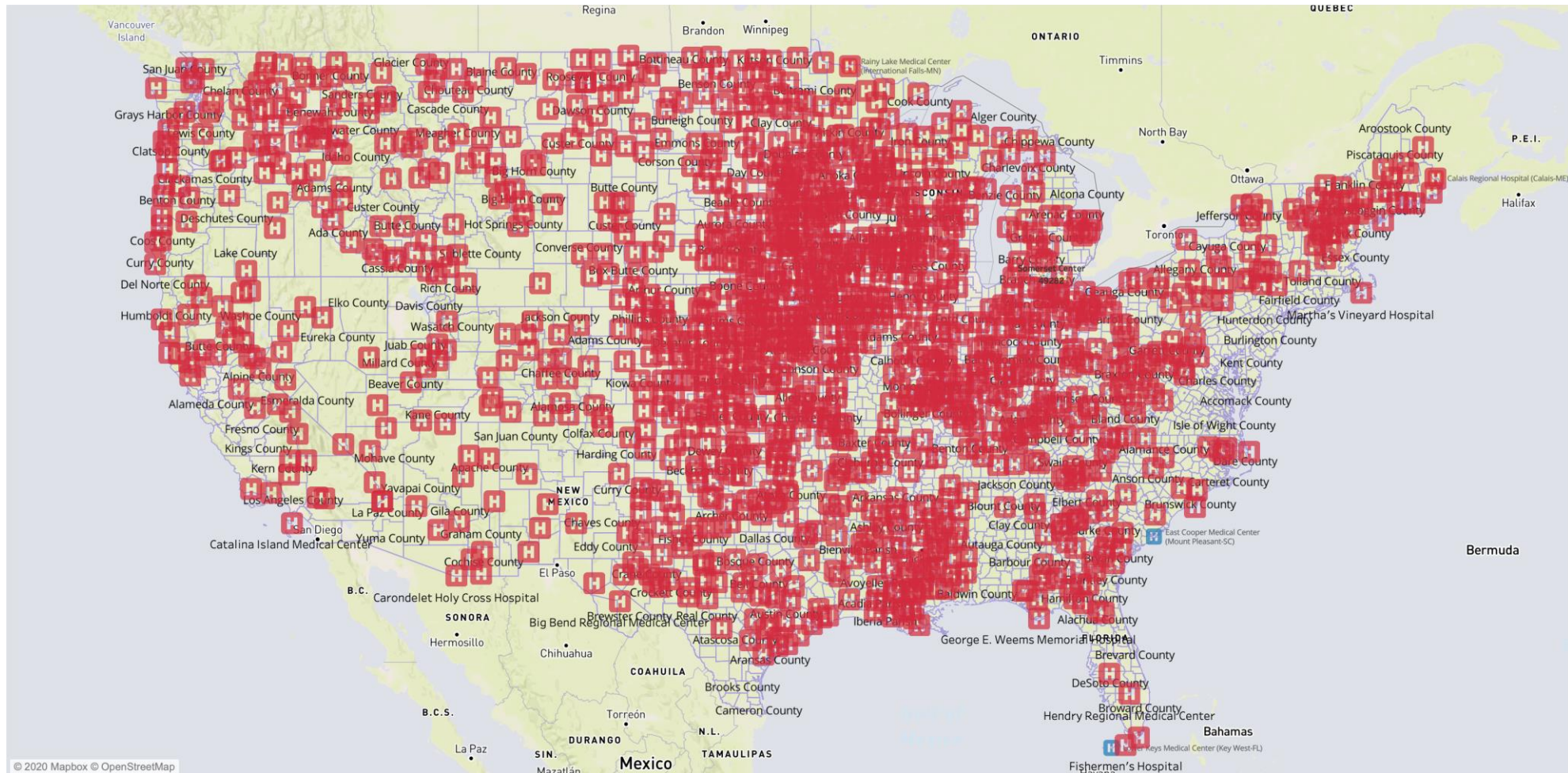
- A. Consider planning dorms and hotels for future emergency conversion to patient care, rather than relying on tents and convention centers.
- B. It is the collaborative efforts, between the state and institutions, between independent institutions, with various facilities within a network, with the architectural/engineering/builder/vendor community, that lead to successful solutions.



There are +/- 5,300 hospitals in the country. The diagram shows two of the main types of hospitals, Prospective Payment System (PPS) Hospitals shown in blue make up about 80% of acute hospitals. The other 20%, shown in red, are Critical Access Hospitals (CAH).



The Prospective Payment System Hospitals (PPS) include a tremendous range of hospitals, from large academic medical centers and large community hospitals all the way down to small rural hospitals.



Critical Access Hospitals are determined by many criteria, including having fewer than 25 beds, average length of stay less than 96 hours (although this has been relaxed due to COVID-19) and being located a prescribed distance from any other hospital. Often, they are several hours from any kind of tertiary hospital. A surge of even a small number of COVID-19 patients has the ability to quickly strain the resources of the hospital and staff. ***The majority of these rural communities can benefit now from contingency planning of alternate spaces to address potential influx scenarios.***

Definitions

What is an acute care facility?

Acute care is immediate, high-level medical care for people suffering from serious injury, exacerbation of an existing illness, and other urgent medical conditions that require an intensive level of treatment and observation. Acute care facilities actively address life-threatening or limb-threatening conditions until the patient can be safely treated with a lower level of care. The length of stay in an acute care facility depends on the specific condition and the requirements of the patient, but stays are generally shorter in duration. A hospital is an example of an acute care facility.

What is subacute care?

Subacute care takes place after or instead of a stay in an acute care facility. Subacute care provides a specialized level of care to medically fragile patients, though often with a longer length of stay than acute care. Many patients with acute illness or injury require comprehensive care that includes frequent assessments and procedures to manage their condition. People with pulmonary disease, cardiac disease, cancer, and conditions requiring IV therapy or tube feedings may need subacute care after a hospital stay. Subacute care can include dialysis, chemotherapy, ventilation care, complex wound care, and other inpatient medical and nursing services.

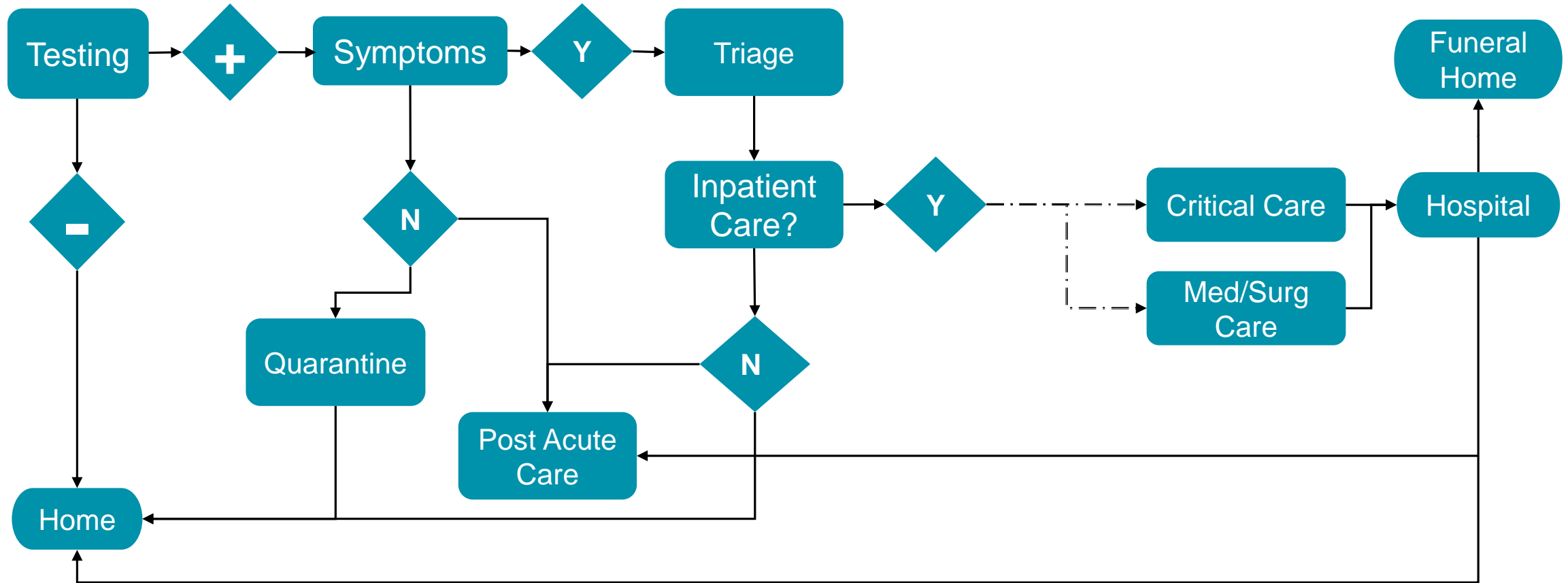
What is post-acute care?

While post-acute care also provides continued medical treatment after a hospital stay, it maintains an emphasis on recuperation, rehabilitation, and symptom management. Patients in recovery from cardiac or pulmonary disease, stroke or neurological disorders, or orthopedic surgery often require rehabilitative therapies to help bridge the gap between hospital and home. The goal of [post-acute rehabilitation](#) is to maximize patient wellness and independence so they can get back to the business of living their best lives. Post-acute care services range from intensive short-term rehab to longer-term restorative care. Some patients will achieve full recovery, while others learn to manage the symptoms of a chronic illness.

Working Group Process

1. 4 Sub-committees were established to address Surge Capacity for Post-Acute Care Patients:
 - Conversion Existing Healthcare Facilities
 - Conversion Existing Non-Healthcare Facilities – Hotels and Dorms
 - Conversion Existing Non-Healthcare Facilities – Convention Centers and Arenas
 - New Facilities – Modular / Tents
2. Approximately 15-25 volunteers have participated in each work session.
3. Collaborative effort of architects, engineers, contractors, owners' project managers, and vendors
4. Groups have had some variation in the interpretation of the charge; this has led to a richness of material that you will all soon see
5. All have been developing surge capacity solutions from the broad lens of infection prevention – including protecting patients, clinicians and staff.

Covid-19 Patient Flow to Post-Acute Care Flow Chart



Active Link to Site Appropriateness Selection Tool:

https://www.dropbox.com/sh/kpx07e3dv8yymxl/AACHTzA5Se9Uzjaabum1drJna/0.%20HAIO%20Presentations?dl=0&preview=200420+HAIO+Surge+Solutions+Site+Appropriateness+Tool+.xlsx&subfolder_nav_tracking=1

HAIO Healthcare Surge Solutions

SITE APPROPRIATENESS SELECTION TOOL

This tool can be used to compare and assess the viability of any given location(s) or scenario(s) for providing additional surge bed capacity. To best utilize this form:

1. Identify the location(s) or scenario(s) being considered for the type of bed capacity needed
2. Review each line item and rank accordingly for the location(s) or scenario(s) selected for comparison
3. First select the estimated construction time frame for the location selected. Then review each cost item and rank for the location(s) or scenario(s) selected

The column with the highest total indicates the most appropriate location or scenario

Bed Need Indicate with X potential options	PROPOSED ADDITIONAL BED NEED CAPACITY				
	Type & Additional Bed Need	< 50 beds	< 50 beds	+50 beds	+50 beds
	Critical Care				
	Med/Surg				
	Post Acute				
	Post Acute (cannot return to residence)				
OPERATIONAL QUALITIES					
Access					
	Food				
	Pharmacy				
	Lab				
	Medical equipment				
	Supplies				
	Toilets				
	Showers				
Separation of flows					
	Clean				
	Soiled				
	Staff				
	Patient				
Safety					
	Security				
	Sight lines				
INFRASTRUCTURE AVAILABILITY					
Utilities					
	Electric				
	Emergency Power				
	Site Lighting				
	Oxygen				
	Sewer				
	Contaminated Water Holding				
	Water				
	IT				
	Wi-Fi				
	HVAC Controls				
	Exhaust				
Roadways					
	Access for deliveries				
	Access for waste holding				
IMPLEMENTATION					
Construction/renovation time frame					
	Immediate				
	< 2 weeks				
	< 4 weeks				
Cost					
	Land costs				
	Infrastructure costs				
	Material Costs				
	Labor Costs				
	Cost to ship and set-up				
	Cost to return or convert back				
TOTAL (maximum of 136 points)		0	0	0	0

HAIO Healthcare Surge Solutions

SITE APPROPRIATENESS SELECTION TOOL

This tool can be used to compare and assess the viability of any given location(s) or scenario(s) for providing additional surge bed capacity. To best utilize this form:

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Bed Need Indicate with X potential options	PROPOSED ADDITIONAL BED NEED CAPACITY				
	Type & Additional Bed Need	< 50 beds	< 50 beds	+50 beds	+50 beds
	Critical Care				
	Med/Surg			X	
	Post Acute			X	
	Post Acute (cannot return to residence)				X
OPERATIONAL QUALITIES					
Access					
	Food			3	2
	Pharmacy			4	2
	Lab			4	2
	Medical equipment			4	3
	Supplies			4	3
	Toilets			4	2
	Showers			4	2
	4			2	4
Separation of flows					
	Clean			4	4
	Soiled			4	4
	Staff			4	4
	Patient			4	4
Safety					
	Security			4	3
	Sight lines			4	3
INFRASTRUCTURE AVAILABILITY					
Utilities					
	Electric			4	4
	Emergency Power			4	4
	Site Lighting			4	4
	Oxygen			4	2
	Sewer			4	3
	Contaminated Water Holding			1	1
	Water			4	4
	IT			4	3
	Wi-Fi			4	3
	HVAC Controls			4	4
	Exhaust			4	4
Roadways					
	Access for deliveries			4	3
	Access for waste holding			4	3
IMPLEMENTATION					
Construction/renovation time frame					
	Immediate			4	
	< 2 weeks				3
	< 4 weeks				
Cost					
	Land costs			4	4
	Infrastructure costs			4	3
	Material Costs			4	2
	Labor Costs			4	2
	Cost to ship and set-up			4	2
	Cost to return or convert back			4	2
TOTAL (maximum of 136 points)		0	0	0	0

EXAMPLE: SITE COMPARISON EVALUATION

HAIO - Designing for Surge Capacity

Existing Facilities within Hospital Networks for Post Acute Care

Jessica Stebbins, HDR (sub-committee chair)
Milly Baker, HGA
Richard Barnett, Colliers Project Leaders
Gretchen Battle, CannonDesign
Sean Brice, Thompson Consultants, Inc.
Win Brown, Heywood Hospital
Andrew Brumbach, SmithGroup
Allen Buie, HDR
Matthew Cotton, SmithGroup
Jason D'Antona, Partners Healthcare
Doug Erickson, FGI
Jeff Galvin, Lavallee Brensinger Arch.
Keith Garratt, SmithGroup
Anne Garrity, Tsoi Kobus Design
Kieran Guinan, Thompsons Consultants, Inc.
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Anna Mancini, HGA

Sarah Markovitz, NBBJ
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Wendy Weitzner, The Innova Group
Greg Wells, HDR
Teresa Wilson, Colliers Project Leaders
Kathleen Woods, HDR
Evan Wyner, Colliers Project Leaders
Bobbe Young, HED

Existing facilities within hospital network

- Facility needs different based on patient needs

FACILITY / SPACE TYPE

AMC's, Community Hospitals, Critical Access

- Closed Units
- Shell Space
- **Med / Surg Beds**
- **Prep-recovery**
- **Conference Centers**
- **Rehab Gym**
- Administration
- Main Lobby

Closed Hospital

Medical Office Buildings

Ambulatory Surgical Centers

Rehabilitation Hospitals

LTACs (Long term Acute Care Facility)

Skilled Nursing Facility

HomeCare

*NOTE: **Bolded** are spaces considered in the following slides:*

PATIENT TYPES

Type 1. Per other HAIO groups working on “Post Acute”

- Covid positive patients only
- Have been discharged from the hospital but cannot go home either due to:
 - Medical needs (minor medical attention still required)
 - Social needs (lives alone, has inappropriate or no housing, etc.) or inability to be placed (such as a nursing home patient who cannot return to the nursing home due to Covid status)

Type 2. Spaulding Cambridge LTAC COVID 19 Dedicated Unit “Sub Acute”

Medium and complex patients who will need oxygen and suction setups.

- Dedicated unit for Covid positive patients only
- Private rooms required for Covid positive patients that are on nebulized therapy, vented, open trach, Bipap/Cipap. They need to remain in their rooms.
- Cohort Covid positive patients utilizing semiprivate and private rooms.

