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We Are Better Together

Excellence and Innovation

We Seek To Advance

Diversity and Inclusion

We Value Each Other

Best Practices in Protecting
HCWs from Exposure to SARS
CoV-2
(or what to do when 135 negative
pressure rooms is not enough)

April 15, 2020



| Disclaimer

The findings, observations and recommendations presented here are those of the author and do not necessarily represent the views of the University of Maryland Medical Center.



| Who we are

The University of Maryland Medical Center is a 789-bed academic medical center located in the heart of Baltimore, MD. UMMC is the flagship of the 13 hospital UMMS

- MAGNET Designated
- Approximately 8,900 staff and 1,200 faculty members
- 29,316 admissions, 56,184 emergency/OBS visits, 319,529 outpatient visits, 18,024 outpatient surgeries (2018)
- Full range of services including trauma, heart and vascular care, NCICC (cancer care), NeuroCare, women's and children's health, organ transplantation and psychiatry.
- Partner with UMB Schools of Medicine, Nursing, Pharmacy, Dentistry, Social Work, Law and Allied Health



| Objectives

- Define what a negative pressure room is
- Discuss why negative pressure rooms should be considered for SARS CoV2
- Discuss how negative pressure rooms and wards could be implemented
 - Operational and Safety considerations



Negative pressure rooms – aka Airborne Infection Isolation Rooms (AIIRs)

Negative pressure rooms are rooms designed to prevent airborne microorganisms in the room from entering hallways and corridors

Design specifications

- Direction of airflow is into the room
- -0.01" water gauge (-2.5 Pa)
- >12 ach (for renovations and new construction)
- Directly exhausted to the outside (avoiding reentrainment) or HEPA filtered if recirculated
- No anteroom is required (FGI)





CDC recommendations (or why do I need an AIIR?)

CDC no longer requires a negative pressure room (AIIR) for SARS CoV2 to save these rooms for aerosol generating procedures

- Understand the rationale - CDC is acknowledging that AIIRs are a finite commodity and may not be available to all settings
- SARS CoV2 patients are constantly generating aerosols – coughing, sneezing, talking, being suctioned (airway maintenance).
- SARS CoV2 is an airborne, contact, droplet spreader. CDC guidance has changed to recommend an N95 (if available) for all patient contact
- SARS CoV2 patients get in trouble quickly often necessitating emergent life sustaining interventions (i.e., intubation and ventilation) – intubation/extubation are among the most hazardous procedures from the aerosol generation perspective

Recommendation - Use of negative pressure rooms for SARS CoV2+ patients should be considered whenever possible.



How to implement negative pressure rooms and wards

Talk to your plant engineer to take advantage of existing building design features

Option 1 - utilize existing AIIRs

- Pros – Already operational
- Cons – Often occupied and/or in geographically disparate locations creating staffing & PPE burn rate issues; may not have anterooms

Option 1a – create AIIRs (and anteroom)

- Pros – can locate where needed (e.g., clustered)
- Cons – it's not as easy as it looks

Option 2 – create negative pressure wards

- Pros – may be the most efficient use of resources
- Cons – staff are in the hot zone for prolonged periods of time

Option 3 – use non-negative pressure options



Option 1a - DIY AIIR

Left photo – use of a hospital grade HEPA Machine. Right photo – use of an industrial scrubber unit



Considerations – noise, patient safety



| Considerations

- Barriers can be rigid or flexible. If you use poly, use FR poly
 - Windows are desirable for observation
- Doors – make sure they're wide enough for beds. Hard doors are more durable than zipper doors
 - Need a cleaning plan for zipper doors
 - Reinforce zippers = consider mechanical fasteners
- Consider pressure monitoring (flexible barriers are obvious, rigid walls are not)
- Exhausting through a window? Make sure it is safe
- Fans should be tamper proof
- Fire and patient safety plan - ILSM



| Types of containment

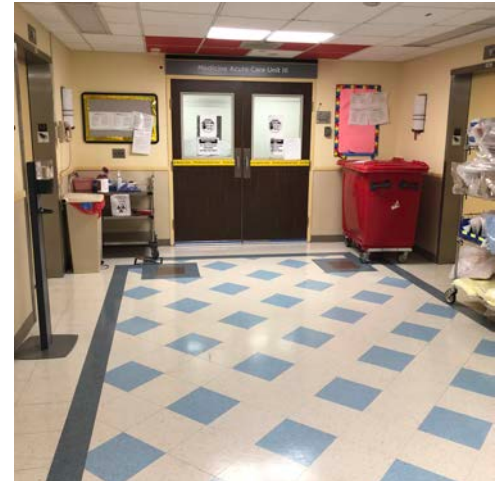




Example of a Negative Pressure Ward

N13W is a 15-bed, acute care medicine unit. In the pandemic plan, N13W converts to a 27-bed negative pressure capable, acute care unit

