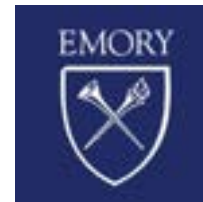


Lab Considerations for Special Pathogens

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All I know is that I know nothing
... and I'm not even sure about that.

Adapted from Pyrrho, Greek Philosopher c. 360

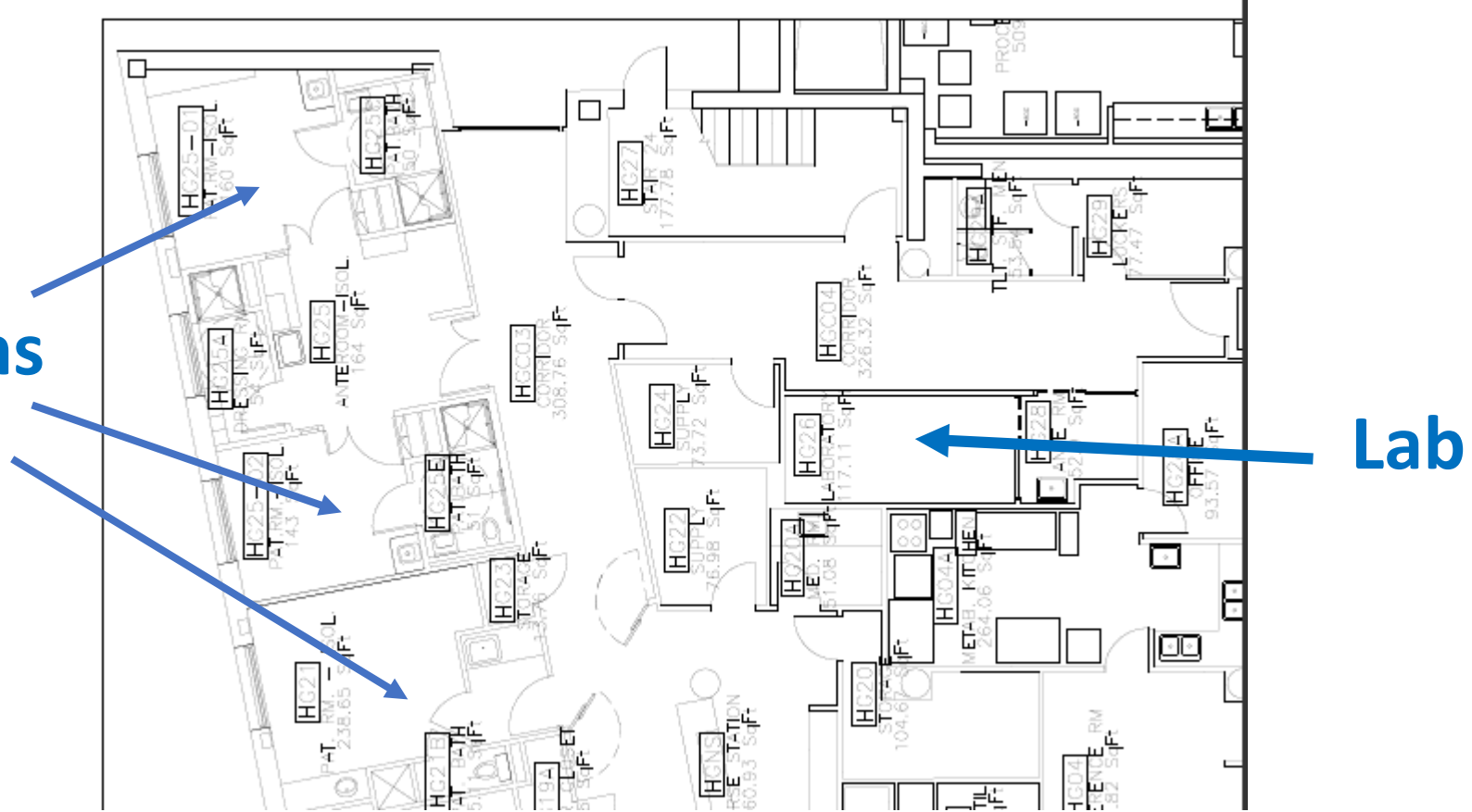


Biocontainment Laboratory Mission:

- Help with Diagnosis
- Support patient care
 - Research

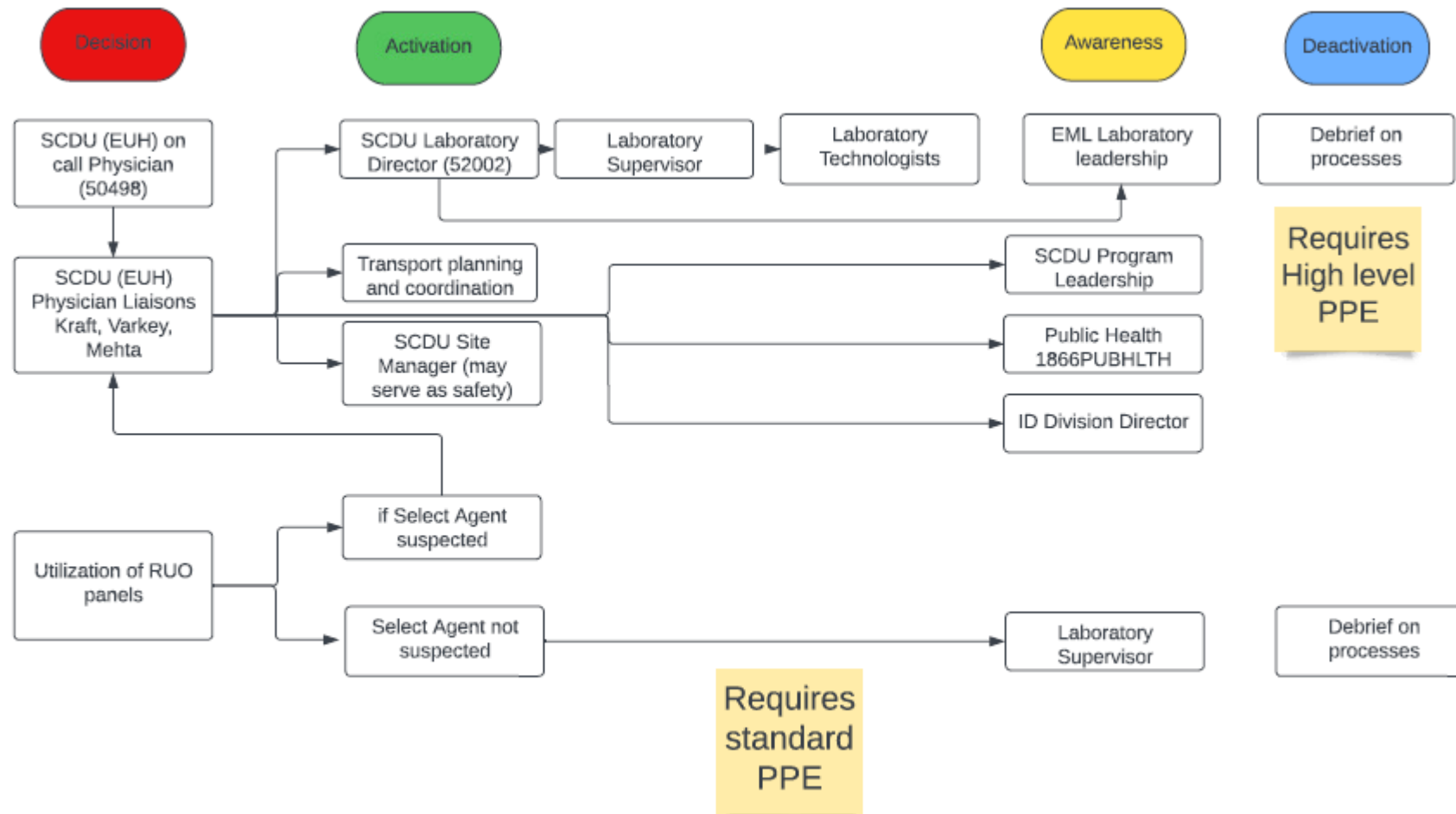


Patient Rooms





Help with Diagnosis: when the lab is activated



Help with Diagnosis

Challenge: Sample collection and transport



Help with Diagnosis

Challenge: Sample collection and transport

“Here are some samples
for transport to the
Biocontainment lab”

Nope.



