Critical Thinking: Recognizing Hazards and Mitigating Risks When Providing Patient Care
Objectives

1. Identify hazards during the care of a patient who is suspected or diagnosed with Ebola or Other Special Pathogen Disease.

2. Discuss hazard controls and strategies to mitigate the spread of disease.
During this session, participants will engage in discussions about how to safely perform a variety of care procedures. In no way is NETEC advocating that all institutions be able to provide all of these procedures to patients in a biocontainment unit.
<table>
<thead>
<tr>
<th>Time to represent</th>
<th>What is your profession?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Bedside nurse</td>
</tr>
<tr>
<td></td>
<td>B. Provider (MD, PA, NP)</td>
</tr>
<tr>
<td></td>
<td>C. Respiratory Therapist</td>
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<td></td>
<td>D. Infection Prevention/Control</td>
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<td>E. Laboratorian</td>
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<td>F. EMS</td>
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<td></td>
<td>G. Administrator</td>
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<tr>
<td></td>
<td>H. Other</td>
</tr>
</tbody>
</table>
**Show of Hands**

**Time to represent**

What type of facility are you?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>A.</td>
<td>Frontline Healthcare Facility</td>
</tr>
<tr>
<td>B.</td>
<td>Assessment Hospital</td>
</tr>
<tr>
<td>C.</td>
<td>Treatment Center</td>
</tr>
</tbody>
</table>
Hierarchy of Controls

- Physically remove the hazard
- Replace the hazard
- Isolate people from the hazard
- Change the way people work
- Protect the worker with Personal Protective Equipment

Most effective

Elimination

Substitution

Engineering Controls

Administrative Controls

PPE

Least effective
# Hierarchy of Controls: Example

<table>
<thead>
<tr>
<th>Control</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation</strong></td>
<td>Teaching your teenager to merge onto the interstate</td>
</tr>
<tr>
<td><strong>Identify the hazard</strong></td>
<td>Inexperienced driver merging into fast flowing traffic creating a risk for a traffic accident</td>
</tr>
<tr>
<td><strong>Elimination</strong></td>
<td>Forbid your child from driving on the interstate</td>
</tr>
</tbody>
</table>
| **Substitution** | Make them use a different route  
Provide chauffeur services or pay for Uber so that someone else does the driving |
| **Engineering controls** | Ensure the vehicle is equipped with safety features such as airbags and rear view mirrors  
Call ahead to have the police set up a roadblock to stop traffic and allow easy access |
| **Administrative controls** | Ensure they understand the rules of the road and have a driver’s license |
| **PPE** | Ensure they wear their seatbelt and/or wrap them in lots of bubble wrap |
The emergency department of a **Frontline Healthcare Facility**.

Today, Mary, a 30 year old female who returned home 10 days ago from the Democratic Republic of the Congo presents at your ER with complaints of fever, headache and nausea.

Because your hospital team have trained with The National Ebola Training and Education Center, Mary was immediately identified as a Person Under Investigation for Ebola virus disease (EVD) based on her clinical symptoms and epidemiological risk factors (travel and symptoms).

The ER initiated their PUI standard operating procedures (SOP) and Mary was placed in an isolation room following their SOP. All the appropriate people have been informed within your facility and your local and state public health departments.

Plans are being made to transfer Mary to an Assessment Hospital where she will undergo testing for EVD.
<table>
<thead>
<tr>
<th>Plan</th>
<th>Mary will be transferred to an Assessment Hospital, but will remain in your ED isolation room until transportation arrives.</th>
</tr>
</thead>
</table>
| Plan of Care | Until Mary has been transferred her care needs must be met.  
A team of trained staff have been assigned to provide care. |
| Physical assessment: | Neuro: Alert and Oriented x 3  
Pulm: Clear to auscultation  
CV: RRR, no edema  
GI: Nausea, abdominal tenderness, normoactive bowel sounds |
| Vital signs: | BP 122/60, HR 87 bpm, SATS 98%, RR 18/min, Temp 39.5°C |
| New Orders: | Tylenol 650mg PO q 4hrs prn for fever  
PIV insertion  
Zofran 4 mg IV q 4hrs prn for nausea  
Prepare for transport |
Scenario 1: Care Needs

