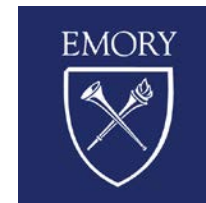


# Lab Considerations for Special Pathogens

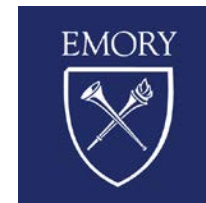
Melanie Sherman, MLS(ASCP), Ph.D.

November 10, 2022



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

Adapted from Pyrrho, Greek Philosopher c. 360



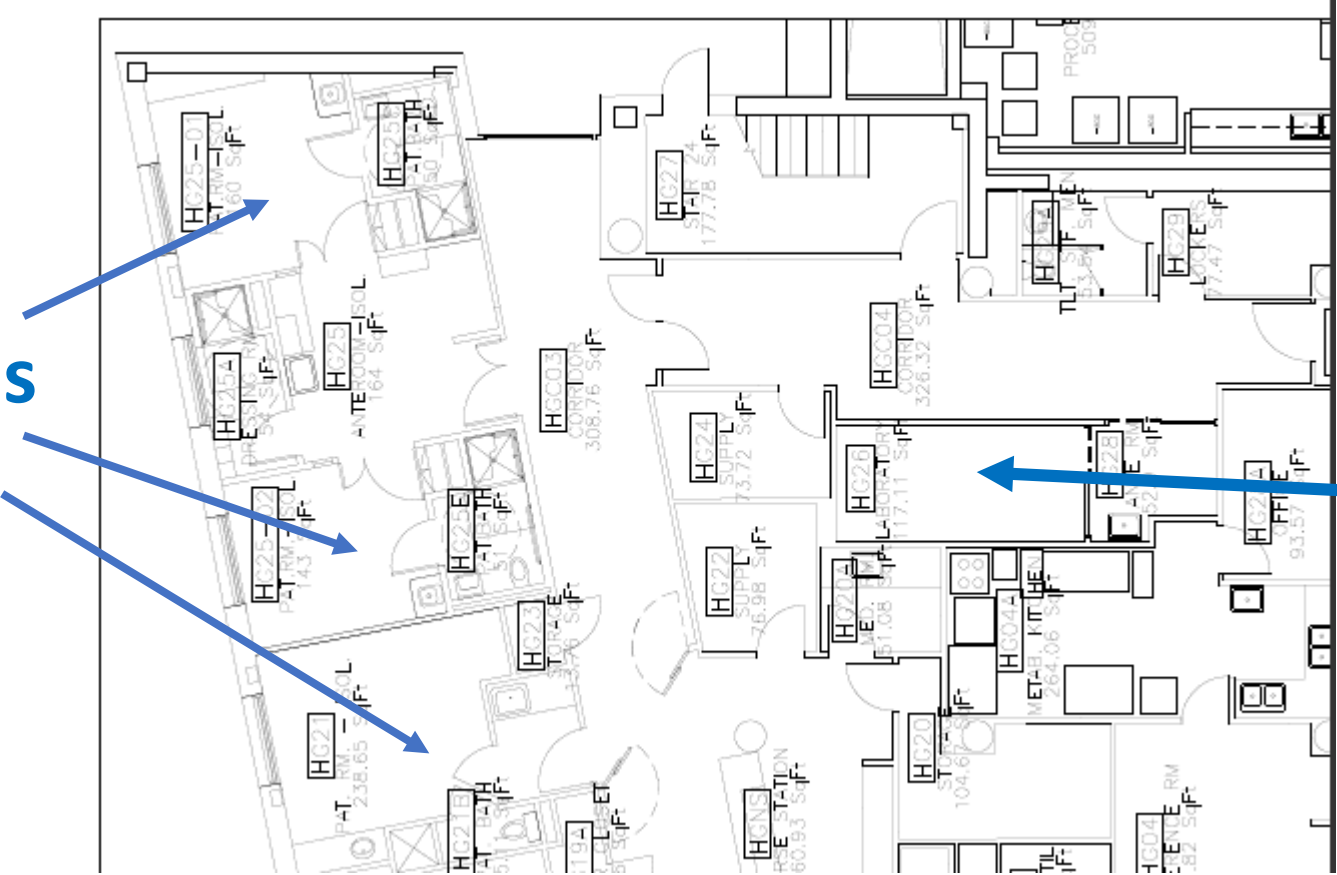
# Biocontainment Laboratory Mission:

- Help with Diagnosis
- Support patient care
  - Research



# Emory SCDU Floor Plan

Patient Rooms

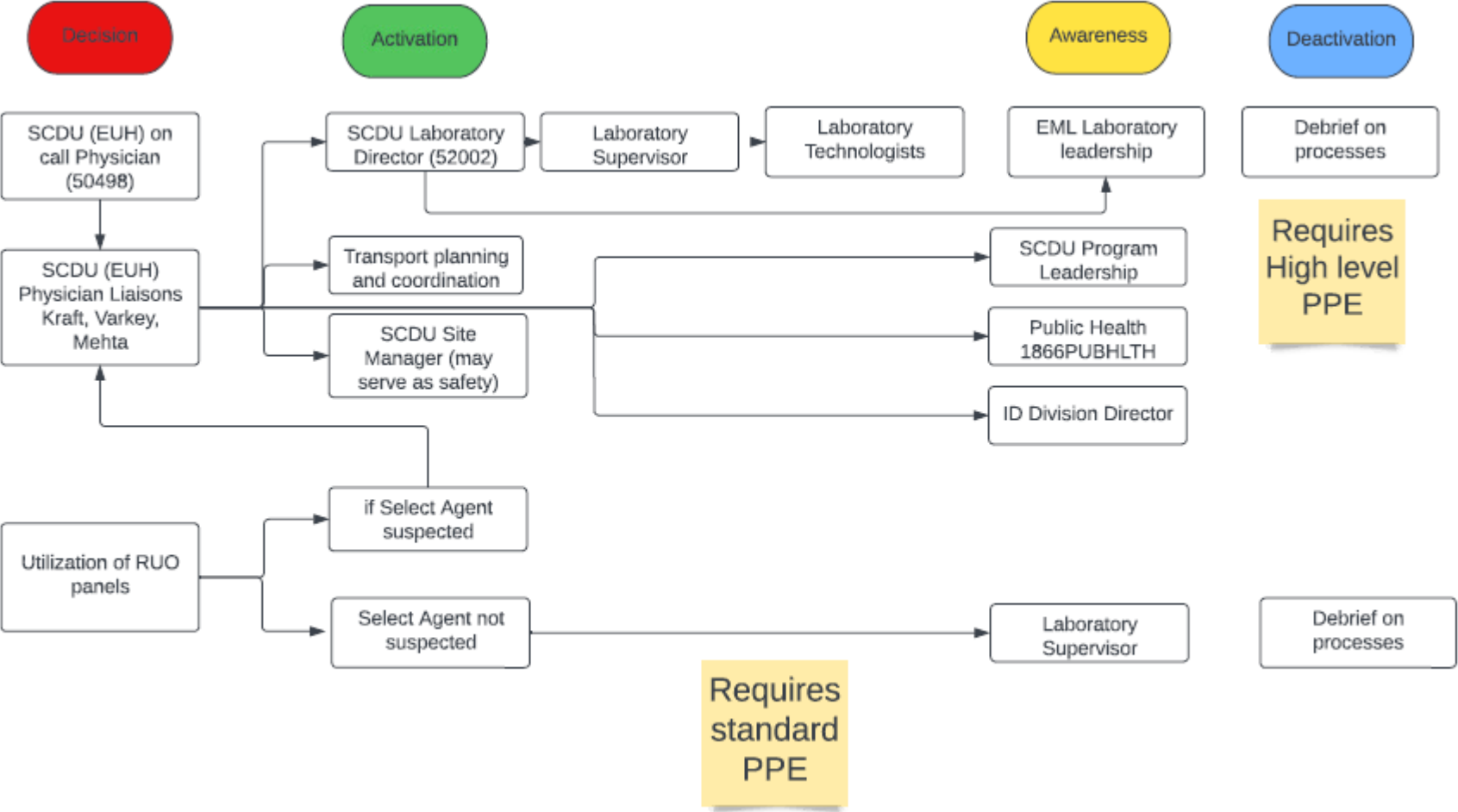


Lab





# 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 <sup>1</sup> , Eye		<sup>1</sup> 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 <sup>2</sup>	Standard Precautions		<sup>2</sup> Potential risk of Yellow Fever transmission in blood transfusion, or immediately post vaccination 
	Dengue	Tropics	Mosquito	No			
	Kyasanur	India					
	Omsk	Siberia	Tick	No			