NOTE: These are still relatively acute “hospital” patients

Site Appropriateness

- Key Considerations

Building / Space Assessment

Check list items

- MEP/FP Life Safety Infrastructure
- Emergency Backup
- IT BackBone Infrastructure
- Supply-chain / Logistics/ Loading Dock
- Patient Transport Capabilities
- Building & Site Area / Parking
- Building Egress & Security
- Local Regulatory Agencies
- ADA/Accessibility
- Waste Management
- Central Sterile
- Morgue

Operational Qualities

Check list items

- Bed Capacity / Patients per Sq Ft
- Staffing Efficiency / Caregiver per Patient Ratio
- Sight Lines
- Separation of Clean / Dirty Flows
- Space for Donning/Doffing
- Food Service / Delivery Access
- Equipment & Materials Storage
- Pharmacy / Medical Supply Access
- Rehabilitation PT/OT Space
- Safety to Healthcare Providers
- Staff Respite Space /On-Call Rooms
- Proximity to AMC

Time & Costs

Check list items

- Deployable/Limited Make-Ready Requirements
- Local Prefabrication Capability
- Labor Market
- Robust Wireless System
- Reusability vs. Permanence / Impact on Space Long-Term
- Construction Cost Estimate
- Design & Construction Schedule
- Report – Prioritize Recommendations

Site Adaptation

- How to adapt your site to accommodate post-acute care

Recommission Closed Hospital

Check list items

- Inventory Amount of Private versus Non-Private Spaces; Negative Pressure / Isolation
- Life Safety / Infrastructure
- Testing of systems, Med Gas, IT, HVAC, Emergency Power
- Bulk Oxygen Tank Capacity
- Cleaning of Facility & Systems
- Interior Environment Suitability / Healthy vs Hazardous
- Understand Site Access & Building Egress
- Evaluate Construction Logistics

Convert Closed Unit or Other Clinical Space (e.g. PACU)

Check list items

- Inventory Amount of Private versus Non-Private Spaces Negative Pressure / Isolation
- Check Pressurization to Adjacent Spaces
- Test of systems, Med Gas, IT, HVAC, Emergency Power.
- Cleaning of Facilities & Systems
- Interior Environment Suitability/ Healthy vs Hazardous.
- Ensure Interior Finishes are Easily Cleanable

Convert Non-Patient Room Spaces

Check list items

- Quantify Capacity of “Ward Type” # of Beds
- Ensure Adequate Power and Plumbing are Available
- Temp / Additional IT Network Infrastructure
- Use of Temporary Modular Systems
- Develop Protocols for Portable Oxygen and Gases
- Ensure Capability to Separate Covid and Non-Covid Patients

Steps needed if only for Type 1/true post-acute & custodial patients

Site Adaptation

- How to adapt your site to accommodate post-acute care

Ambulatory Surgical Center

Check list items

- Inventory Amount of Private versus Non-Private Spaces
- Check Pressurization to Adjacent Spaces
- Check Humidity, Life Safety, Generators
- Develop Protocols for Portable Oxygen and Gases
- Ensure Capability to Separate Covid and Non-Covid Patients
- Interior Environment Suitability
- Assess Parking Capacity
- Food Service

Medical Office Building

Check list items

- Inventory Amount of Private versus Non-Private Spaces
- Confirm HVAC suitability – Ducted vs Open Plenum
- Check Humidity, Life Safety
- Temporary Generators?
- Develop Protocols for Portable Oxygen and Gases
- Temporary Bulk Oxygen Tank
- COVID Positive Patients Only
- Interior Environment Suitability
- Food Service

Home Care

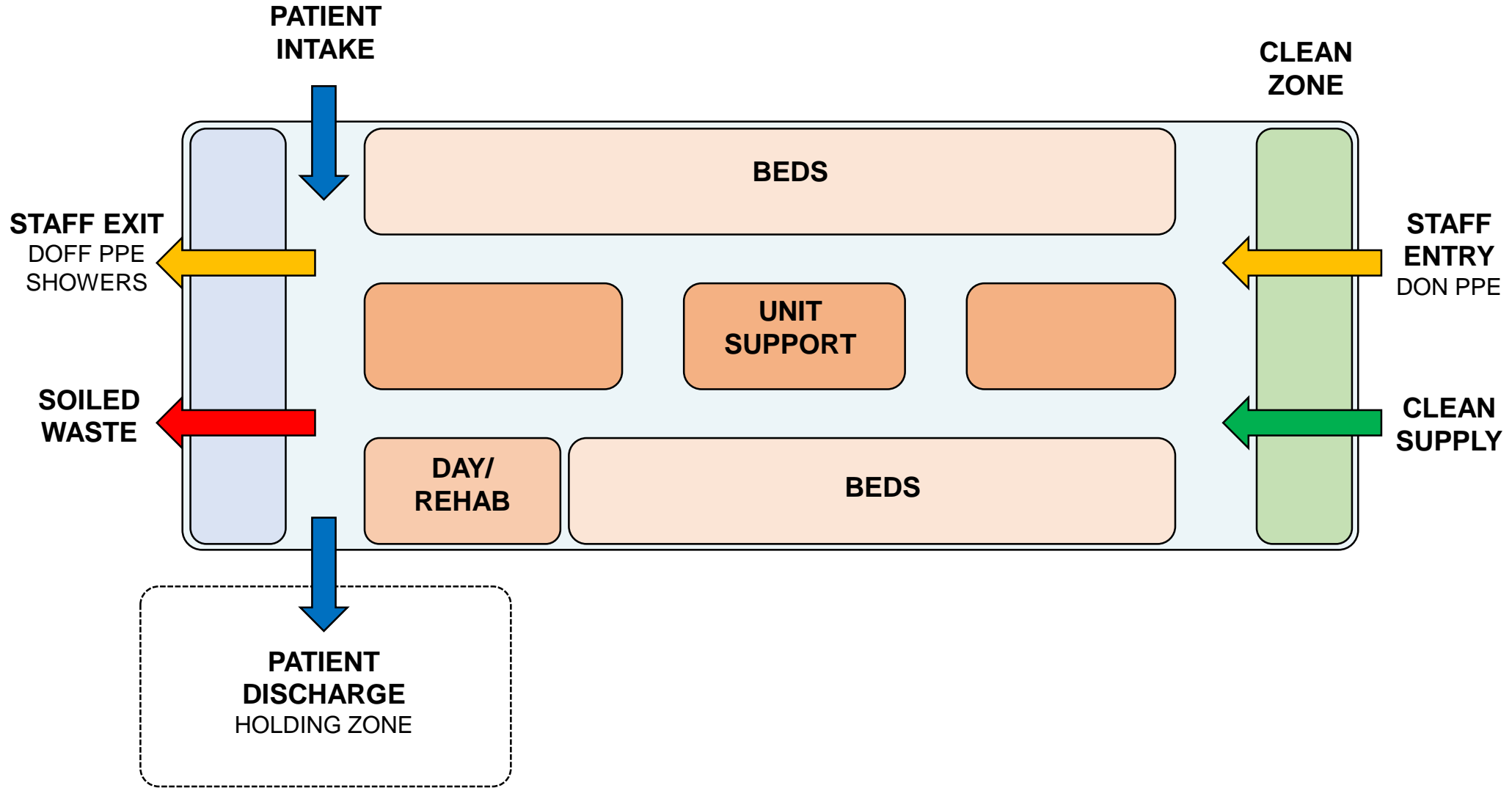
Check list items

- Test Internet Connectivity
- Train Patients & Family on Virtual Care Usage
- Train Patients & Family in Infection Control Techniques
- Assess Space for Accessibility (if Applicable)
- Organize Space Into “Dirty” and “Clean” Areas
- Visiting Nurse, PT and OT
- Develop Quarantine Space for Patient With Majority of Needed Items for Daily Living

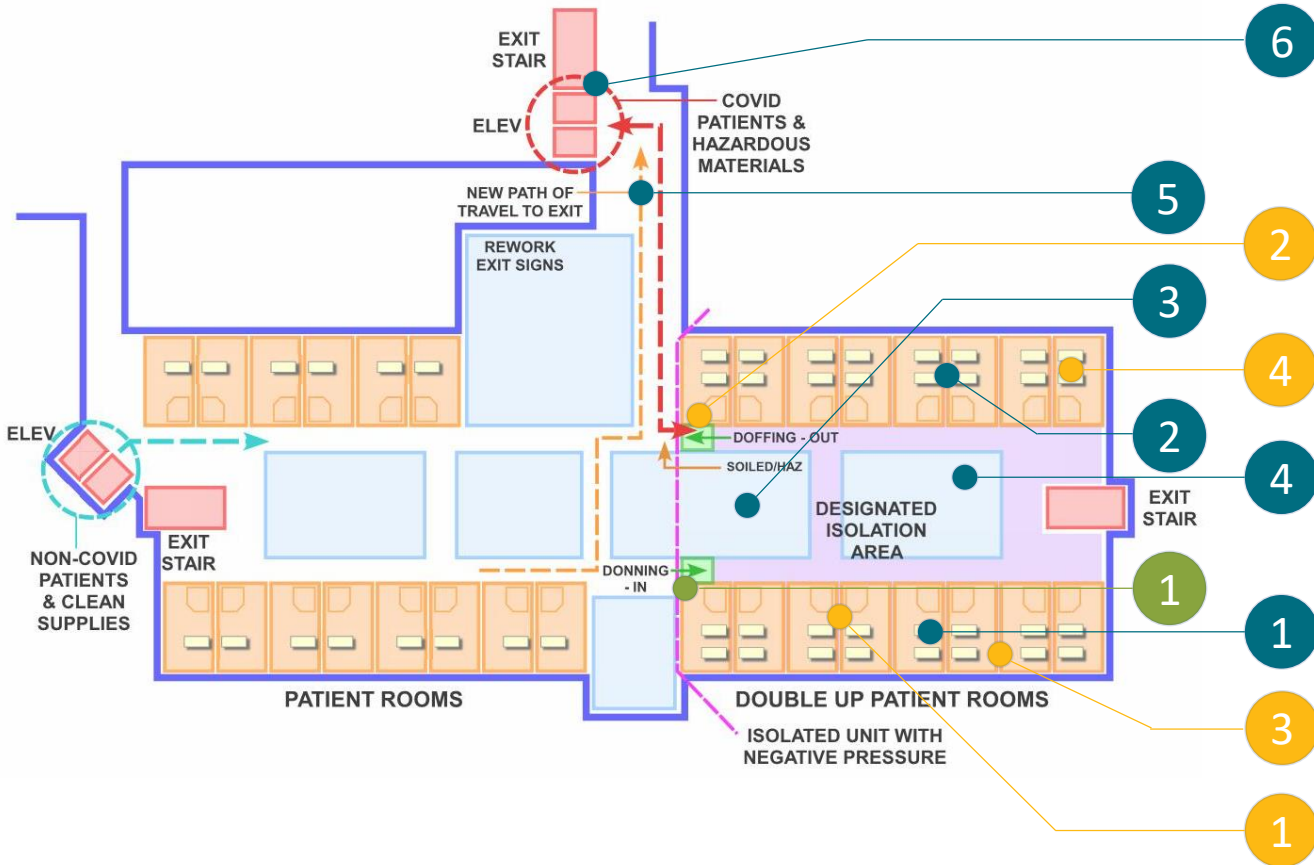
Steps needed if only for Type 1/true post-acute & custodial patients

Operational Flows

- To Hospital Covid-19 + Post Acute Care



MED/SURG Unit Conversion Diagram



Existing Space Benefits

1. Private patient rooms – can be used for double occupancy
2. Medical Gasses, Power, Tel/Data
3. Nurse stations & support space for staff
4. Clean, Soil, Nour & Equipment Space
5. Life safety provisions
6. Ability to Isolate elevator cores

Changes Recommended

1. Convert to negative pressure
2. Ante rooms for donning & doffing
3. Remove excess furniture and equipment in patient rooms
4. Privacy for patients

Challenges

1. Infection control at entry / exit

Infrastructure

- All necessary infrastructure is available in a med/surg suite for post acute care

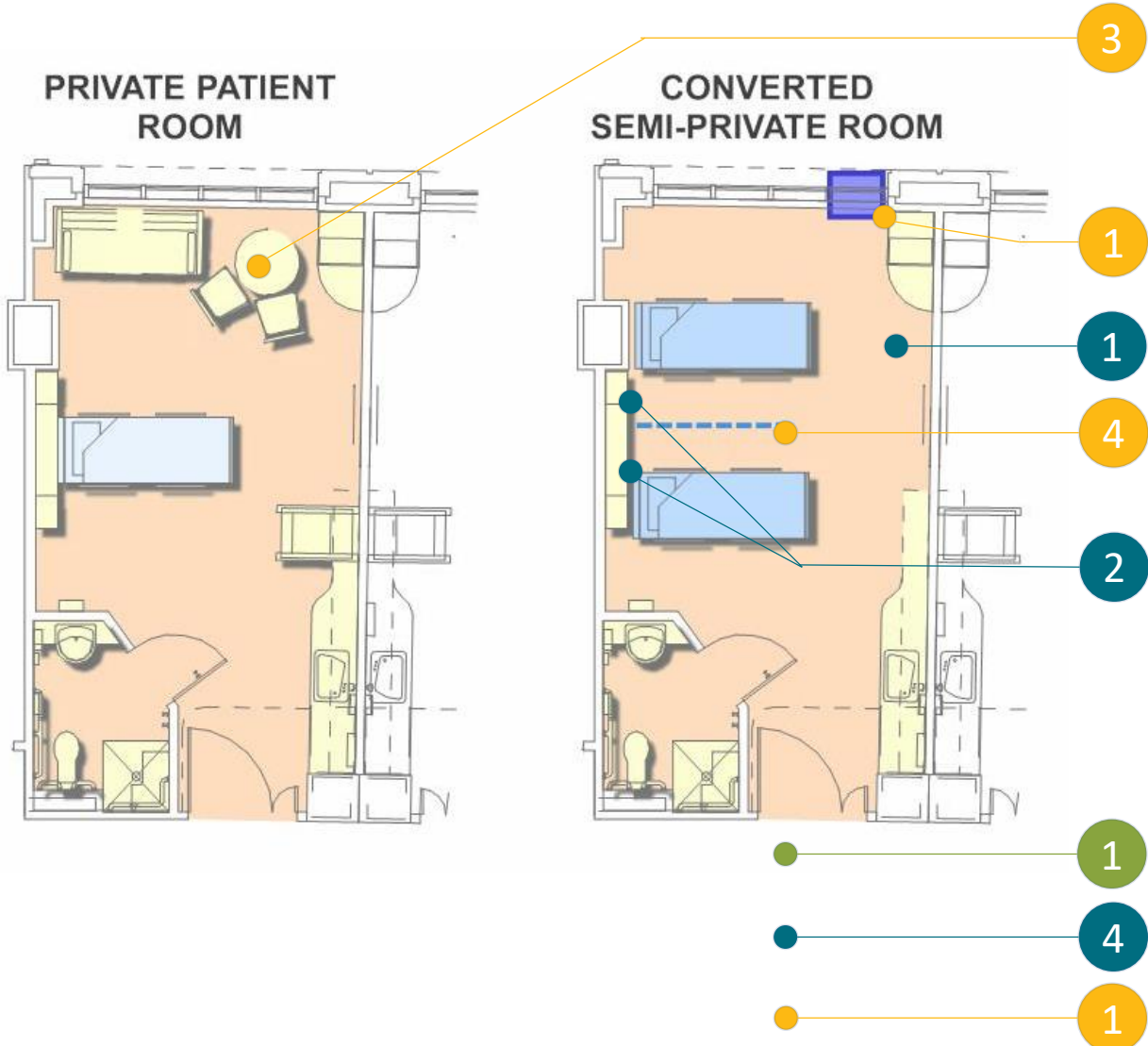
Staff Flow

- Control clean and dirty entries with ante rooms

Patient Flow and Life Safety

- Good patient flow and egress from clinical spaces

Private Patient Room Conversion Diagram



Existing Space Benefits

1. Private patient rooms – can be used for double occupancy
2. Medical Gasses and power
3. Nurse stations & support space for staff
4. Clean, Soil, Nour & Equipment Space
5. Life safety provisions

Changes Recommended

1. Convert Unit to negative pressure or rooms to negative pressure (through window unit & portable exhaust fan w/HEPA filter)
2. Ante rooms for donning & doffing
3. Remove excess furniture and equipment in patient rooms
4. Privacy for patients

Challenges

1. Infection control at entry / exit

Infrastructure

- All necessary infrastructure is available in a med/surg suite for post acute care