Identify the hazard(s) for each topic and discuss the controls to reduce the risks to staff

Discussion

Staffing
Peripheral IV Placement
Prepare for Transportation

Hierarchy of Controls

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- PPE

Physically remove the hazard
Replace the hazard
Isolate people from the hazard
Change the way people work
Protect the worker with Personal Protective Equipment

Least effective
Most effective
Hierarchy of Controls: Staffing

**Situation**
Create staffing schedule to provide clinical care for the patient

**Identify the hazard**
Staff will be in close proximity to a patient with a special pathogen disease

**Elimination**
- Limit the number of staff providing care to the patient
- Facilitate tele health or video consultations

**Substitution**
Cross-train staff to perform multiple roles as permitted within their Scope of Practice

**Engineering controls**
- Place patient in AIIR
- Use safety design medical devices where available

**Administrative controls**
Develop protocols, train staff, maintain a log of who enters the room

**PPE**
CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Hierarchy of Controls: Peripheral IV Insertion

**Situation**: Placement of a peripheral IV

**Identify the hazard**: Risk for puncture/needle stick injury  
Potential contact with infected body fluids

<table>
<thead>
<tr>
<th>Level</th>
<th>Control</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elimination</strong></td>
<td>Practice the procedure wearing PPE to prepare for the ‘real’ experience to know what to expect</td>
<td></td>
</tr>
</tbody>
</table>
| **Substitution** | Give PO medications if appropriate  
If difficult to place, consider an IO |
| **Engineering controls** | Use safe devices  
Use safe technique... i.e. don’t place fingers in direct line of needle |
| **Administrative controls** | Develop protocols for IV insertion  
Ensure all staff have been trained in PIV insertion while wearing PPE |
| **PPE** | CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease. |
### Hierarchy of Controls: Prepare for Transport

<table>
<thead>
<tr>
<th>Situation</th>
<th>Identify the hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient with a Special Pathogen Disease to be transferred to an assessment Hospital</td>
<td>Risk for staff exposure and environmental contamination</td>
</tr>
</tbody>
</table>

#### Elimination
- Contain the patient to avoid exposure and contamination for staff and environment

#### Substitution
- Use special pathogen transportation procedures i.e. containment wrap, portable isolation unit, PPE in place of normal procedures

#### Engineering controls
- Use barriers to prevent the spread of infection i.e. draping the ambulance

#### Administrative controls
- Develop protocols for transportation (ConOPs) and conduct training, drills and exercises
- Provide report to transport personnel and assessment hospital

#### PPE
- CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Scenario 1: Situation Update

Mary has now been transferred successfully to the Assessment Hospital where laboratory testing will be performed.

6 hours later

- Mary’s test for Ebola has come back positive
- Transfer to a Treatment Center is expected to occur in about 6 hours

Physical assessment:

- Neuro: Alert and Oriented x 3
- Pulm: Clear to auscultation
- CV: Tachycardia, Sudden onset c/o chest pain
- GI: Nausea, emesis, and now has diarrhea

Vital signs:

- BP 106/60, HR 122 bpm, SATS 94%, RR 23/min, Temp 39.5°C

New Orders:

- LR 150mls/hr IV continuous
- Tylenol 650mg IV q 4hrs prn for fever
- Morphine 4 mg IV q 1hr prn for pain
- Other orders include CMP, CBC, lactic acid, cardiac enzymes and 12 lead EKG
Scenario 1: Discussion

Identify the hazard(s) for each topic and discuss the controls to reduce the risks to staff

Discussion

Hierarchy of Controls

- **Lab Draws**
- **12 Lead EKG**

**Most effective**
- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- PPE

**Least effective**
- Physically remove the hazard
- Replace the hazard
- Isolate people from the hazard
- Change the way people work
- Protect the worker with Personal Protective Equipment
Hierarchy of Controls: Lab Draws