- 2 existing AIRs
- North Building was designed with once-through air (air is not recirculated). Exhausted air is discharged vertically via two high velocity stacks away from air intakes
- Created a negative pressure capable zone with a poly barrier on back corridor and an anteroom using existing smoke door and new hard all door.
- Negative pressure is created by adjusting exhaust off of floor >> supply. Pressure is monitored by magnahelic gauge and BAS





ZONE N13-01
EXISTING HEALTH CARE
COMPLETE SPRINKLER PROTECTION
12386 SQ FT



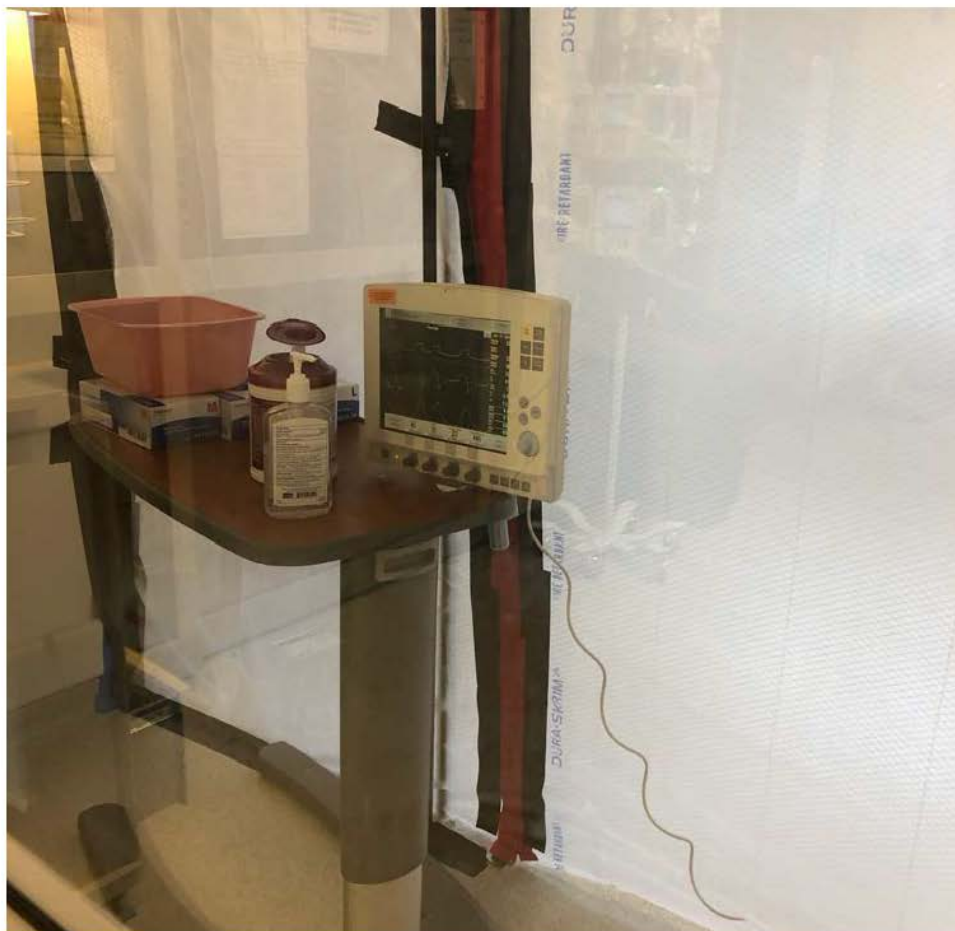
ZONE N13-02
EXISTING HEALTH CARE
COMPLETE SPRINKLER PROTECTION
11742 SQ FT

 | IV pumps located out of room





| Vent monitoring





| Remote monitoring





Questions?



| Remember - Social distancing and hand hygiene