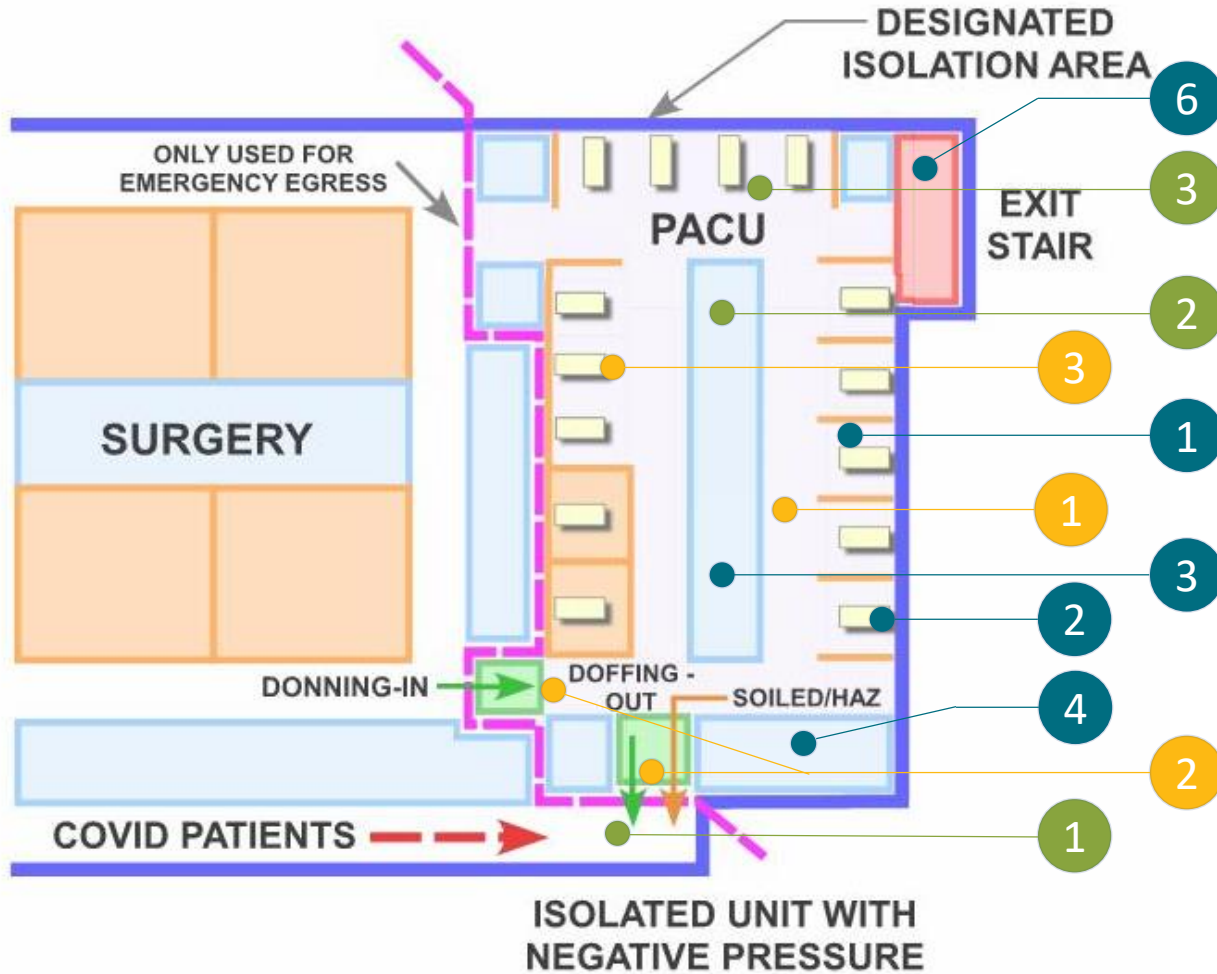
Staff Flow

- Control clean and dirty entries with ante rooms

Patient Flow and Life Safety

- Good patient flow and egress from clinical spaces

PACU Conversion Diagram



Existing Space Benefits

1. Patient recovery bays adequately sized
2. Medical Gasses and power
3. Nurse stations & support space for staff
4. Clean, Soil, Nour & Equipment Space
5. Cleanable surfaces
6. Life safety provisions

Changes Recommended

1. Convert to negative pressure
2. Ante rooms for donning & doffing
3. Remove excess furniture and equipment in patient bays

Challenges

1. Infection control at entry / exit
2. Limited patient toilets
3. Limited privacy in suite

Infrastructure

- All necessary infrastructure is available in a PACU suite for post acute care

Staff Flow

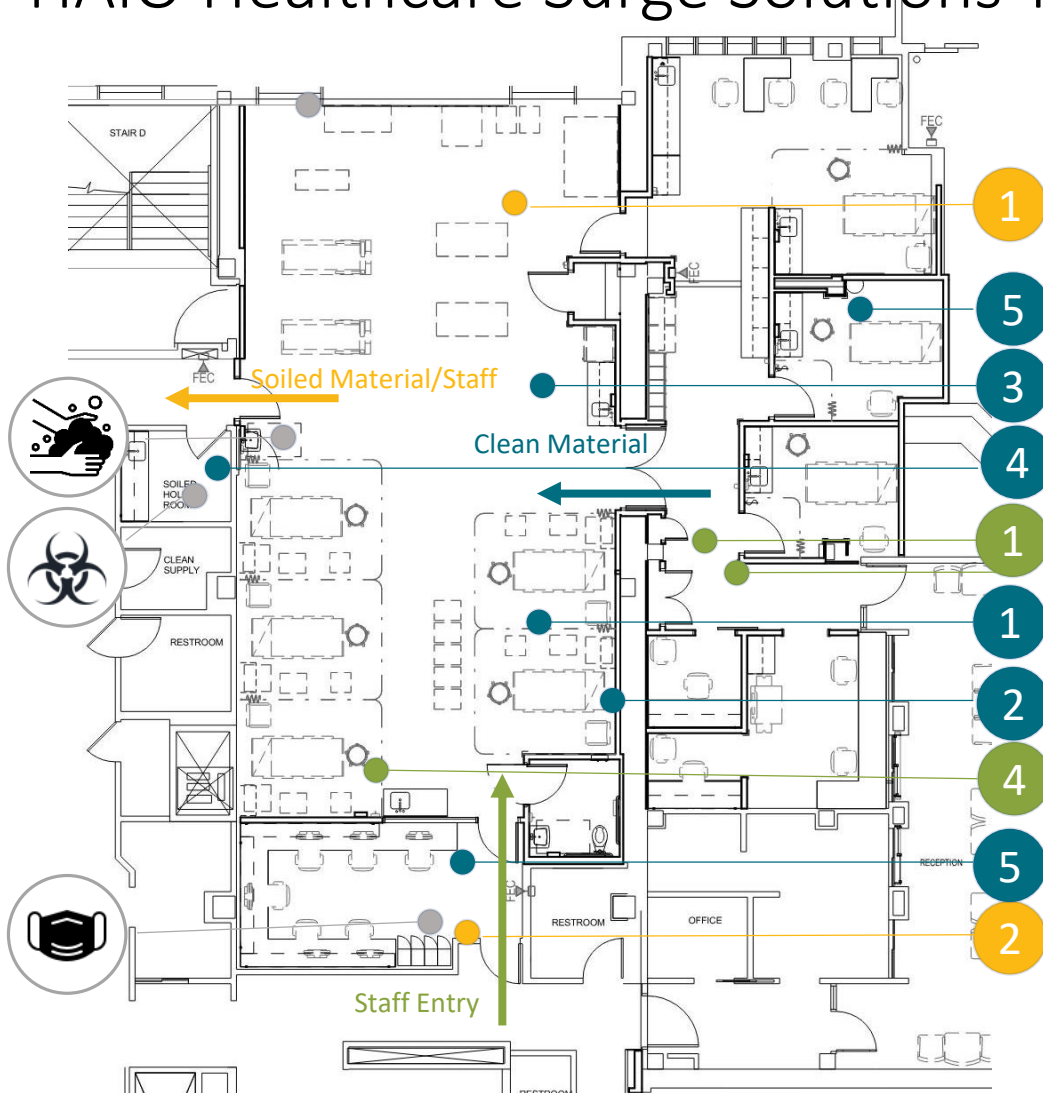
- Control clean and dirty entries with ante rooms

Patient Flow and Life Safety

- Good patient flow and egress from clinical spaces

Rehab gym space conversion Diagram

HAIO Healthcare Surge Solutions Task Force



Existing Space Benefits

1. Existing appropriately sized bays
2. Normal power existing
3. Cleanable finishes
4. Clean and Soiled space
5. Enclosed staff viewing area
6. Enclosed examination spaces

Infrastructure

- Space not equipped for acute patients
- Need to confirm pressure differentials

Staff Flow

Multiple entry points may make material and staff flows unclear. Each site would need flows mapped and secured.

Changes Recommended

1. Create additional bays in Gym area
2. Create donning/doffing area

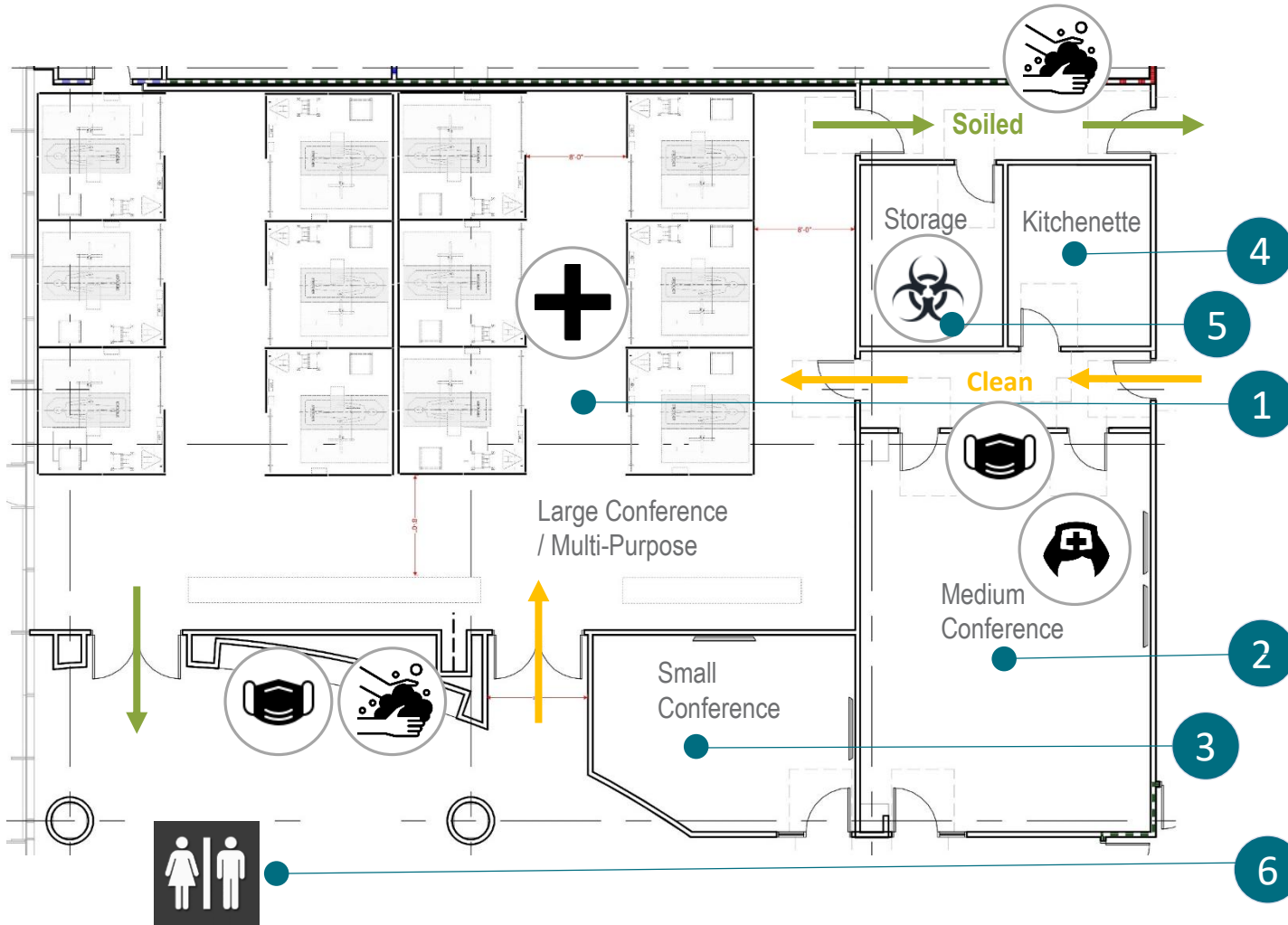
Challenges

1. Corridors may be small for stretcher
2. No emergency power
3. No bathing facility
4. Curtain only bays
5. No medical gases

Patient Flow and Life Safety

Depending on location in hospital may not have appropriate Life Safety or connection with all support spaces.

Conference Center



Existing Space Benefits
 Repurpose Rooms to provide:

1. Patient Treatment Zone
2. Staff Respite and Work Areas
3. Communications / Command Center
4. Nourishment Room
5. Soiled Holding
6. Access to toilet facilities - separate staff and patients

Changes Recommended

- Create temporary patient treatment bays using mobile equipment and furniture
- Provide dedicated clean and soiled traffic flow
- Replace carpeting with hard, monolithic flooring

Challenges

- Not all facilities have a multi-room conference center
- Sizes and adjacencies differ
- Space is not equipped for mid to high level patient care – gases, neg air flow, etc.

Infrastructure

- Good adjacencies to support services
- Large open rooms to house multiple bays
- Strong IT capabilities

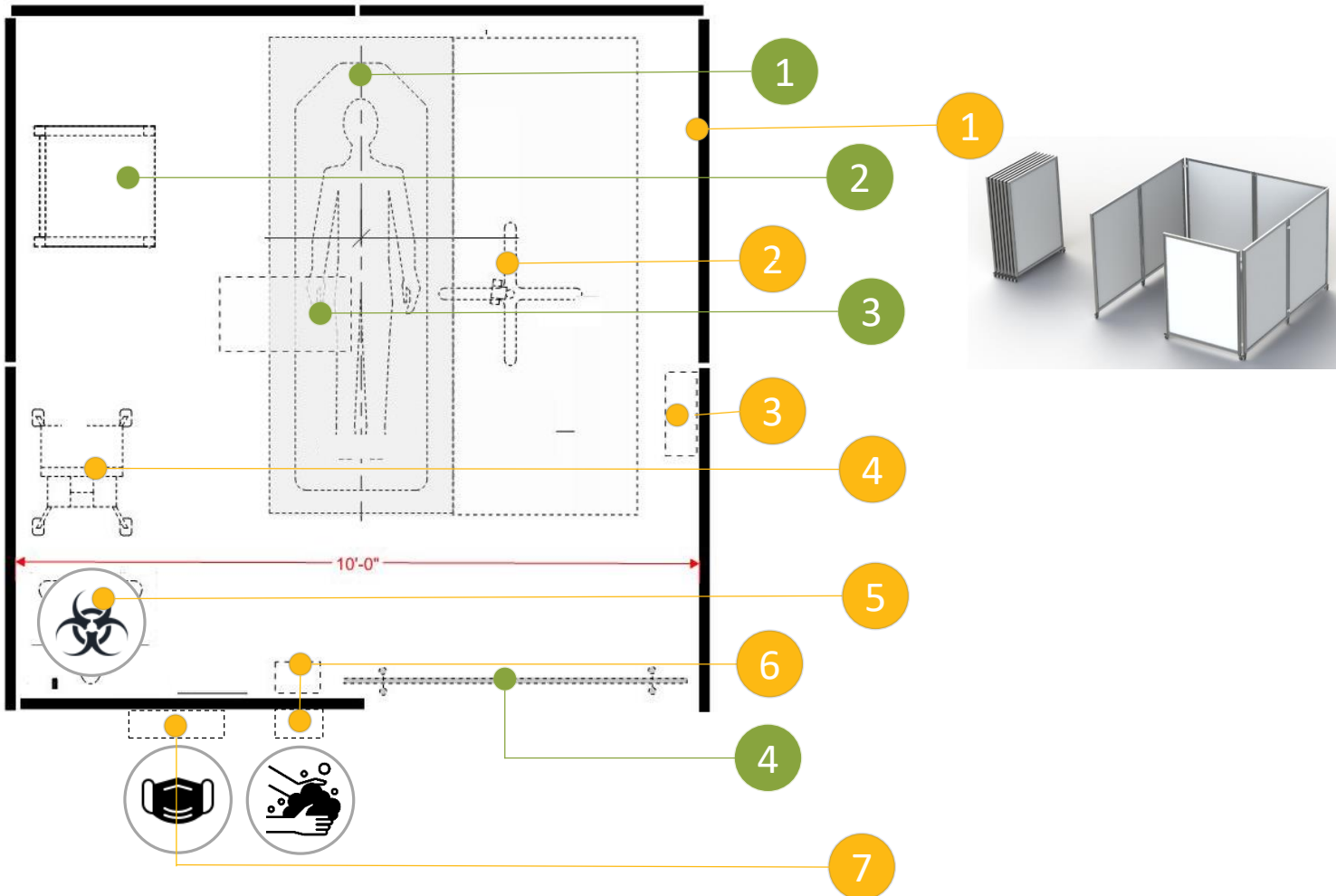
Staff Flow

- Create dedicated entry point to treatment bays with area for don/doff and handwashing.
- Create dedicated rooms for staff respite, work and communication center

Patient Flow and Life Safety

- Depending on size and location within the hospital, life safety requirements may be limiting

Conference Center – Patient Treatment Bay



Treatment Bay Equipment

1. Temporary Modular Wall
2. IV Stand
3. Sharps
4. Mobile Workstation
5. Linen Hamper
6. Hand Sanitizer Station x2
7. PPE

Treatment Bay Furniture

1. Hospital Bed / Stretcher
2. Patient Recliner / Chair
3. Overbed Table
4. Mobile Privacy Screen

Ambulatory Surgery Center



Existing Space Benefits

1. Existing healthcare use
2. Ease of community access / families know that loved ones are nearby
3. Suitability of finishes / materials
4. Availability of healthcare support spaces (meds, supplies, soil, equipment, toilets)
5. Built-in sterilization potential in SPD (for masks & equipment)
6. Utilize OR and Procedure Rooms to accommodate 1 to 3 beds; Endo Rooms are well-suited as they are always negative pressure

Changes Recommended

1. Move surplus furniture & equipment to vacated adjacent areas
2. Utilize patient discharge for patient in/out
3. Convert Waiting to command center, staff respite, PPE donning and doffing

Challenges

1. Remoteness if more intense care required or back-up clinical staff needed
2. Support availability – food, supplies, etc.