**Situation**
- Perform phlebotomy on a patient with a special pathogen disease

**Identify the hazard**
- Potential contact with infected body fluids
- Risk of puncture/needle stick injury

**Elimination**
- Use point of care (POC) when appropriate

**Substitution**
- Have bedside RN draw labs instead of phlebotomy staff
- Use plastic vials instead of glass to avoid potential spill with sharps

**Engineering controls**
- Use transfer devices to collect specimens to avoid body fluid exposure
- Use safe medical devices

**Administrative controls**
- Discuss ahead of time what labs need to be drawn so that lab staff can be ready

**PPE**
- CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Hierarchy of Controls: EKG

**Situation**
Perform EKG on patient with Special Pathogen Disease

**Identify the hazard**
Potential contamination of the EKG machine

**Elimination**
Consider if performing an EKG will change clinical management

**Substitution**
Consider alternatives i.e. can you use the bedside monitor

**Engineering controls**
- Isolate the machine from the environment using a plastic cover
- Send the results digitally to the EHR

**Administrative controls**
Develop a protocol and train RN to perform EKG’s

**PPE**
CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Scenario 1: Situation Update

Mary has now been transferred successfully to Treatment Facility where she will remain for the duration of her illness.

Status
- Mary’s condition is deteriorating rapidly

Physical assessment:
- Neuro: Awake but confused to time and place
- Pulm: Rales/ crackles bilateral lower lobes
- CV: EKG showed prolonged PR interval, ST depression (suggesting hypokalemia)
- GI: Nausea, emesis, and copious diarrhea

Relevant Lab:
- Potassium 2.6 mEq/L
- Creatinine 3 mg/dl
- BUN 24 mg/dl

New Orders:
- ZMapp 50 mg/kg q 3 days
- 40 mEq KCL IV
- CVC/ HD line placement
Scenario 1: Discussion

Identify the hazard(s) for each topic and discuss the controls to reduce the risks to staff

Discussion

CVC/ HD Line Placement
Effluent Management

Hierarchy of Controls
- Elimination: Physically remove the hazard
- Substitution: Replace the hazard
- Engineering Controls: Isolate people from the hazard
- Administrative Controls: Change the way people work
- PPE: Protect the worker with Personal Protective Equipment

Least effective
Most effective
## Hierarchy of Controls: CVC or HD placement

<table>
<thead>
<tr>
<th>Situation</th>
<th>Placement of a CVC or HD line in a patient with a special pathogen disease</th>
</tr>
</thead>
</table>
| Identify the hazard | Risk for puncture/needle stick injury  
Potential contact with infected body fluids |
| **Elimination** | Eliminate unsafe practices i.e. bedside RN holding vial while provider draws-up medication  
Perform early to avoid emergent line placement |
| **Substitution** | Replace the straight needle with a curved needle and needle driver for securing line  
Avoid breaking any glass ampules – replace with plastic if able |
| **Engineering controls** | Use ultrasound to increase likelihood of first attempt success  
Controlling the guidewire after it has been removed |
| **Administrative controls** | Develop protocols, train and drill in PPE with providers  
Follow institution protocols i.e. time out |
| **PPE** | CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease |
Scenario 1: Dialysis Catheter Discussion

Ideal location for dialysis catheter

- **Right IJ**
  - Non-tunneled dialysis catheter
  - Preferred Location

- **Left IJ**
  - Non-tunneled dialysis catheter
  - NOT Preferred Location
Hierarchy of Controls: Effluent Management

**Situation**
Effluent management from HD machine

**Identify the hazard**
Disposing of large amount of effluent

- **Elimination**
Pretreat effluent prior to disposal

- **Substitution**
Use alternative method for disposal

- **Engineering controls**
Effluent collection process

- **Administrative controls**
  - Develop protocols
  - Develop understanding with local public works department

- **PPE**
  CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Scenario 1: HD vs CRRT

Hemodialysis

Continuous Renal Replacement Therapy

5000ml
Scenario 1:

If using Citrate as an anticoagulant to prevent blood clotting in the circuit will result in frequent lab draws and calcium replacement infusion.
Scenario 1: Effluent Management

Effluent Disposal

- Line Drain
- Bag Drain
While setting up the dialysis machine, a blood spill occurs
Identify the hazard(s) for body fluid spill and discuss controls to reduce the risks to staff.