Help with Diagnosis

Challenge: Sample collection and transport

Response: Education
Training
Supplies and Job Aids



Help with Diagnosis

Safety considerations:

Buddy system



Help with Diagnosis









Safety considerations:

Buddy system

Appropriate PPE



Choice of PPE depends on suspected pathogen

| Virus Family | Illness Caused | Common Geography | Vector or Source | Person-to-person spread | Precautions | PPE | Comments | | | |
|--------------|--|--|--------------------------|-------------------------|---|---|--|--|--|--|
| Filoviridae | Ebola Virus Disease | Central, sub-Saharan Africa | ? Presumed bat | YES | Contact, Droplet/Airborne, Eye |  | Dry phase = impermeable gown to mid-calf | | | |
| | Marburg virus | | Fruit bat | | | | Wet phase = Full body coverage | | | |
| Arenaviridae | Lassa fever | West Africa | Rodents | YES | Contact, Droplet/Airborne, Eye |  | Dry phase = impermeable gown to mid-calf | | | |
| | Junín Machupo (Bolivian HF) Guanarito (Venezuelan HF) Sabia (Brazilian HF) | South America | | | | | Wet phase = full body coverage | | | |
| Bunyaviridae | CCHF – Crimean Congo Hemorrhagic Fever | Europe, Mediterranean, Middle East, Africa, India, China | Tick, infected livestock | YES | Contact, Droplet ¹ , Eye |  | ¹ Add respiratory protection (N95 or +) for centrifugation  | | | |
| | Hantaviruses (HPS/HFRS*) (Sin Nombre, Andes virus) | Worldwide | Rodent | Possible | Standard Precautions unless Andes virus suspected |  | Contact, Droplet/Airborne, Eye for potential Andes virus or contact/clean-up of rodent droppings | | | |
| | Rift Valley Fever | All of sub-Saharan Africa | Mosquito | No | Standard Precautions |  | | | | |
| Flaviviridae | Yellow Fever | Tropics | Mosquito | Blood ² | Standard Precautions |  | ² Potential risk of Yellow Fever transmission in blood transfusion, or immediately post vaccination  | | | |
| | Dengue | Tropics | Mosquito | No | | | | | | |
| | Kyanasur | India | Tick | No | | | | | | |
| | Omsk | Siberia | | | | | | | | |

Help with Diagnosis

Safety considerations:

- Buddy system

- Appropriate PPE

- Sample sequestration until diagnosis



Help with Diagnosis

Challenge: Diagnosis needs to be confirmed by state or CDC lab

How to transport the sample?

Call the CDC for a consult: 770-488-7100 open 24/7



Routine Testing



Safety considerations:
Buddy system
Appropriate PPE
Batch testing

Routine Testing



Chemistry: Piccolo by Abbott Point of Care

Single-use reagent discs

100 uL Lithium heparized whole blood

Results in 12 minutes

CLIA waived test

Can be interfaced to LIS

Job Aids helpful

Test menu: ALB, ALP, ALT, AST, BUN, Ca, Cl⁻,
CRE, GLU, K⁺, Na⁺, TBIL, tCO₂, TP, MG, LD, GGT,
AMY, PO₄, CK

Routine Testing



Hematology: pocHi by Sysmex

CBC

15 μ L EDTA whole blood

Closed tube analysis

(Manual Diff not available in Isolation Lab)

Results in 2 minutes

Can be interfaced to LIS

Smallest footprint available for Hematology

Very reliable

Routine Testing



Blood Gases: GEM5000 by Werfen

Strong Quality Assurance: QC and Calibration checks are automatically run every few minutes

Can be interfaced

Cartridges with reagents and QC are self-contained, stored at RT, and changed every 30 days

Test Menu:

pH, pCO₂, pO₂, Na⁺, K⁺, Ca⁺⁺, Cl⁻, Glu, Lac, Hct, tHb, O₂Hb, COHb, MetHb, HHb, tBili, sO₂

Routine Testing

Urinalysis: Dipstick



PT/PTT: Roche Coaguchek



Performed by nurse at bedside

Trash Management

Category A trash must be contained and autoclaved



Autoclave



**Regulated
Medical Waste
Disposal**



After Activation: **Lab Decontamination (terminal cleaning)**

Vaporized Hydrogen Peroxide

- Process takes about 6 hours
- Biological and chemical indicators in place
- Instruments are not compromised



Exposure in Core Lab!! What to do....

Take care of your staff

- Inform them what happened
- Root Cause Analysis
- Implement a Plan to prevent further exposures
- Monitor physical symptoms and offer emotional counseling
- Prophylaxis treatment if available



Exposure in Core Lab!! What to do....

Take care of your space

- Clean the Exterior Surfaces
- Decontaminate the Instruments
- Vaporized H₂O₂ if possible (?)
- Find and destroy all specimens
- Contain solid and liquid waste
- If instruments are plumbed, test waste water



How can a non-Biocontainment Lab support the PUI?



References

- <https://netec.org/>
- <https://www.cdc.gov/vhf/ebola/laboratory-personnel/safe-specimen-management.html>
- <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/Cat%20A%20Waste%20Planning%20Guidance%20-%20Final%20-%202022-06.pdf>