Infrastructure

- Built for healthcare, but not acute patient care
- Availability of medical gases

Staff Flow

- Separation of staff entry possible though ASC Waiting &/or Control
- Dedicated Staff Respite and PPE Clean / soiled areas possible

Patient Flow and Life Safety

- Ambulatory Care compliant
- Separation of patient flow possible through patient discharge building exit

Homecare: Technology Systems

- Virtual check-in, telehealth visits, e-visits



Existing Space Benefits

1. Existing Administrative Space
2. Existing Call Center Space
3. Existing Patient Home WiFi
4. “Non-Public” Facing Applications
 1. Zoom, FaceTime, WhatsApp, Skype, Webex, Doxy.me
5. Third Party Telehealth Provider

Considerations

1. Balance Natural & In-Room Lighting
2. Avoid Background Noise
3. Test System(s) in Advance of Call
4. Charge/Power Device
5. Close Other Applications/Save Bandwidth
6. Close Proximity to WiFi Router
7. Wearable Patient Monitoring Devices

Challenges

1. Training of Staff and Patients
2. Timely Electronic Record Keeping
3. Maintaining Cyber Security Protocols
4. Threat & Liability of Patient Information
5. Reliability of Home Internet Access

Infrastructure

- Patients Home Internet Access
- Clinician Home Internet
- Existing Hospital/Third Party Network

Staff Flow

- Call Center
 - On Premise
 - Virtual
- Electronic Record Input
 - On Premise
 - Encrypted Virtually

Patient Flow

- Call Center Management System
- Virtual Check In
- Scheduled Telehealth & E-Visits
- HHS Relaxed Guidelines

Rehabilitation Hospital



Existing Space Benefits

1. Existing healthcare use
2. Ease of community access / families know that loved ones are nearby
3. Suitability of finishes / materials
4. Availability of healthcare support spaces (meds, supplies, soil, equipment, toilets)

Infrastructure

- Built for healthcare out-patient and acute patient care
- Availability of medical gases on in-patient unit

Staff Flow

- Separation of staff entry
- Dedicated Staff Respite and PPE Clean / soiled areas available

Changes Recommended

1. Move surplus furniture & equipment to mobile trailers if space is not available in the facility
2. Utilize patient discharge for patient in/out
3. Convert Waiting to command center, staff respite, PPE donning and doffing

Patient Flow and Life Safety

- Ambulatory Care and In-patient care compliant
- Separation of patient flow possible through patient discharge building exit

Challenges

1. Suspended use for out-patient rehabilitation

Rehabilitation Hospital



Typical In-Patient Floor Plan

Areas for additional Beds

Existing Space Benefits

1. Existing healthcare use will allow immediate use of existing in-patient beds
2. Potential to add a bed in each room
3. Ease of community access / families know that loved ones are nearby
4. Suitability of finishes / materials
5. Availability of healthcare support spaces (meds, supplies, soil, equipment, toilets)
6. Utilize In-patient Gyms and Day Rooms for additional bed capacity.

Changes Recommended

1. Move surplus furniture & equipment to mobile trailers if space is not available in the facility

Challenges

1. Relocation of existing Rehab. Patients

Infrastructure

- Built for healthcare out-patient and acute patient care
- Availability of medical gases on in-patient unit

Staff Flow

- Separation of staff entry
- Dedicated Staff Respite and PPE Clean / soiled areas available

Patient Flow and Life Safety

- Ambulatory Care and In-patient care compliant
- Separation of patient flow possible through patient discharge building exit

Engineering Infrastructure Matrix

What is Needed	Existing Hospital Closed Unit	Existing Hospital Shell Space	Existing Hospital Med/Surg Beds	Existing Hospital Prep/Rec Spaces	Existing Hospital Rehab Gym	Existing Hospital Conference Center	Existing Hospital Administration	Existing Hospital Main Lobby	Medical Office Building	Closed Hospital	Rehabilitation Hospital	Skilled Nursing Facility	LTAC Hospital	Home Care	Ambulatory Surgical Center
Convert Room/Space to Negative Pressure or Directional Airflow	Verify operation if any of HVAC systems	Extend ventilation systems	Verify Directional Airflow / Convert Return air systems to Exhaust	Verify Directional Airflow / Convert Return air systems to Exhaust	Verify Directional Airflow / Convert Return air systems to Exhaust	Verify Directional Airflow / Convert Return air systems to Exhaust	Verify Directional Airflow / Convert Return air systems to Exhaust/Verify toilet exhaust systems	Relax positive pressurization / Convert Return air systems to Exhaust	Convert Return to Exhaust in Exam Rms	Verify operation if any of HVAC systems	Verify Directional Airflow / Convert Return air systems to Exhaust	Verify Patient Toilet Exhaust operation / Verify PTAC operation	Verify Patient Toilet Exhaust operation / Verify PTAC operation	N/A	Convert Return to Exhaust in PACU / set up OR's negative for wards
Modular Dividers (Reusable walls i.e., DIRT, STARC, Edgeguard, etc.)	N/A	POSSIBLE	N/A	N/A	ADD	ADD	N/A	POSSIBLE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medical gases	N/A	ADD	N/A	N/A	ADD	ADD	ADD	ADD	ADD	ADD/TEST	N/A	N/A	N/A	ADD	N/A
Electrical	TEST	ADD	N/A	N/A	ADD	ADD EMERGENCY	ADD EMERGENCY	ADD EMERGENCY	POSSIBLE	TEST	POSSIBLE	POSSIBLE	N/A	ADD	N/A
Video Streaming Device/Monitoring device (i.e., nicuview or something more low tech like a baby monitor or "RING" device)	ADD	ADD	N/A	N/A	ADD	ADD	ADD	ADD	ADD	ADD	ADD	ADD	N/A	ADD	N/A
Internet Connection	POSSIBLE	ADD	N/A	N/A	N/A	N/A	N/A	ADD	N/A	ADD	N/A	N/A	N/A	ADD	N/A

HAIO - Designing for Surge Capacity

Hotels + Dorms for Post Acute Care

Kenneth Fisher, Gensler (sub-committee co-chair)
Patricia Nobre, Gensler (sub-committee co-chair)
Richard Barnett, Colliers Project Leaders
Alison Faecher, SmithGroup
Dominic Gagnon, Colliers Project Leaders
Randy Keiser, Turner Healthcare
Paul Kondrat, CannonDesign
Sarah Markovitz, NBBJ
Jeff Saad, Gensler
Matthew Tharp, Gensler
Dan Quinn, Colliers Project Leaders
Evan Wyner, Colliers Project Leaders

Site Evaluation for Post Acute Care

CORE CONSIDERATIONS

- 1 Agility to Respond to COVID Surge**
Speed to market | Capacity | Pathway for Stretcher
- 2 Infectious Disease Control**
Ventilation | Staff support areas
- 3 Part of an Integrated Continuum of Care**
Location | Connectivity | Host Caregivers
- 4 Ability to Support Broader Care**
Oxygen Tubes | Generator | Food Facilities | Laundry | Loading Dock | Parking

Site

Hotel-Dorm

Categories	Points	Points
Days to Patient Ready	2	< 7 days = 2
		< 21 days = 1
Capacity (consider ability to put 2 beds in large rooms)	2	> 200 people = 2
		> 75 people = 1
		< 75 people = 0
Ease of Pathway for a stretcher from ambulance to room (Elevator with dimensions to move patient on stretcher)	1	accessible = 2
		not accessible = 0
Individual Heating and Cooling Units	1	yes = 1 no = 0
Central exhaust (attention to distance between discharge and intake)	1	yes = 1 no = 0
Private Restrooms	2	individual restrooms = 2
		shared restrooms < 2 patients = 1
		shared restrooms > 2 patients = 0
Access to handwashing and support space for staff beyond patient toilet rooms (wide corridors/use of room by elevator)	1	yes = 1 no = 0
Adjacency to Acute Care Hospital/Screening	1	< 10 Mi = 1 > 10 Mi = 0
Robust WiFi	1	yes = 1 no = 0
Ability to host caregivers	1	yes = 1 no = 0
Ease of running oxygen tubes into rooms	1	yes = 1 no = 0
Emergency generator	2	able to keep facility operational = 2 life-safety and smoke control = 1 not available = 0
Food facilities	1	yes = 1 no = 0
Laundry	1	yes = 1 no = 0
Loading dock	1	yes = 1 no = 0
Parking lot	1	yes = 1 no = 0
Total	20	Max 20

Conversion Checklist

for Post Acute Care

CORE CONSIDERATIONS

	By Construction Manager	Post-Acute COVID Care	By Hotel	Post-Acute COVID Care	By Others (Hospital)	Post-Acute COVID Care
1 Mold/Hazmat	Mold/Haz Mat Removal or Containment	<input type="checkbox"/>	Hotel Bed (with medical linen)	<input type="checkbox"/>	Ventilator	<input type="checkbox"/>
	HVAC - direct exhaust room units	<input type="checkbox"/>	Hotel Chair	<input type="checkbox"/>	Telemetry/Pump on IV Stand	<input type="checkbox"/>
	HEPA filtering	<input type="checkbox"/>	Hotel Desk	<input type="checkbox"/>	Stool	<input type="checkbox"/>
2 Ventilation	Create negative in pressure room by optimizing existing exhaust system (to try to get to 0.01)	<input type="checkbox"/>	Hotel Wardrobe	<input type="checkbox"/>	Over bed table	<input type="checkbox"/>
	Ensure air discharge is far enough from the intake	<input type="checkbox"/>	Hotel Plumbing Fixtures	<input type="checkbox"/>	Mobile Workstation	<input type="checkbox"/>
	Protect building duct system from contamination	<input type="checkbox"/>			Linen Hamper	<input type="checkbox"/>
3 Contact Surfaces	Zip wall	<input type="checkbox"/>			Sharps/Gloves	<input type="checkbox"/>
	Disengage locks of room doors	<input type="checkbox"/>			Hand Sanitizer Station	<input type="checkbox"/>
	Install carpet protector over existing carpet	<input type="checkbox"/>			Infectious Waste	<input type="checkbox"/>
4 Protect Care Team	Emergency Back-up and Power	<input type="checkbox"/>			Portable Med Gases	<input type="checkbox"/>
	Verify Electrical Outlets	<input type="checkbox"/>			Use of Concentrator for O2	<input type="checkbox"/>
5 Double Occupancy	Install wireless nurse call + camera	<input type="checkbox"/>				
	Install O2 temporary piping system	<input type="checkbox"/>				
	Segregate staff area on each floor, if possible add sinks in the corridor or use first room by elevator as staff support are for donning and doffing	<input type="checkbox"/>				
	Install cleanable Partitions/Plastic to subdivide multiple occupancy rooms (18" below ceiling)	<input type="checkbox"/>				

Space Conversion Diagram

for Post Acute Care

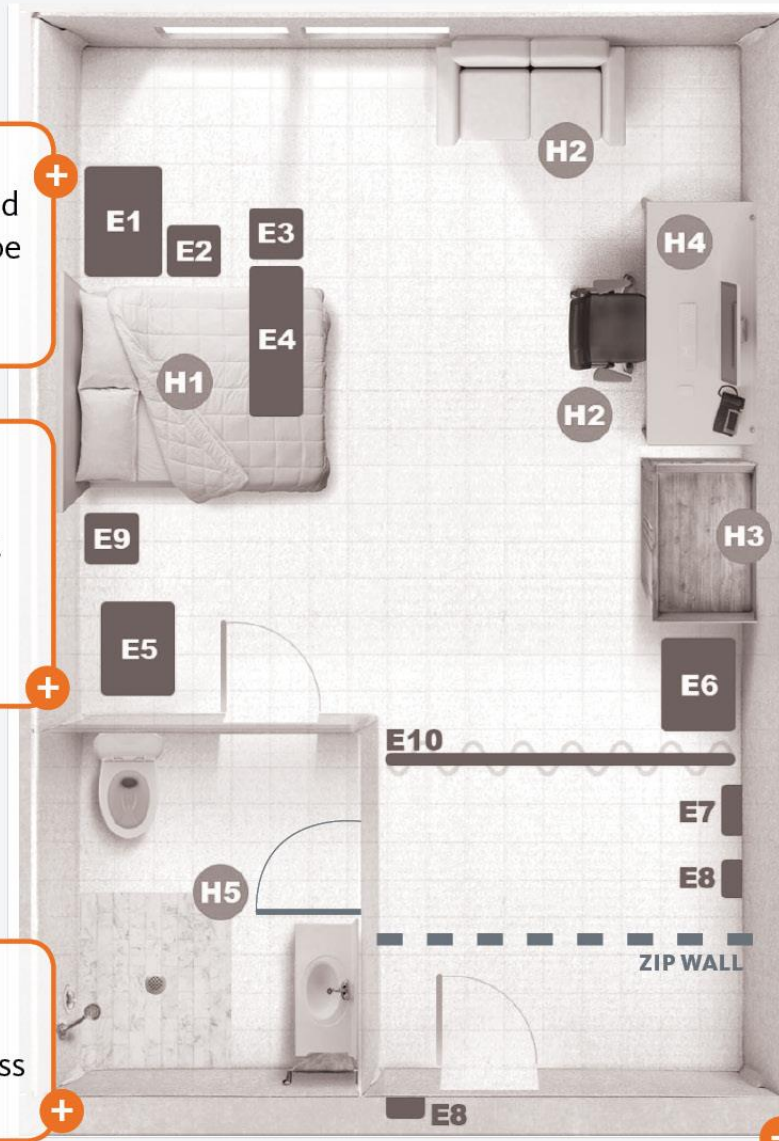
HOTEL ROOM | CORE CONSIDERATIONS

- 1 Mold/Hazmat**
- 2 Ventilation**
Negative Pressure / HEPA filtering / Explore direct room exhaust
- 3 Contact Surfaces**
Disengage door lock
- 4 Protect Care Team**
Add sinks and area for donning and doffing in corridor/room by elevator
- 5 Double Occupancy**
Install cleanable partitions/plastic to subdivide rooms

Instead of removing carpet, we recommend carpet protectors to be installed for agility

Restroom door is often located in proximity to the front door, potentially posing challenges for placement of zip wall

Disengage door lock to minimize surface contact. Install wireless nurse call + camera.



Source: USACE hotel room to healthcare room diagram

USACE KEY

HOTEL PROVIDED

- H1 HOTEL BED
- H2 HOTEL CHAIR
- H3 HOTEL DESK
- H4 HOTEL WARDROBE
- H5 HOTEL PLUMBING FIXTURES

ENGINEERING CHANGES

- 1 REMOVE CARPET
- 2 INSTALL VINYL FLOORING OR EPOXY
- 3 REVISE HVAC DUCTING AND HEPA FILTERING
- 4 ADD EMERGENCY BACK-UP POWER & UPS
- 5 ADD ELECTRICAL OUTLETS
- 6 ADD PRIVACY CURTAIN

SPECIAL MEDICAL EQUIPMENT

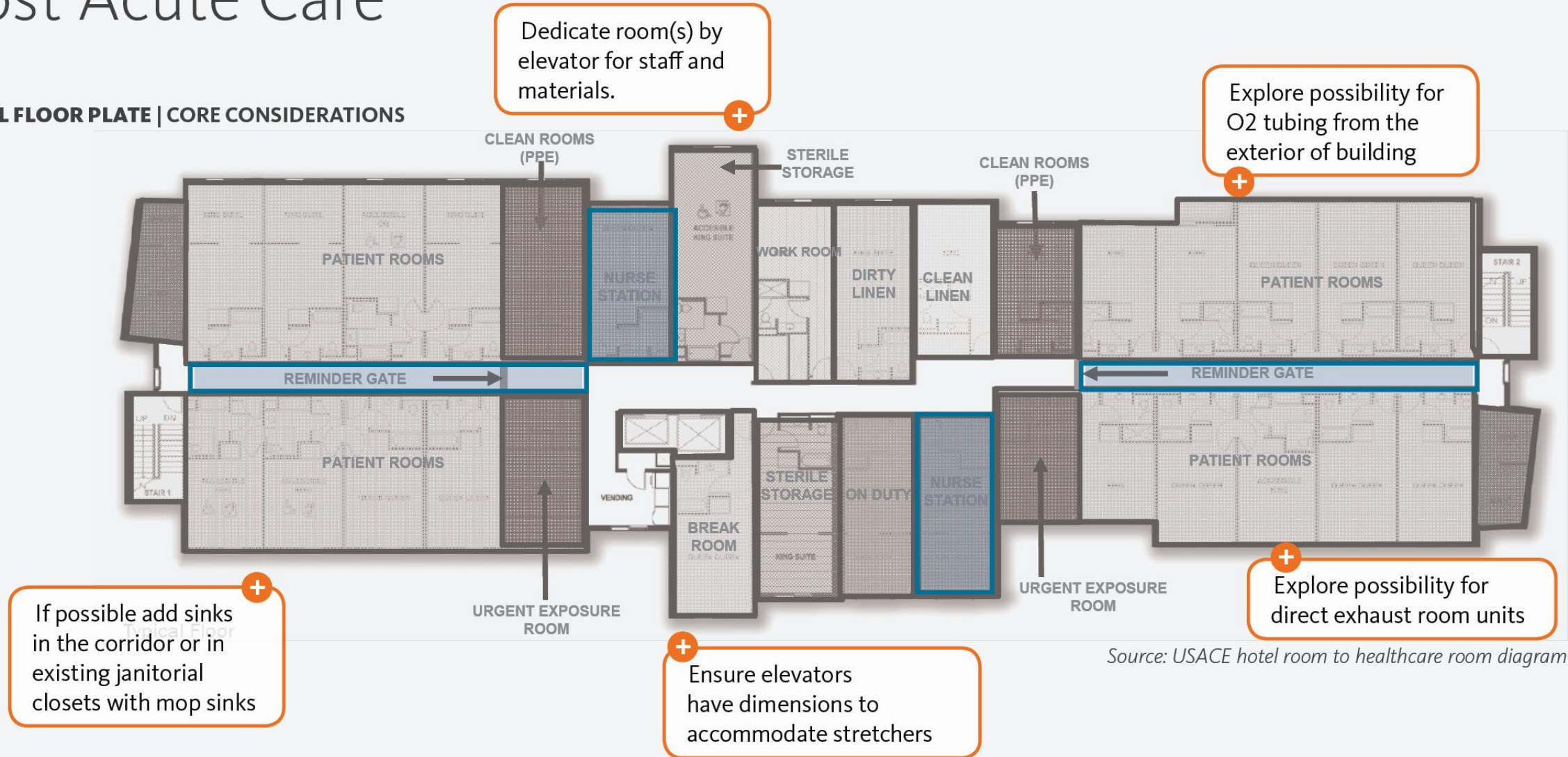
- E1 VENTILATOR
- E2 TELEMETRY/PUMP ON IV STAND
- E3 STOOL
- E4 OVER BED TABLE
- E5 MOBILE WORK STATION
- E6 LINEN HAMPER
- E7 SHARPS/GLOVES
- E8 HAND SANITIZER STATION
- E9 INFECTIOUS WASTE
- E10 PRIVACY CURTAIN

E10: Privacy curtain is best avoided for mitigation of infectious disease contamination.