**Body Fluid Spill**

**Hierarchy of Controls**

1. **Elimination**
   - Physically remove the hazard

2. **Substitution**
   - Replace the hazard

3. **Engineering Controls**
   - Isolate people from the hazard

4. **Administrative Controls**
   - Change the way people work

5. **PPE**
   - Protect the worker with Personal Protective Equipment

**Discussion**

Scenario 1: Discussion
Hierarchy of Controls: Body Fluid Spill

**Situation**
Bodily Fluid Spill from Patient with Special Pathogen Disease

**Identify the hazard**
Potential contact with infected body fluids
Environmental contamination from bodily fluid

**Elimination**
Remove the spill by containing it, removing it and then cleaning and disinfecting the area

**Substitution**
Cross train staff on how to clean-up spills to avoid having EVS staff enter the zone

**Engineering controls**
Absorb the spill making it easier to clean: absorbent pads, solidifier, towels etc...

**Administrative controls**
Develop protocols for spill clean-up, train and drill in PPE with providers

**PPE**
CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease
Congratulations

Your patient has made a full recovery and has been discharged to home
Scenario 2: Case Study

You are a provider in the emergency room at a State designated treatment center.

Today, Bill, a 50 year old male who returned home 6 days ago from a business trip to Saudi Arabia presented at your ER with complaints of muscle aches, difficulty breathing, cough, chest pain, fever and chills.

Because your hospital teams have trained with The National Ebola Training and Education Center, Bill was immediately identified as a Person Under Investigation for the Middle East Respiratory virus based on his clinical symptoms and epidemiological risk factors (travel and contact with camels).

All the appropriate people have been informed within your facility, your local and state public health departments, and resources have been made available such as the state public health lab for laboratory testing.
Bill has been admitted and is being cared for in an Airborne Infection Isolation Room (AIIR) in the ED, where he will remain until testing confirms or rules out MERS-CoV.

Bill has a productive cough

Physical assessment:
- Neuro: Alert and Oriented x 3
- Pulm: Bilateral coarse crackles
- CV: Tachycardia, regular, no edema
- GI: Normal bowel sounds, loss of appetite

Vital signs:
- BP 145/70, HR 96 bpm, SATS 90%, RR 26/min, Temp 39.5°C

Current Treatments:
- 2L O2 via nasal cannula,
- Tylenol 650mg PO q4hrs prn for fever
- Morphine 4mg IV q2hr prn for pain.
- The public health department has authorized RT-PCR testing for MERS.
Scenario 2: New Orders

Treatments:
• CXR
• EKG
• Labs:
  • MERS CoV Nasal Pharyngeal Swab
  • CBC
  • CMP
  • Lactic Acid
  • ABG’s
Scenario 2: Discussion

Identify the hazard(s) for each topic and discuss the controls to reduce the risks to staff

Discussion

Hierarchy of Controls

- Least effective
- Most effective

1. Nasopharyngeal Swab
2. Chest X-Ray

- Physically remove the hazard
- Replace the hazard
- Isolate people from the hazard
- Change the way people work
- Protect the worker with Personal Protective Equipment

Controls:

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- PPE
Hierarchy of Controls: Nasopharyngeal Swab

**Situation**
Perform a Nasopharyngeal Swab on a patient suspected with a special pathogen disease

**Identify the hazard**
Potential exposure to infected respiratory secretions and other bodily fluids/saliva, emesis
Potential glove breach when breaking swab in vial

**Elimination**
Reduce amount of staff in room

**Substitution**
Cross train staff

**Engineering controls**
Position self out of direct line of spray and use Barriers i.e. face shield or PAPR
Use technique for breaking swab to prevent breaching glove