# 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**

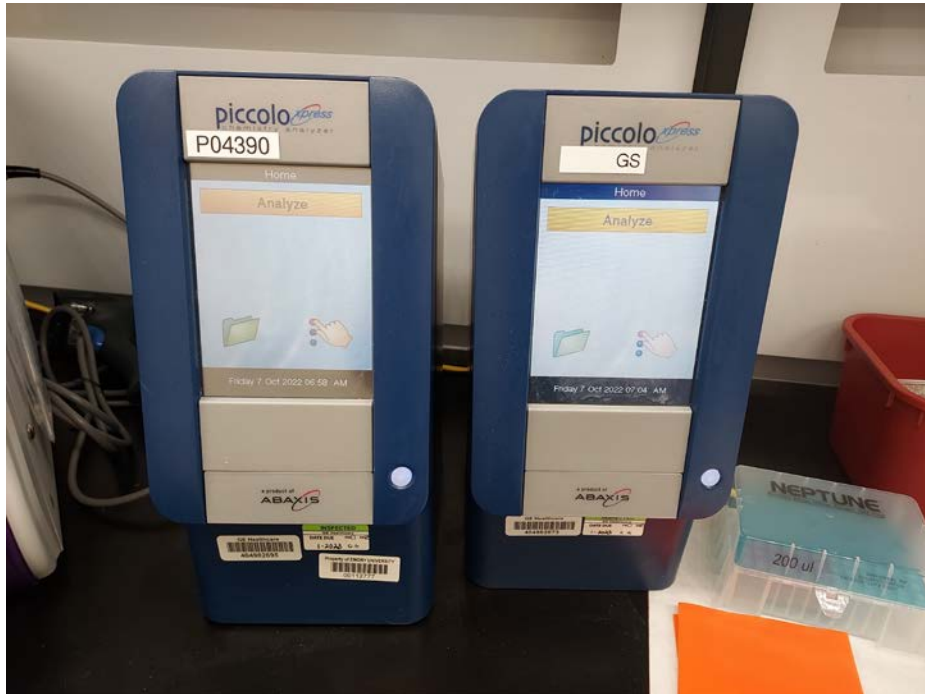


# Routine Testing



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<sup>-</sup>,  
CRE, GLU, K<sup>+</sup>, Na<sup>+</sup>, TBIL, tCO<sub>2</sub>, TP, MG, LD, GGT,  
AMY, PO<sub>4</sub>, CK



# Routine Testing



## Hematology: pocHi by Sysmex

CBC

15  $\mu$ L EDTA whole blood

Closed tube analysis

(Manual Diff not available in Isolation Lab)