E8: Beyond hand sanitizers, install sinks for staff in corridor or room by elevator

Space Conversion Diagram for Post Acute Care

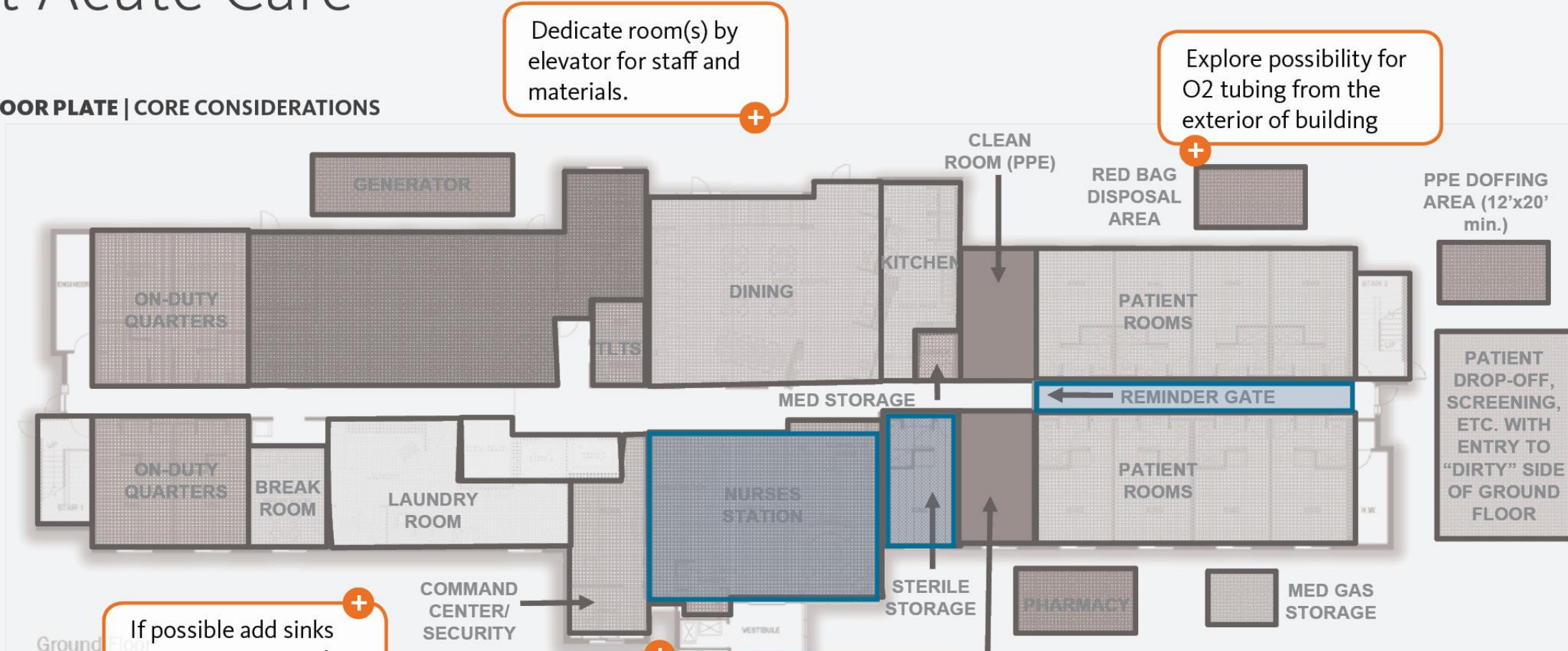
HOTEL TYPICAL FLOOR PLATE | CORE CONSIDERATIONS



Source: USACE hotel room to healthcare room diagram

Space Conversion Diagram for Post Acute Care

HOTEL GROUND FLOOR PLATE | CORE CONSIDERATIONS



Dedicate room(s) by elevator for staff and materials.

Explore possibility for O2 tubing from the exterior of building

If possible add sinks in existing janitorial closets with mop sinks

Ensure elevators have dimensions to accommodate stretchers

Explore possibility for direct exhaust room units

Source: USACE hotel room to healthcare room diagram

Space Conversion Diagram for Post Acute Care

DORM ROOM | CORE CONSIDERATIONS

- 1 Mold/Hazmat**
- 2 Ventilation**
Negative Pressure / HEPA filtering / Explore direct room exhaust
- 3 Contact Surfaces**
Disengage door lock
- 4 Protect Care Team**
Add sinks and area for donning and doffing in corridor/room by elevator
- 5 Double Occupancy**
Install cleanable partitions/plastic to subdivide rooms

Instead of removing carpet, we recommend carpet protectors to be installed for agility

Disengage door lock to minimize surface contact. Install wireless nurse call + camera.

Explore possibility for direct exhaust room units

Beyond hand sanitizers, install sinks for staff in corridor or in existing janitorial closets with mop sinks



Space Conversion Diagram

for Post Acute Care

DORM FLOOR PLATE | CORE CONSIDERATIONS

- 1** Mold/Hazmat
- 2** Ventilation
- 3** Contact Surfaces
- 4** Protect Care Team
- 5** Double Occupancy

Explore possibility of converting floor lounges into nurse stations

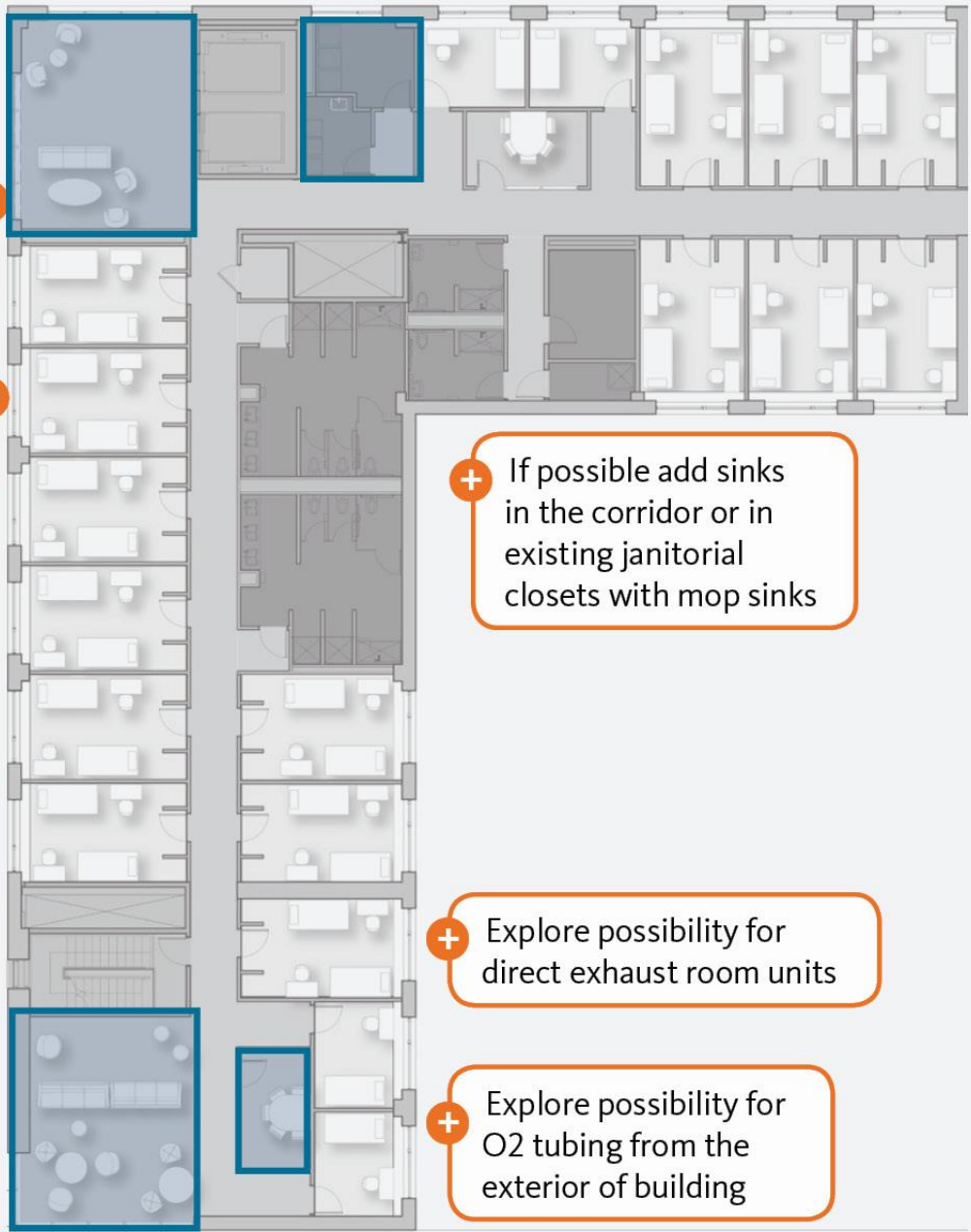
Ensure elevators have dimensions to accommodate stretchers

Dedicate room(s) by elevator for staff and materials.

If possible add sinks in the corridor or in existing janitorial closets with mop sinks

Explore possibility for direct exhaust room units

Explore possibility for O2 tubing from the exterior of building



HAIO - Designing for Surge Capacity

Convention Centers & Arenas for Post Acute Care

Ron Gorham, Perkins & Will (sub-committee chair)

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Gretchen Battle, CannonDesign

Sean Brice, Thompson Consulting, Inc.

Andrew Brumbach, SmithGroup

Matthew Cotton, SmithGroup

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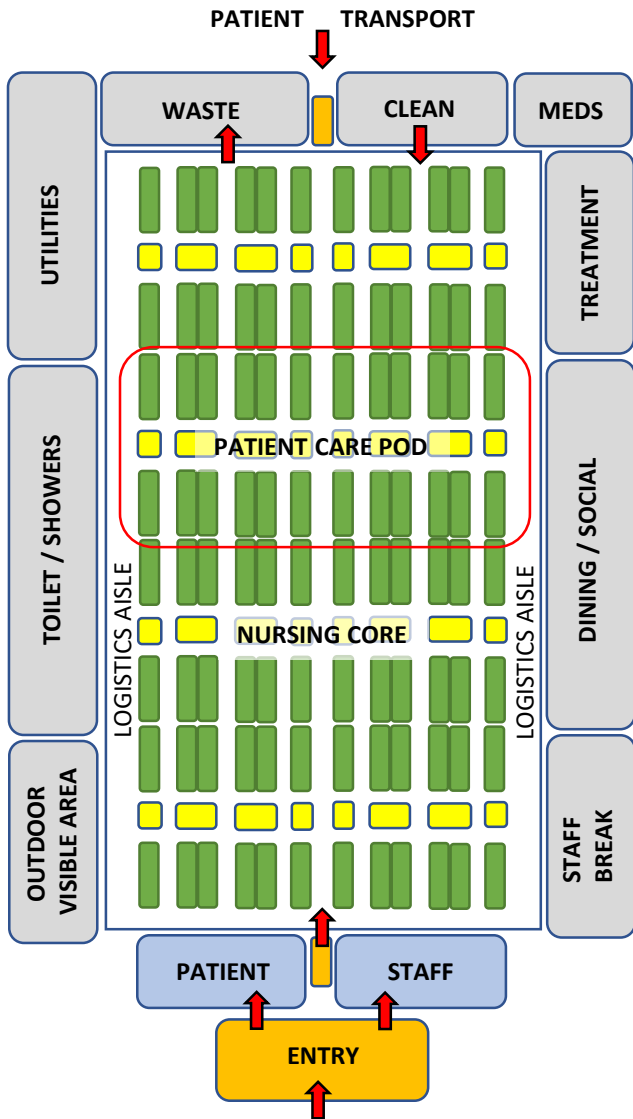
Amy Sowersby, Turner Healthcare

Evan Wyner, Colliers Project Leaders

Bobbe Young, HED

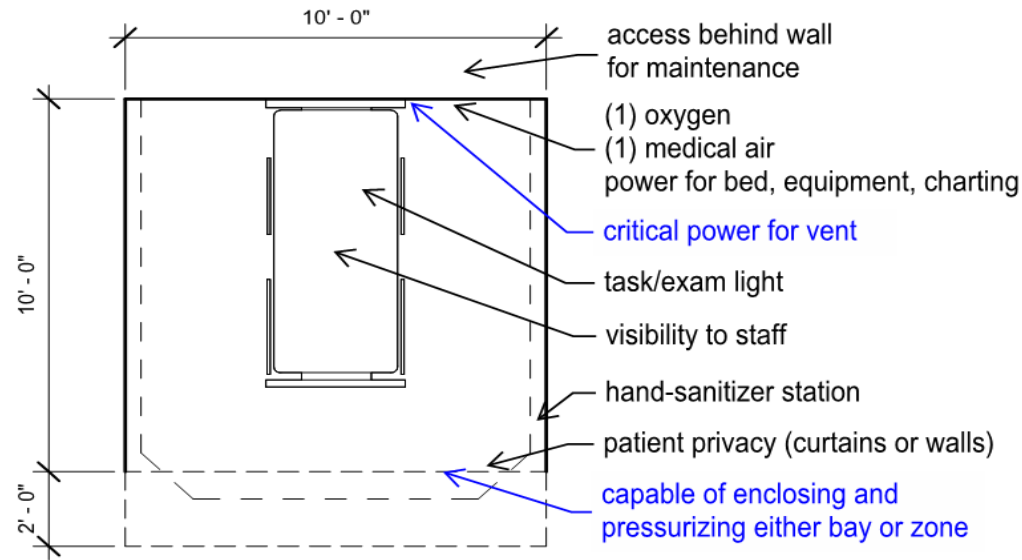
SPACE CONVERSION PROGRAM

PROGRAM YOUR SITE TO ACCOMMODATE POST-ACUTE CARE



SAMPLE PROGRAM DIAGRAM

Patient Care Bays



Consider clusters to allow for reduced travel distances, sight line to staff, possible one-way flow or isolated zones for staff, patient, and logistics.

COVID-19 patients: zoned for patient isolation

Logistics

- Pharmacy / Meds
- Treatment Area(s)
- EVS Supplies
- Ambulance Area
- Mobile Trailer Parking
- Waste Management
- Materials Management
- Dining / Social
- Infrastructure – IT, Power, Med Gas, etc.