**Administrative controls**
Develop protocols and conduct training

**PPE**
CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Scenario 2: Nasopharyngeal Swab

Nasopharyngeal Swab Essentials

- Swab must be made from synthetic fiber (not natural)
- Shaft must be made from plastic (not wood)
- Insert swab to about half the distance from the nostril to the ear
- Rotate swab several times
- Hold gauze pad as a barrier when snapping the breakpoint on the shaft to prevent breaching glove
Hierarchy of Controls: Chest X-Ray

<table>
<thead>
<tr>
<th>Situation</th>
<th>Perform a CXR on a patient suspected with a special pathogen disease</th>
</tr>
</thead>
</table>
| Identify the hazard | Potential Contamination of machine  
| | Exposure of additional staff to patient and to radiation from the machine |

- **Elimination**: Use a different method if appropriate i.e. ultrasound
- **Substitution**: Replace the x-ray machine with ultrasound machine
- **Engineering controls**: Take steps to isolate the machine from the hazard (wrapping machine in plastic)  
  Use lead sheets and/or distance to protect staff from the radiation
- **Administrative controls**: Follow hospital and regulatory rules such as having a radiology technologist perform the x-ray as it is required by law
- **PPE**: CDC guidance: N95 or PAPR, gown, gloves, eye protection depending on task and disease.
Scenario 2: Example

Barriers to Protect Equipment
Scenario 2: update

Relevant lab results  
- **MERS = Positive for Middle East Respiratory Virus**

X-Ray results  
- Chest x-ray shows **bilateral patchy opacities** with moderate R sided pleural effusion

Now that Bill is confirmed positive for MERS-CoV he has been transferred to the biocontainment unit, per institutional policy

Physical assessment  
- Bill is becoming increasingly anxious  
- His work of breathing has increased and he is now receiving 100% O2 using a non-rebreather mask

Vital signs  
- BP 105/60, HR 125 bpm, **SATS 88%**, RR 30/min, Temp 39.2°C
### Scenario 2: Respiratory Choices

<table>
<thead>
<tr>
<th>Show of Hands</th>
<th>What would you anticipate the next order to be?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Get the patient out of bed and into a chair since he can’t lay down anyway</td>
</tr>
<tr>
<td>B.</td>
<td>Start patient on BiPAP</td>
</tr>
<tr>
<td>C.</td>
<td>Start high-flow nasal cannula (ie Airvo) and monitor the patient</td>
</tr>
<tr>
<td>D.</td>
<td>Intubate the patient</td>
</tr>
<tr>
<td>E.</td>
<td>Continue to monitor while on the non-breather mask</td>
</tr>
</tbody>
</table>
Scenario 2: Respiratory Therapy Choices

Heated High Flow Nasal Cannula (Optiflow and Comfort flow)

- Comfort flow
- Optiflow
Scenario 2: Respiratory Therapy Choices

Possible spots where the MERS virus can escape

The red arrows point to the common areas of leakage.

Note:
Where the circuit connects to the mask, it is made with a leak port, designed for proper function. Ie, no way to eliminate leaks with NIV.
Scenario 2: Respiratory Therapy Choices

Intubation Options (DL vs VL, RSI or not)

Direct Laryngoscope

Direct Laryngoscope

Video Laryngoscope
Scenario 2: Respiratory Therapy Choices

Manual ventilation with HEPA filtration

Risk of patient’s exhaled airway secretions being aerosolized to the room can be reduced with the use of a HEPA filter placed between the mask or ETT and the resuscitation bag.
Scenario 2: Respiratory Therapy Choices

HEPA filters can reduce or eliminate contamination

HEPA filter on Inspiratory outlet can prevent contamination due to inadvertent backflow to the machine.