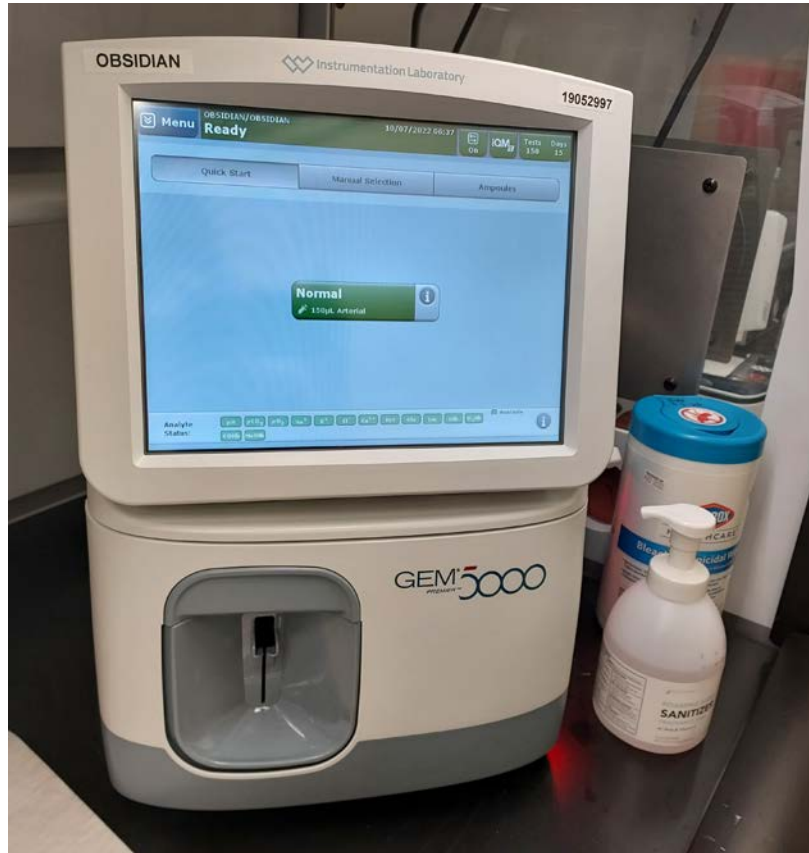
Results in 2 minutes

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

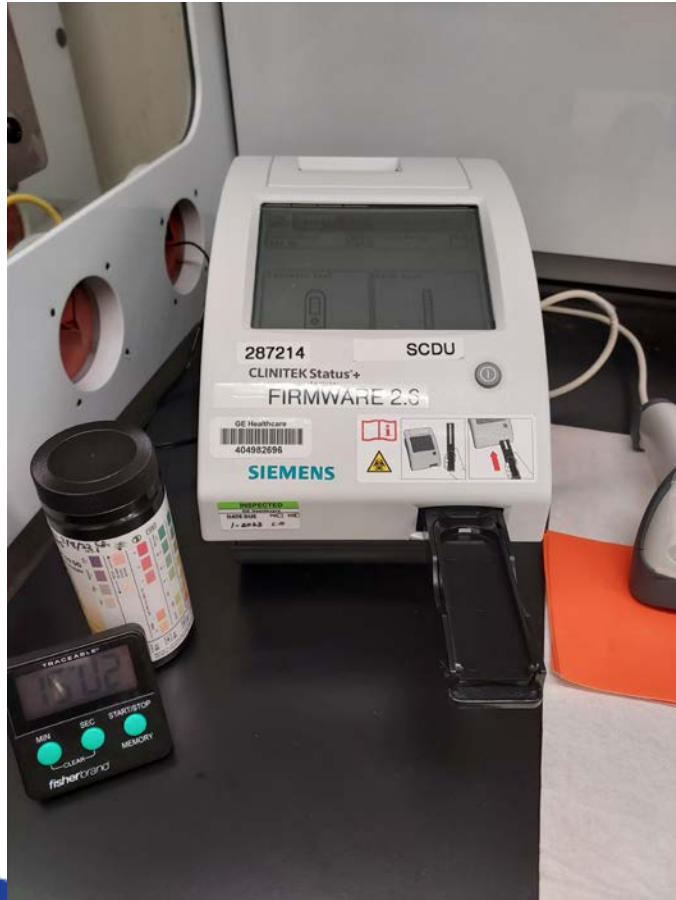
Cartridges with reagents and QC are self-contained, stored at RT, and changed every 30 days

Test Menu:

pH, pCO<sub>2</sub>, pO<sub>2</sub>, Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>++</sup>, Cl<sup>-</sup>, Glu, Lac, Hct, tHb, O<sub>2</sub>Hb, COHb, MetHb, HHb, tBili, sO<sub>2</sub>

# Routine Testing

## Urinalysis: Dipstick



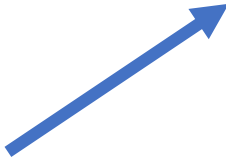
## PT/PTT: Roche CoaguChek



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 H<sub>2</sub>O<sub>2</sub> 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>