Patient Support

- Nurse / Staff Station
- Patient Showers
- Toilets / ADA
- Handwash Stations
- Sanitizing Stations
- Equipment Storage
- Clean Supplies
- Soiled Area

Staff Support

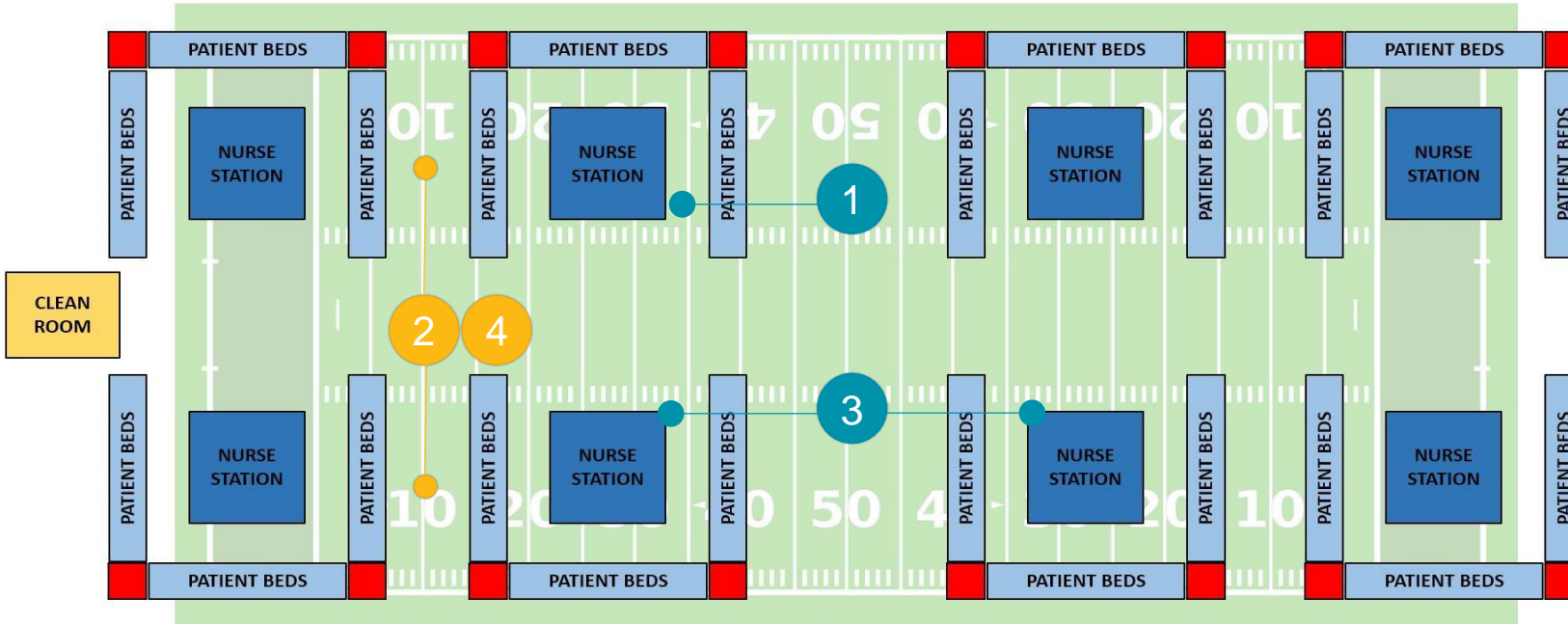
- Lockers / Changing Rooms
- Toilet / Shower
- Staff Respite Area
- Telemedicine

Entry / Screening

- Screening stations
- Testing
- PPE Station
- Handwash / sanitizing station

SPACE CONVERSION PLAN

SAMPLE PLAN - FOOTBALL ARENA



Patient Care Zone

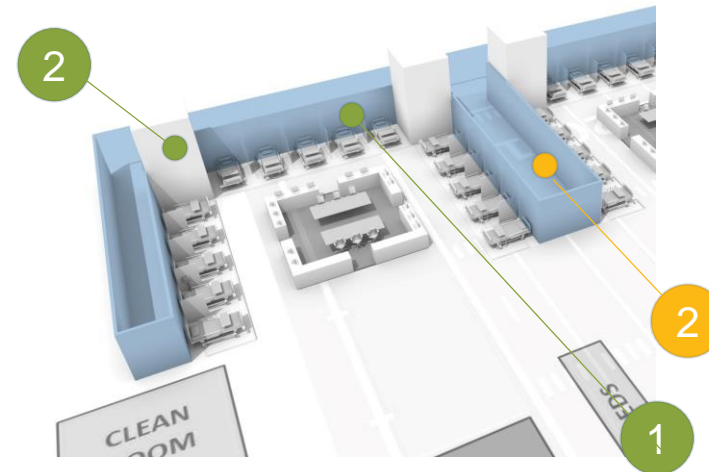
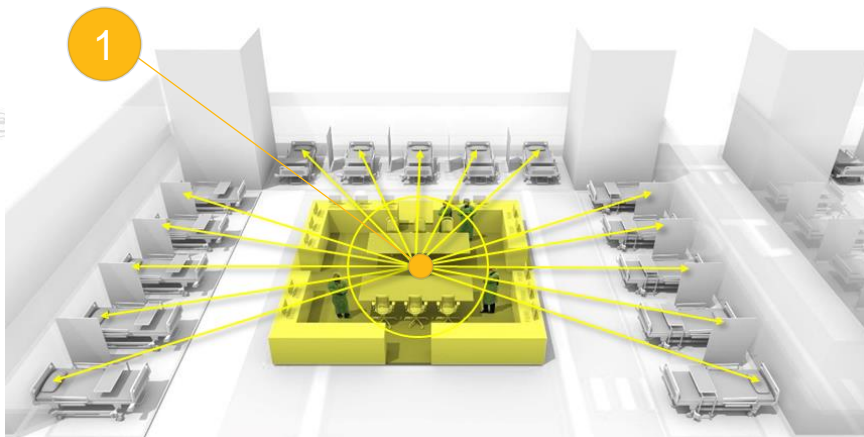
1. **POD:** 3 sides x 5 bays = 15 bays ea.
2. Multiple Pods / Designate Zones
3. **Flexible / Scalable**
4. Adaptable to most large open space

Patient / Staff Support

1. **Visibility** – Nurse to Patient
2. **On Stage / Off Stage** Capable
3. Optimized Clinical Operation
4. **Equipment Storage / PPE**

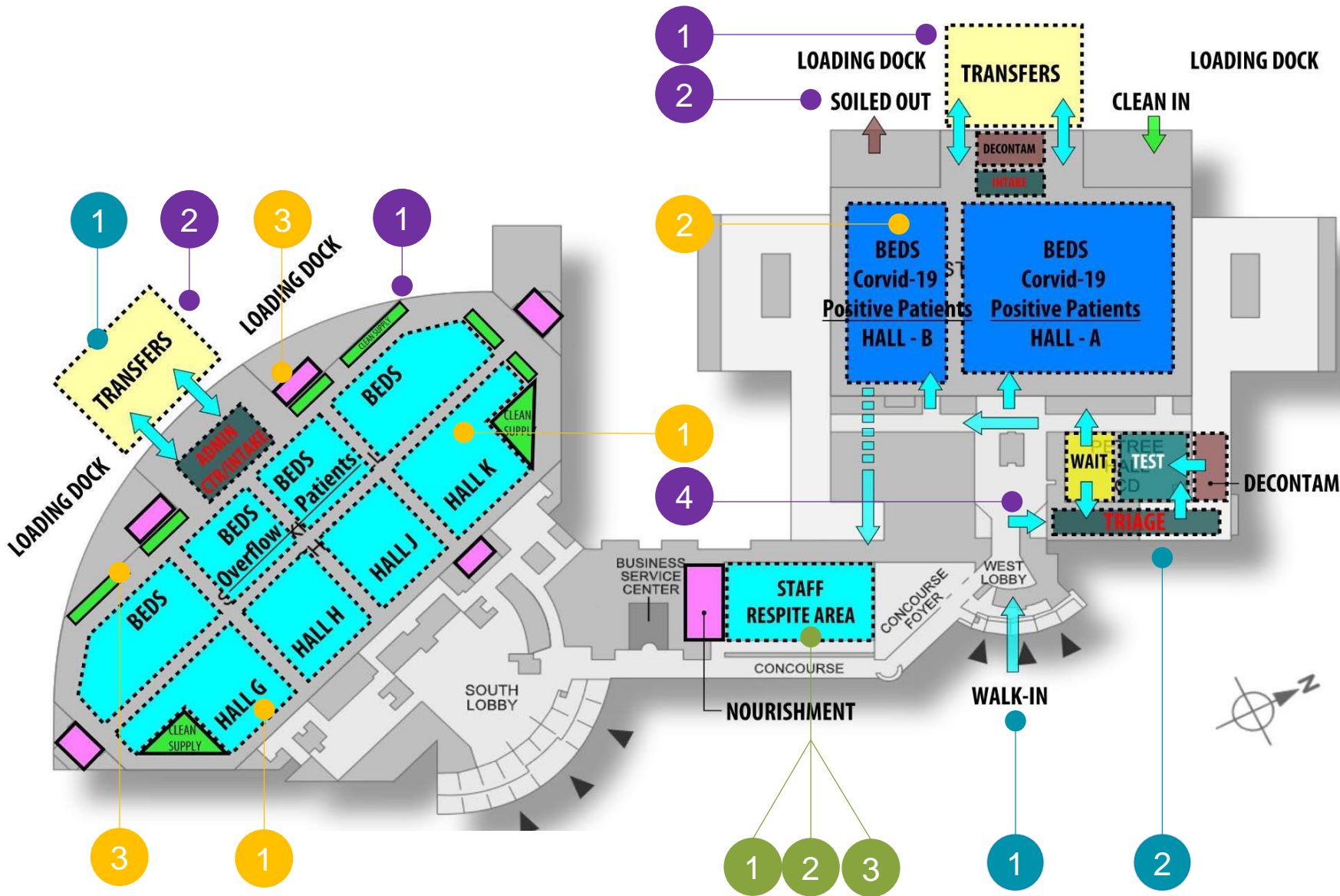
Modular / Prefabrication

1. **Unitized Headwall / Wall Panels**
2. **Freestanding Mechanical Units**
3. **PRIORITY: SPEED TO MARKET**



SPACE CONVERSION DIAGRAM

SAMPLE PLAN – LARGE CONVENTION CENTER



Entry / Screening

1. Segregated / Secured
2. Triage / Screening Capable
3. Decon (Optional)

Patient Care Area

1. Non COVID
2. COVID 19 Positive
3. Patient Support

Staff Support

1. Dining
2. Lockers
3. Touch Down Space

Logistics

1. Materials / Waste Management
2. Ambulance
3. Pharmacy
4. One-way flow

SPACE CONVERSION DIAGRAM

SAMPLE PLAN – LARGE CONVENTION CENTER



Patient Care Zone

1. Patient Care Bays - Density
2. Multiple Pods / Designated zones
3. Flexible / Scalable
4. Adaptable to large open space

Patient / Staff Support

1. Visibility – Nurse to Patient
2. On Stage / Off Stage
3. Equipment Storage / PPE
4. Dining / Social

Modular / Prefabrication

1. Unitized Headwall / Wall Panels
2. Freestanding Mechanical Units
3. PRIORITIZE: SPEED TO MARKET

Logistics

1. Materials / Waste Management
2. Ambulance
3. Pharmacy
4. One Way Flow

SPACE CONVERSION DIAGRAM

SAMPLE PLAN – LARGE CONVENTION CENTER



Patient Care Zone

1. Patient Care Bays - Density
2. Multiple Pods / Designated zones
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Modular / Prefabrication

1. Unitized Headwall / Wall Panels
2. Freestanding Mechanical Units
3. PRIORITIZE: SPEED TO MARKET

Logistics

1. Materials / Waste Management
2. Ambulance
3. Pharmacy
4. One Way Flow

SPACE CONVERSION DIAGRAM

SAMPLE IMAGES – LARGE CONVENTION CENTER



Boston Convention and Expo Center – Patient Bays



Javit Center- NYC: Patient Bay



Denver Health MC – Material Supply



Javit Center – NYC: Logistic Area



Denver Health MC – Pharmacy

HAIO - Designing for Surge Capacity

Modular Solutions + Tents for Post Acute Care

Candice Barter, HGA (sub-committee chair)

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Cindy Lee, CannonDesign

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Kevin Neumann, E4H Architecture

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Daniel Quinn, Colliers Project Leaders

Andrew Quirk, Suffolk

Harry Shanley, CannonDesign

Amy Sowersby, Turner Healthcare

Jimmy Su, Arup

Dale Taglienti, E4H Architecture Evan

Wyner, Colliers Project Leaders

Bobbe Young, HED


SITE APPROPRIATENESS

PRIORITIZING SELECTION AND EVALUATION FOR ADDITIONAL PATIENT CARE CAPACITY

SITE LOCATION


Address: _____

Owner: _____



BED ACUITY

Convert private to semi	Recovery/holding areas	Former nursing units	Cafeteria/Dining	Conference areas	Clinics	Shuttered Hospital	Rehab Facility	Ambulatory Surgery Center	Dialysis/Infusion Centers	Clinics	Parking Lot	Parking Garage (flat plate)	Park or Grassy Field	Other	Arena	School	Hotel Meeting Space	Warehouse	Vacant Retail	Other
Within Institution					Within System or PSA					Outdoor, within 1 mile				Indoor, within 1 mile						



POTENTIAL LOCATIONS WITHIN SYSTEM

PROPOSED ADDITIONAL BED NEED PRIORITY

Type & Additional Need	Within Institution	Within System or PSA	Outdoor, within 1 mile	Indoor, within 1 mile
Critical Care				
< 12				
< 36				
+36				
Intermediate Care				
< 12				
< 36				
+36				
Med/Surg				
< 12				
< 36				
+36				
Post Acute				
< 12				
< 36				
+36				
ABILITY TO CONVERT, EQUIP, STAFF				
Time Frame				
Immediate				
< 2 weeks				
< 4 weeks				

Checklist for an institution which is starting to address a surge.

Consider as a system – similarly to what BIDMC is doing, shifting volume to New England Baptist that has additional capacity.

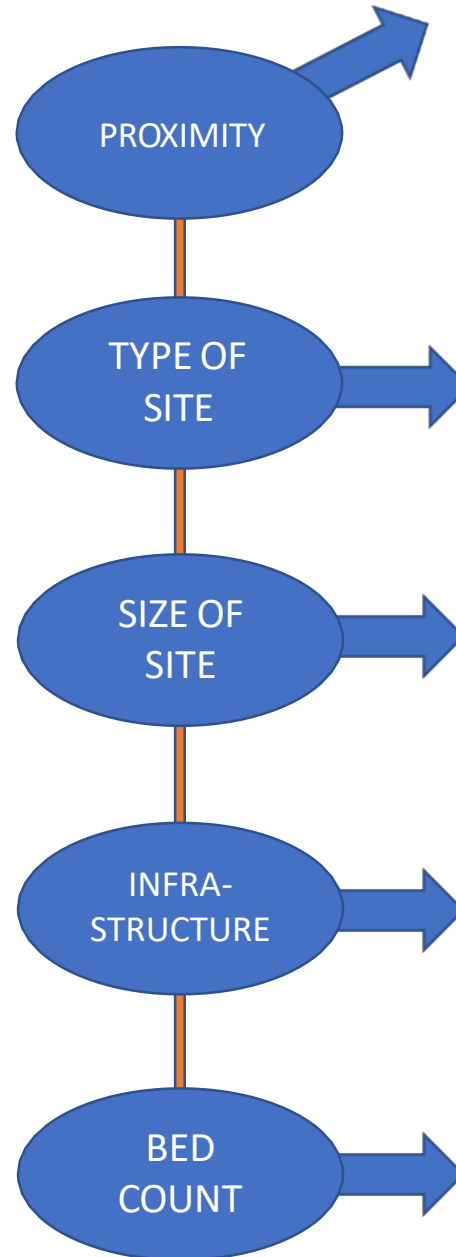
This checklist can be combined with similar assessment tools being prepared by the other subcommittee.

SITE APPROPRIATENESS

SELECTION AND EVALUATION OF SITE FOR POST ACUTE CARE

Checklist for Site Evaluation

1. Locate potential site
2. Evaluate
3. Score
4. Determine Bed Count



SITE LOCATION				
Address:				
Owner:				
LOCATION			SCORE	COMMENTS
Proximity				
Within 1 mile of Medical Center		x		
Within 5 miles of Medical Center				
Within 10 miles of Medical Center				
TYPE OF SITE				
Outdoor				
Parking Lot		x		
Parking Garage (flat plate)				
Park or Grassy Field				
Other (define)				
Weather				
Winter Conditions Considerations				
Summer Cooling issues				
Indoor				
Arena				
School				
Convention Center				
Hotel Meeting Space				
Warehouse				
Vacant Retail				
Other (define)				
SIZE OF SITE				
Dimensional Data				
Open Clear Area		___ ft by ___ ft		
Additional open area		___ ft by ___ ft		
INFRASTRUCTURE AVAILABLE				
Utilities				
Electric				
Site Lighting				
Sewer				
Water				
IT				
Existing Uses available for potential use				
Parking				
Delivery access				
Garage				
Storage				
Commercial Kitchen				
Refrigeration				
Toilets				
Staff areas				
Other (define)				
Module Type		Module size	Qty	Patient Qty
Modular type 1				
Modular type 2				
Tent Type 1				
Tent Type 2				

SITE ADAPTATION – MODULAR & TENT

HOW TO ADAPT YOUR SITE TO ACCOMMODATE POST-ACUTE CARE

Site Preparation

- Excavation/Fill/Slab
- Temporary Site Work & Access
- Parking

Additional Requirements

- Food Service
- Materials Management
- Linen Supply
- Clean/Soiled Delivery

Regulatory

- Life Safety Review/AHJ
- Waiver of DPH
- Special Permit/Oversize Load
- Temporary Permitting
- ADA/Accessibility