HEPA filter on Expiratory inlet can reduce contamination of expiratory valves and transducers, along with reducing chance of patient’s secretions being aerosolized to the room.
Scenario 2: Respiratory Therapy Choices

Confirmation of ETT Placement
Congratulations

Your patient has made a full recovery and has been discharged to home
You are a provider in the emergency department of an **assessment hospital**

Today, John, a 35 year old male who returned home 3 days ago from the Democratic Republic of the Congo presented at your ER with complaints of fever, abdominal pain, nausea and mild diarrhea

Because your hospital teams have trained with The National Ebola Training and Education Center, John was immediately identified as a Person Under Investigation for Ebola based on his clinical symptoms and epidemiological risk factors (travel and symptoms)

The ER initiated their PUI standard operating procedures (SOP) and the patient was placed in isolation following their SOP. All the appropriate people have been informed within your facility, your local and state public health departments, and resources have been made available such as the state public health lab for laboratory testing
### Scenario 3: Current Situation

John’s first test for Ebola has been sent to the state public health lab. As he awaits the results of this first test, his abdominal pain worsens.

#### Physical assessment:
- **Neuro:** Alert and Oriented x 3
- **Pulm:** Clear to auscultation
- **CV:** Sinus tachycardia
- **GI:** *Worsening LLQ abdominal pain (8/10)*, mild diarrhea, NGT placed for persistent nausea with return of 500cc of non-bloody gastric contents

#### Vital signs:
- **BP 92/54, HR 138 bpm,** SATS 96%, RR 25/min, Temp 38.6°C.

#### Current Treatments:
- 2L O2 via nasal cannula, NS at 100cc/hr, 350mg PO Tylenol for fever and 4mg IV morphine for pain
- Other orders include KUB, CBC, CMP and lactic acid
Scenario 3: 7 hours later

Relevant lab results
- John’s first test for Ebola is negative

Physical assessment:
- His KUB was performed by the nurse and a radiology technician. It shows significant amounts of free air under the diaphragm

Relevant lab results
- John’s Labs are notable for:
  - WBC = 25
  - Lactic acid = 6
  - Cr = 1.8 (baseline Cr = .9)

Prescribed Treatment:
- General Surgery has been consulted and they suspect a perforated bowel
  - John needs emergent surgery
Scenario 3: KUB Image

KUB showing free air

Patient needs to go to the OR!
Scenario 3: Surgical Intervention

Considerations for Transport to the OR
## Scenario 3: Considerations

### Pre-procedure OR Considerations

- Is it possible to change the airflow to negative pressure?
- Have dedicated route to OR that minimizes exposure to other patients
- Plan for pre-op and recovery in the OR
- Use disposable equipment whenever possible
- Plan how to perform sterilization of non-disposable equipment
- Remove all unneeded items, devices, machines
- Cover OR table and required equipment with plastic
- Remove all waste before the patient enters the room
- Ensure the entire OR team is present and donned in PPE before the patient enters the room
Scenario 3: Considerations

Preparing the Operating Room
Scenario 3: Considerations

Use minimal instrumentation
Use instruments to retract tissue
Use instruments to pickup and load/un-load needles and scalpels
Incise patient using cautery vs. scalpel
If using a scalpel use round-tipped rather than sharp pointed
Avoid hand to hand passage of sharps, consider neutral zone passing
Use surgical methods that will reduce the amount of blood loss
### Scenario 3: PPE in the OR

**PAPRs and N95 respirators in the OR**

<table>
<thead>
<tr>
<th>PAPR</th>
<th>N95 Respirator</th>
</tr>
</thead>
<tbody>
<tr>
<td>![PAPR Image]</td>
<td>![N95 Respirator Image]</td>
</tr>
</tbody>
</table>

**VERSUS**

What would be your next step?
Scenario 3: PPE in the OR Cont…

Other PPE concerns

- Gowns
- Gloves
- Foot covers
- Eye Protection
- Double PPE
### Scenario 3: Considerations

#### Post-procedure OR Considerations

- Use back table to soak instrument sets in sterile water
- Remove gross contamination, below the water line – using extreme caution
- Place reusable sharp instruments in a closed container, disposable sharps should be placed in a sharps container for disposal
- Contain all contaminated items including trash, linens, plastic coverings, and place in waste bags
- Transport waste items to the designated area following transport protocol.
Congratulations

Your patient did not have Ebola. After he recovered from his bowel surgery he made a full recovery and has been discharged to home.
The Hierarchy of Controls can be used to perform a risk assessment for any procedure you might perform in a biocontainment unit.
Questions ?