Infrastructure

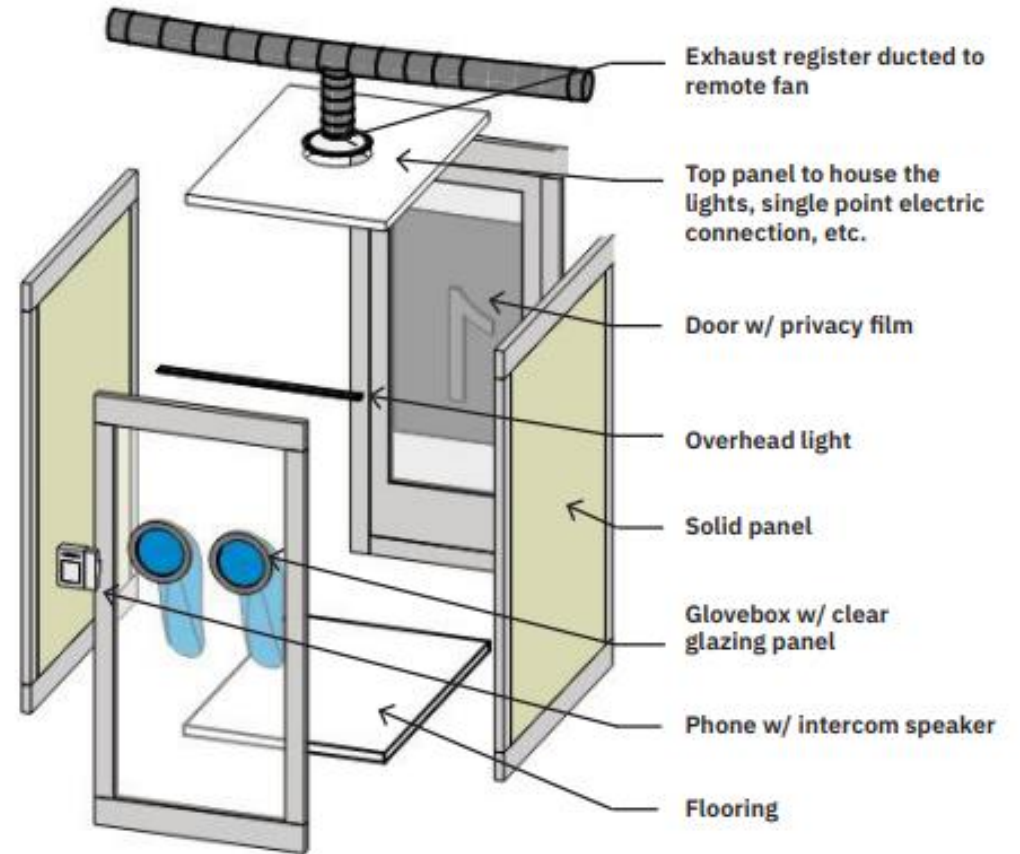
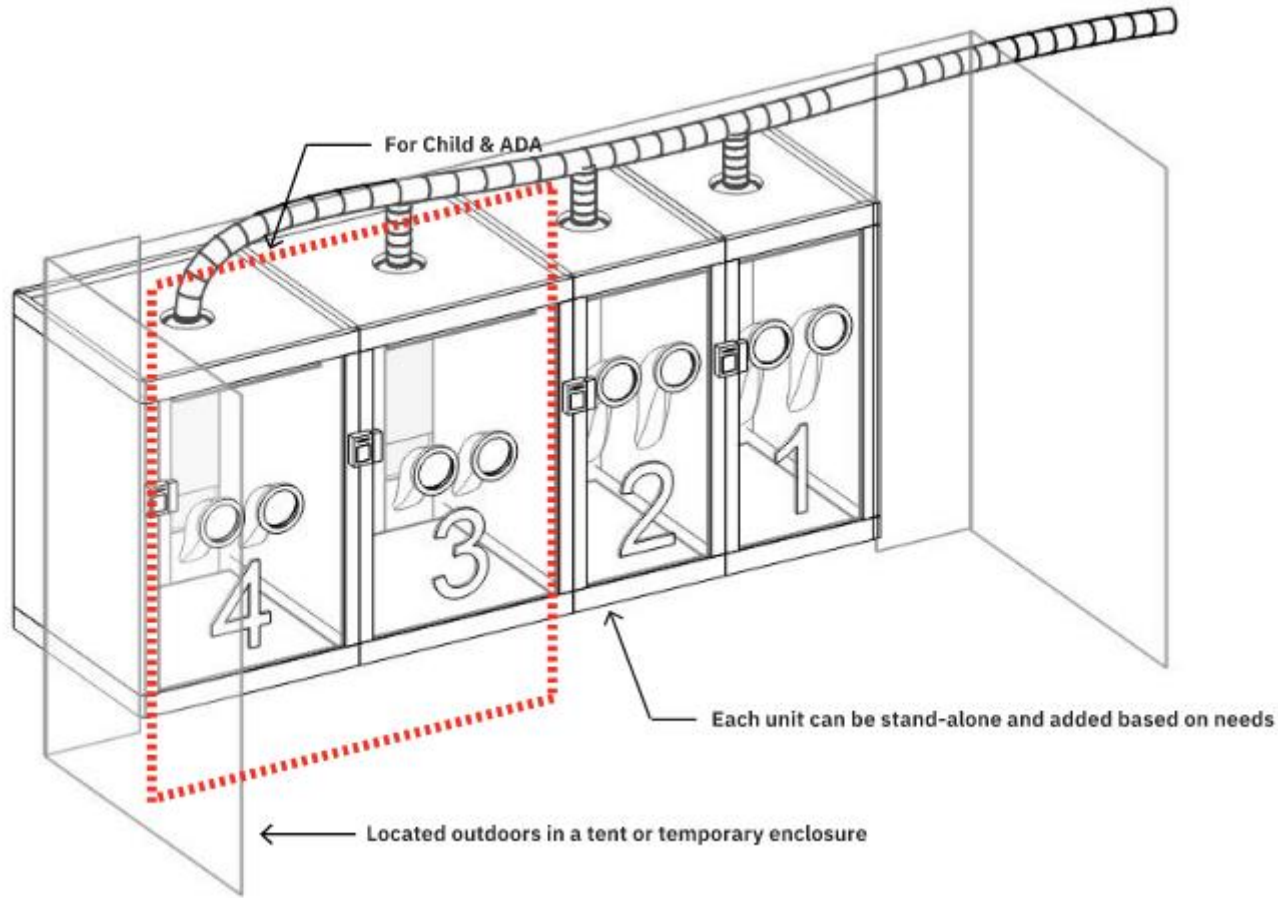
- Sanitation
- Potable Water Source
- Adequate Power
- Emergency Power/Generator
- Adequate WiFi (Firewall)
- Telephone
- Security
- HVAC (filtration, pressure)
- Med Gas access/storage

SPACE CONVERSION DIAGRAM – TESTING BOOTH

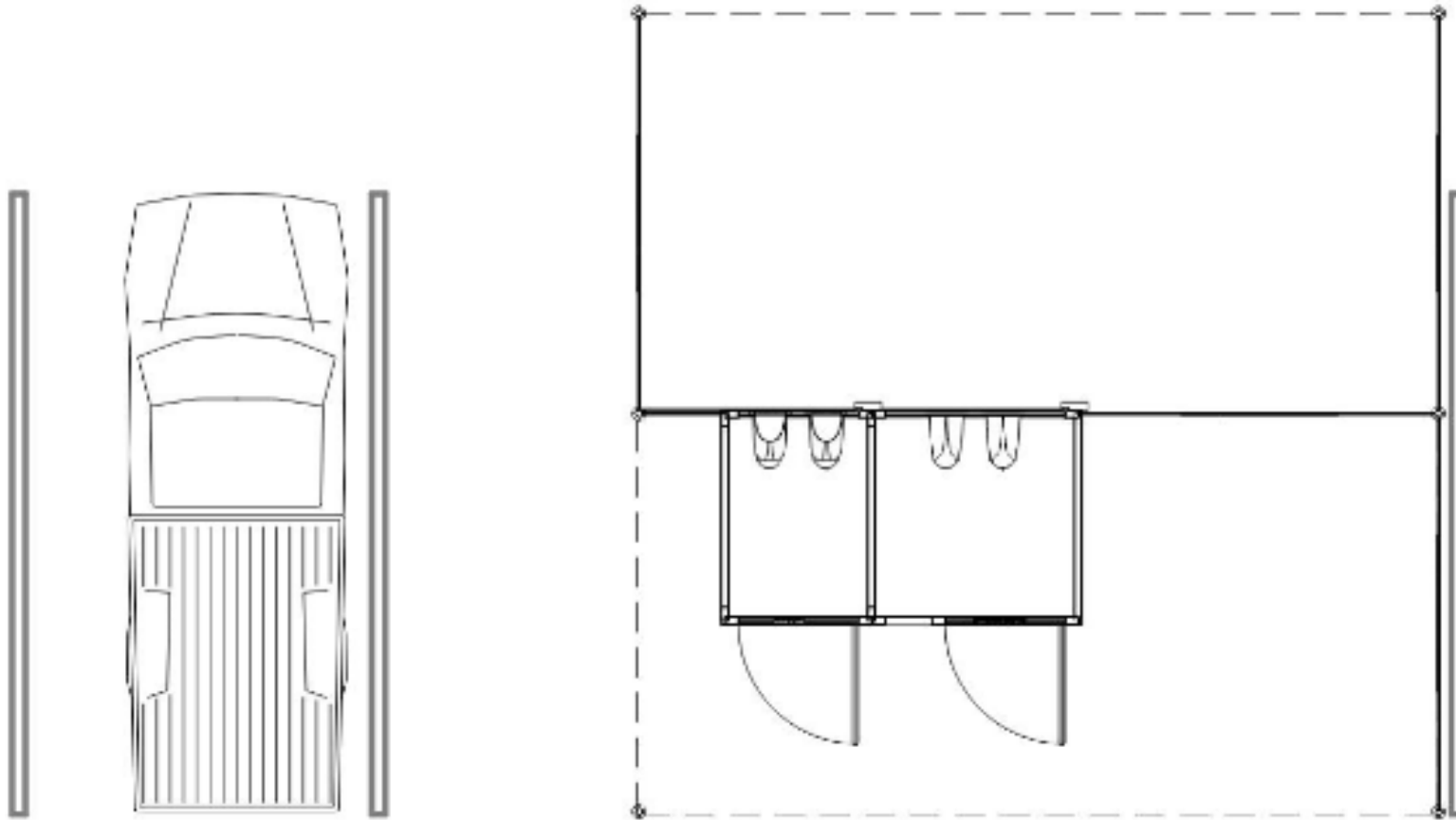


Keeping medical professionals healthy during the COVID-19 pandemic is essential in both slowing the rate of infection and meeting heightened staffing needs. Shortages of personal protective equipment (PPE) supplies make the task difficult. Walk-in testing booths eliminate physical provider-patient exposure in a modular format that can be deployed for temporary testing operations. More information is available via this [link](#).

SPACE CONVERSION DIAGRAM – TESTING BOOTH



SPACE CONVERSION DIAGRAM – TESTING BOOTH



KEY PLAN - PARKING LOT CONFIGURATION

This concept by CannonDesign is licensed under Creative Commons Attribution 4.0 International

- Eliminates physical provider-patient exposure
- Minimizes PPE consumption
- Facilitates faster testing cycles without interruption
- Mobile, modular structure for temporary testing operations
- Outdoor installation with limited infrastructure needs
- Easy connection to existing building electrical source

Contact:
mbailey@cannondesign.com

MODULAR TENT – FLEXIBLE POST ACUTE CARE

BLU-MED
Response Systems®
The World's Leader in Deployable Medical Facilities™

NEGATIVE PRESSURE ISOLATION SYSTEM



Meets CDC guidelines set by the Healthcare Infection Control Practices Advisory Committee

NPI SYSTEM FEATURES:

- BLU-MED® Shelter and HVAC
- Negative Pressure Air Scrubber with HEPA and UV Germicidal Filtration
- Monitor / Alarm System
- Variable Size Isolation Space and Anteroom
- System can be converted to a Positive Pressure Clean Room





Vestibule Entry
Isolation Partition
Supply Air
Return Air
Anteroom
Isolation Area
ECU
Negative Pressure Filtration Unit

For more information or immediate response, contact:

toll free +1-888-680-7181
local +1-425-739-2795

BLU-MED
Response Systems
www.BLU-MED.com

Clinical Services Supported

1. Wide variety of configurations available, including Testing modules, hospitals from 15-200 beds
2. Lab, Imaging, Pharmacy modules
3. Surgery modules
4. Intake, Triage, Emergency modules

Support Services Accommodated

1. Food Service/Dining modules
2. Supplies Management module
3. Bio Hazard Waste Management
4. Administrative Support

Infrastructure Available

1. Environmental Control Units
2. NPI Filtration
3. Potable, Grey, Black Water Bladders
4. Generators

Considerations

- Evaluate need for negative pressure units
- Need staff support connector to all modules
- Typical 4-week delivery time
- Set-up in 2 days or less

Adaptation

- Bed units can be used for staff respite/sleeping
- Post-Acute Patients will need entertainment area and rehab space

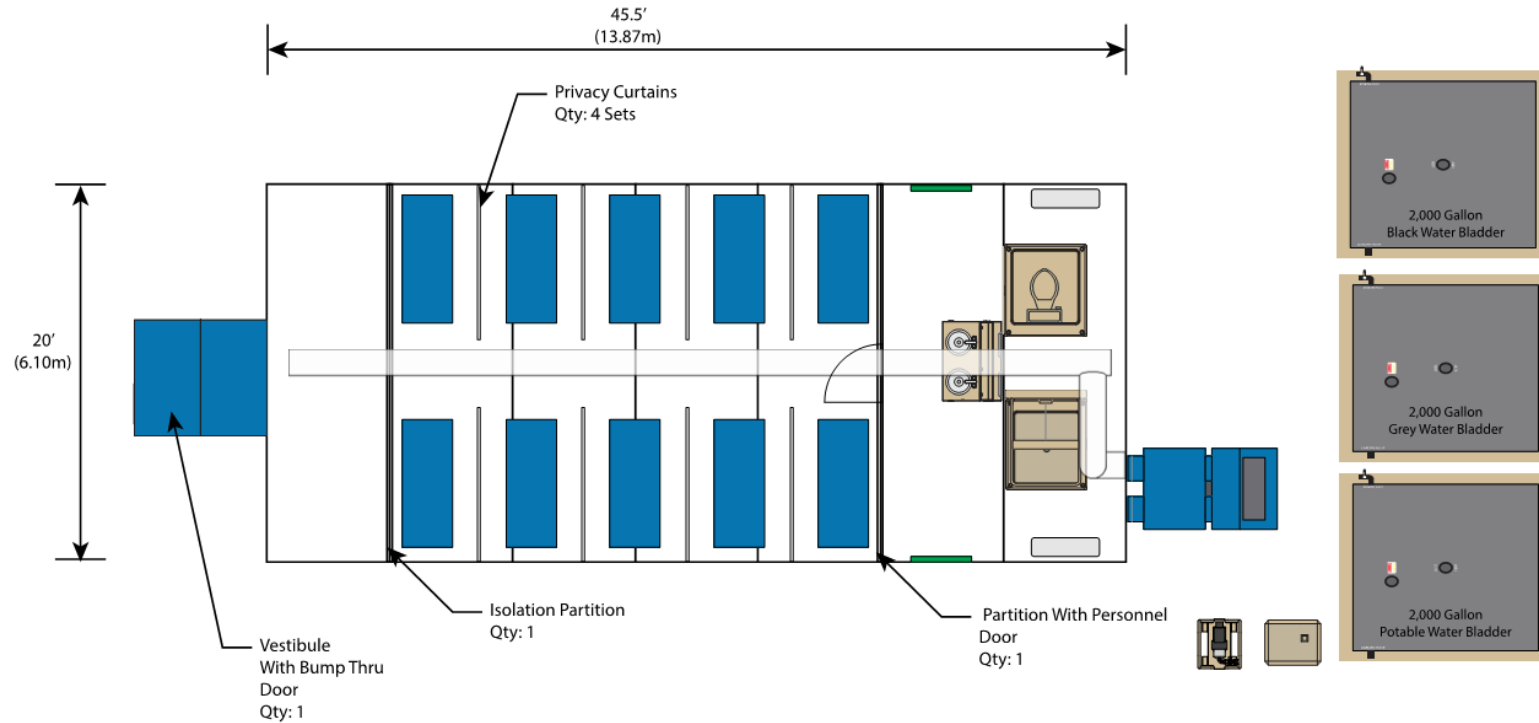
Considerations

- 5-ton ECU typical
- Patient & staff bathing facilities require special purpose modules or adjunct support in existing facilities
- Temporary morgue facility by others

MODULAR TENT – FLEXIBLE POST ACUTE CARE



20' x 45.5' Isolation System
With Shower And Latrine
(6.10m x 13.87m)



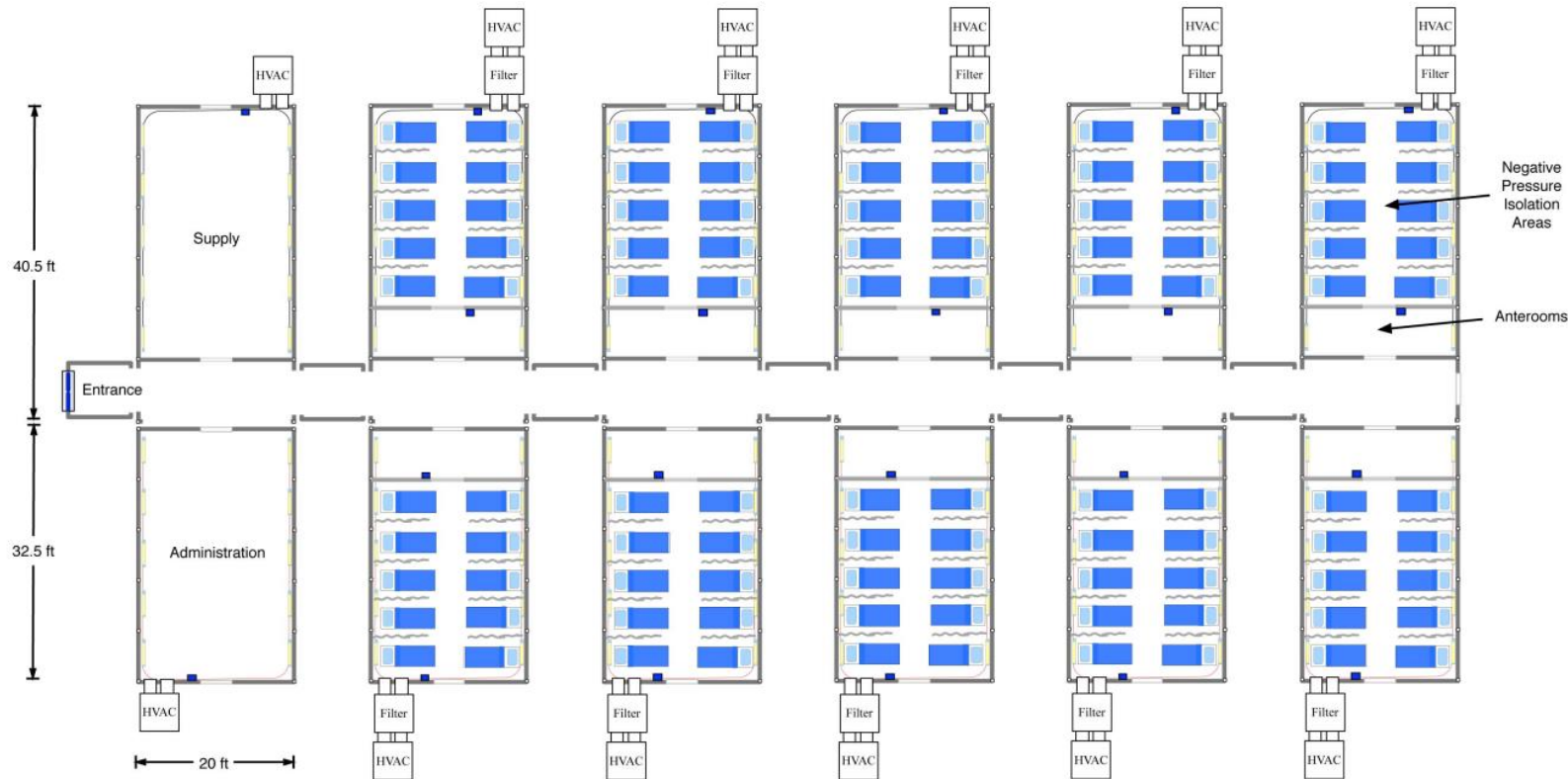
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MODULAR TENT – FLEXIBLE POST ACUTE CARE



12-Shelter Medical Facility with 100-Beds Negative Pressure / Isolation



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MODULAR SOLUTIONS

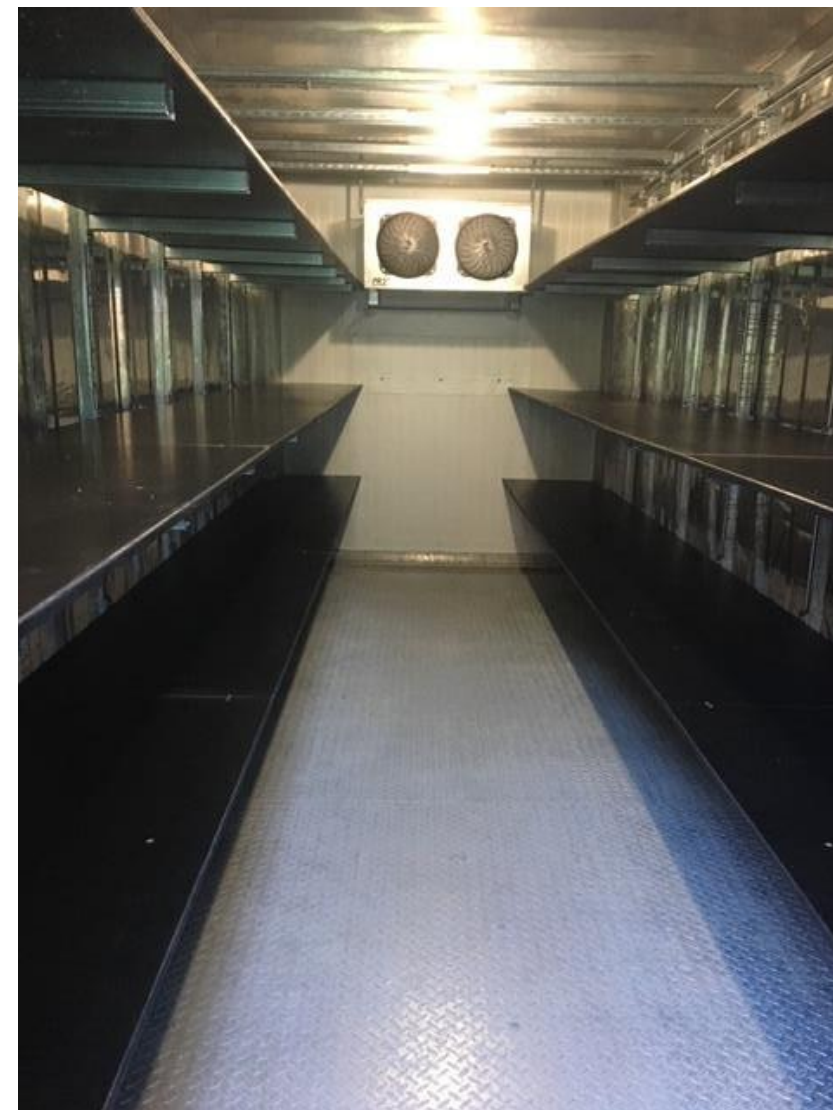
PPE Disinfection

1. Skinned the walls and floor
2. Installed eyelets on the wall
3. Cabling will be run horizontally and hold PPE for disinfecting



Temporary Morgue

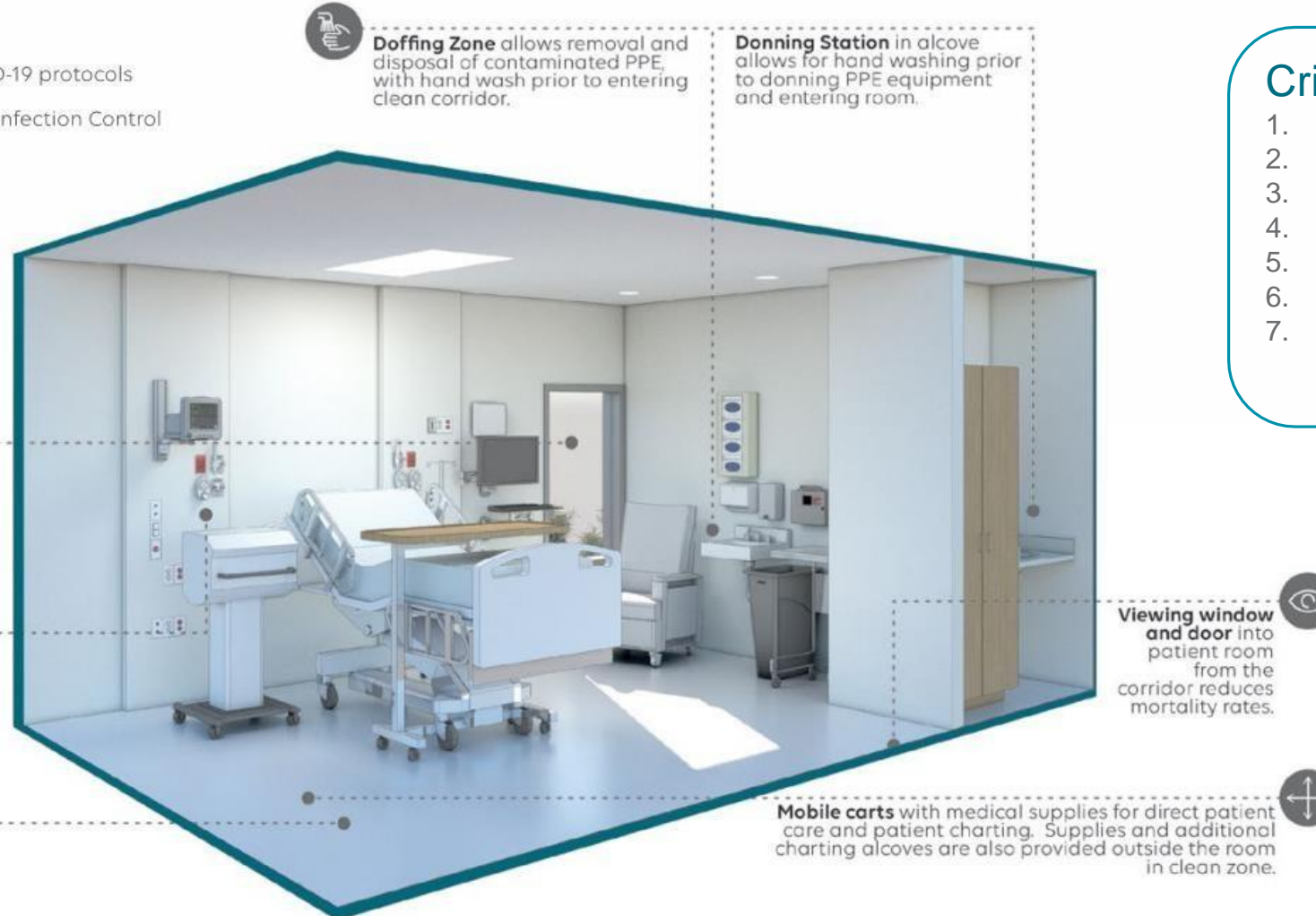
1. Reefer box (insulated trailer) rented by client
2. Outfitted with unistrut, brackets, SS platforms/shelving, flooring ramp
3. Temp refrigeration unit



PREFABRICATED PATIENT CARE SPACES

Expert-tested in virtual reality simulation by:

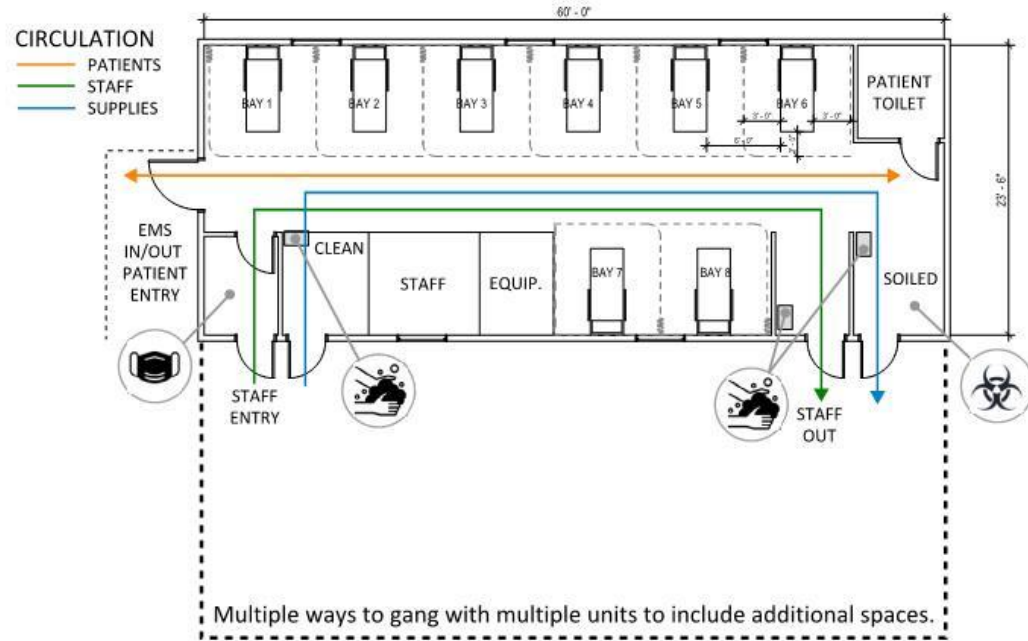
- Lean Process Engineers
- Critical Care Nurse trained in COVID-19 protocols
- Hospital Environment Specialist in Infection Control



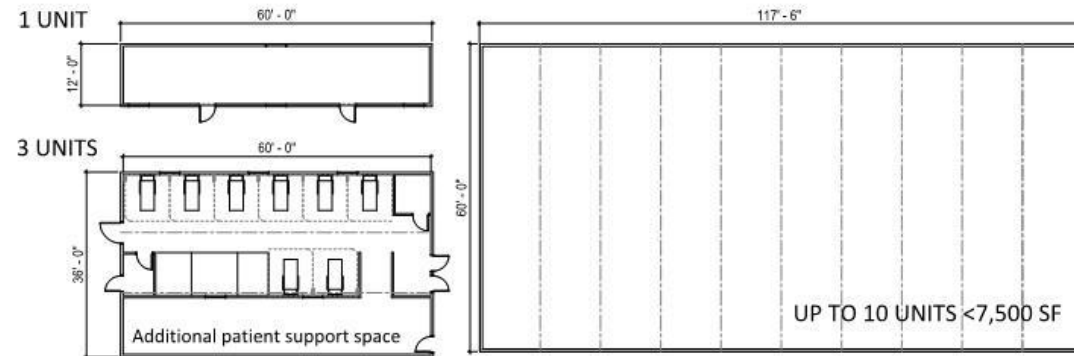
- ### Critical to Quality
1. Exterior Window
 2. Fixed Medical Gases
 3. 15'-0" Wide Room
 4. Donning Station
 5. Doffing Zone
 6. Viewing Window/Door
 7. Mobile Carts

CONSTRUCTION TRAILER CONVERSION DIAGRAM

TYPICAL DOUBLE WIDE TRAILER



SINGLE TRAILER



NOT TO SCALE

Space Benefits

1. Typical size 60 ft wide. Option to gang multiple units to create larger spaces.
2. Interior flexibility to accommodate multiple layouts. Multiple openings and doors can be provided to create a one way flow.
3. Options to provide hand washing sinks, toilets and showers and other support spaces inside the unit.

Changes recommended

1. Use of stick-build construction for the interior layouts to shorten completion date.

Challenges

1. Require transportation permits for oversized loads. Teams will have to coordinate with local authorities.
2. Infrastructure required for MEP will vary depending on the size and location.

CONSTRUCTION TRAILER CONVERSION

Trailer sizes

WILLIAMS SCOTTSMAN / Triumph / Likely Sizes						
Length	Width	Boxes	SF	BEDS	~~ add' space needed	TOTAL FOOTPRINT
64	24	2	1536	8	750	2286
64	36	3	2304		750	3054
64	48	4	3072	16	1000	4072
64	60	5	3840		1000	4840
64	72	6	4608	24	1200	5808
64	84	7	5376		1200	6576
64	96	8	6144	32	1400	7544
64	108	9	6912		1400	8312
64	120	10	7680	40	1500	9180

Power and Data considerations

1. Use of rented generators for normal and emergency power. Considerations for space and hook up.
2. Power Lines can be hooked to permanent plant or closest utility. Considerations for lines thru lot and paths)
3. Data availability using campus Wifi hotspots. Wired connection base on campus proximity.

HVAC

1. HVAC is integral to the trailers. Additional portable units are needed to provide negative air

Plumbing

WATER – TOILETS (waste holding tank or potential waste line w pumping)

1. Toilets integral to units with exterior waste holding tank. Might not be enough toilets – add porta-pottys.
2. Option to add advanced exterior portable toilet units..

WATER – SHOWERS (large waste holding tank or potential waste line w pumping)

1. Showers available in trailer or as an advanced exterior portable units.

WATER SINKS

1. Sinks integral to trailers as kitchen set up/other - piped from source or tanks
2. Portable hand washing units that can be fill/empty daily.

CONSTRUCTION TRAILER CONVERSION

Companies

Triumph has the fastest growing mobile office trailer fleet in the northeast. Our expanding product lines include modular buildings, mobile office trailers and storage containers. Our team is committed to providing quality equipment and a superior level of customer service.



Call our Sales Team today at: 800-257-2536 or visit: www.triumphmodular.com

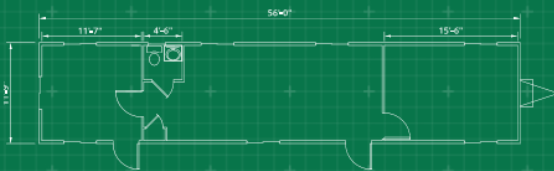
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WILLSCOT

60' x 12' MOBILE OFFICE



In addition to your office solution, we can provide additional products and services that complete your space- creating a more productive, comfortable, and safe work environment.



CUSTOMIZATION

- Steps & Ramps
- Furniture & Appliances
- Technology
- Site Services
- Loss Protection

OTHER CONSIDERATIONS

EXTREME WINTER CONDITIONS

1. Water lines and tanks freezing will need specialty-constructed ideas to heat these utilities. Heating blankets, boxed enclosures, etc.
2. Porta-pottys will need some sort of temp 'hut' to heat to avoid freezing or climate discomfort for patients /staff
3. Portable shower units (exterior) may need some type of 'bridge' constructed to avoid outside travel.

FOOD

1. Food must use institution/facility or local food service (caterers/banquet). 3 meals a day delivered, limited rotation menu. Snacks distribution – brown bag/other.

DUMPSTER/Trash

1. Room for a dumpster can will be needed for flow of food and potential other wastes.

Dissemination beyond HAIO through Healthcare Networks and Local & National Organizations

HAIO Surge Solutions Library:
Please send information to:
Haio.surgesolutions@colliers.com

To review and download information:
https://www.dropbox.com/sh/kpx07e3dv8yymxl/AADhxvqzM_IT21hDNw485gmoa?dl=0

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