Location, Location, Location: Managing Outbreaks in Ambulatory Care Settings

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Learning Objectives

- Recognize the vital role that each team member plays in response to a public health emergency
- Identify unique challenges to infection control in each setting
- Formulate effective strategies to protect healthcare providers and staff
Goals

- Describe methods for early identification of potential outbreak scenarios in the ambulatory care setting
- Identify steps for initial management of the contaminated patient, including isolation and notification procedures
- Outline key education and prevention strategies for managing outbreaks in the ambulatory setting

Early Identification

- When will this patient be identified?
  - Travel screening
  - Waiting room signage
  - Animal exposure and travel questioning – should be routine

Photos courtesy of Jan Carey.
Early Identification

- Have a plan in place
- Supply education/resources for staff
  - Resource location—simple and easy to find
- Drill/exercise plans to ensure readiness
  - How long before identification/isolation?
  - What is the risk to others in the waiting area?

- Plan for the most likely scenarios
- Use patient-facing as well as staff-facing signage
  - Encourage patients to self-mask
- Is the patient with any family members?
  - Are they symptomatic?

Photo courtesy of Danielle Suminski.
Isolation

- Designate a single-patient room with a toilet/sink
  - Negative pressure room = best choice
  - Communicate and label the isolation room (eg, “I” sticker)
- Use minimal equipment
- Develop a quick, efficient transfer process
- Document staff in contact with the patient
- Minimize contact as much as possible


Outpatient PPE

- Worn only if close contact with the patient is absolutely necessary before trained personnel arrive
Identifying an Isolation Room

- Single-patient room
- Private bathroom or covered commode
- Close to entry/exit
- Preferably with a window for staff
- Standard, contact, and droplet precautions
- Red bag trash—Category A
  - Special handling

Outpatient Setting Limitations

- PPE stock
  - What is available?
- No negative pressure rooms
- Management of body fluids
  - Bedside commode versus toilet
  - Treated versus untreated
- Proper disinfectants

Photos courtesy of Danielle Suminski.
**Notification Process**

1. Outpatient trigger (travel screen at check-in)
2. Outpatient manager notified by PSR
   - 2. Infection control
   - 3. Nursing supervisor

1. Notify local health departments

1. Notify SDCU physician on call
2. Notify local health departments
3. Notify 4-East Stepdown charge RN to move patients out of rooms CP4-203 & 205
4. Nursing supervisor notifies 2 SDCU RNs & 1 MD on call
   - Contact info located on Ebola Sharepoint—“Training Tracker” (60 mins to arrive at MHMC)

**Outpatient triggers & travel screen at check-in**

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**Communication Flow Sheet**

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**Conference Call**

1. Nursing supervisor
2. ED nurse IC Team
3. Notify nursing supervisor that SDCU is set up

1. Notify SDCU RN Facilitator RN that SDCU is set up
2. Notify EVS supervisor STAT
   - Notification needed for patients moved from rooms CP4-203 & 205

**Life Flight**

1. Life Flight notifies FCO of arrival to destination
2. SDCU RN Facilitator RN updates outpatient nurse manager and operations manager on conference call details
3. Life Flight arrives at designated entrance & transfer of care occurs to SDCU RNs (2) with MHPD/EVS escort
4. SDCU RN Facilitator RN updates FCO on conference call details
5. SDCU RN Facilitator RN updates FCO on conference call details
6. FCO contacts SDCU RN Facilitator RN (2) with MHPD/EVS escort
7. SDCU RN Facilitator RN updates FCO on conference call details

Photo courtesy of Danielle Suminski.
Communication Flow Sheet

- SDCU physician
- Infection prevention
- Public health
- Nursing supervisor/senior leadership
- SDCU nursing
- Environmental services
- Transportation

Communication Flow Sheet

- Use a dedicated and secure conference line
- Ensure all parties are present
- Provide scenario background
- Discuss a plan
- Assign tasks/roles
- Arrange a follow-up call
Challenges

- Training space and time
- Creating staff buy-in long term
- Cleaning
- Transportation

Education

- Use education opportunities to build rapport with staff
- Annual online learning
- Annual donning/doffing
- Resource/equipment location
- Tip sheets for EMAR changes
- Videos
Prevention

- Working relationship with public health
- Strong employee health collaboration
- Solid exposure plan in place
- Employee vaccination/immunization
- Regular training/competency

Additional Resources

- Guidance on Personal Protective Equipment (PPE) To Be Used By Healthcare Workers during Management of Patients with Confirmed Ebola or Persons under Investigation (PUIs) for Ebola who are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE. Centers for Disease Control and Prevention. [www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html](http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html)
Location, Location, Location! 
EMS

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Learning Objectives

- Recognize the vital role that each team member plays in response to a public health emergency
- Identify unique challenges to infection control in each setting
- Formulate effective strategies to protect healthcare providers and staff
Overview

- Challenges associated with EMS management of patients with serious communicable disease
- Biosafety transport program preparation and execution
- Considerations for EMS, ED, and community preparedness

EMS and ED

Photo courtesy of Alex Isakov.
EVD: What Was So Special?

“EVD is a severe, often fatal illness, with a case fatality rate of up to 90%”*

“The worst outbreak in the four-decade history of tracking the disease”

“Ebola epidemic ravaging West Africa—an international health emergency”


Infection Control: What’s Wrong?

Similar to what is found in the hospital setting:

- EMS crews do not adhere to hand hygiene recommendations
- Adherence to standard infection control precautions and disinfection of equipment has been described as suboptimal
- Collections of environmental samples from ambulances have grown methicillin-resistant Staphylococcus aureus and other MDROs

Education: Serious Pathogens

- Route of transmission
- **Infection control**
- Immunization, prophylaxis
- Post-exposure prophylaxis
- Treatment
Competency-Based Training: Donning/Doffing PPE

Protecting Environmental Surfaces
Ambulance Disinfection Mission Recovery

- Driver compartment isolation and patient compartment barrier drapes
- Decontamination, disinfection of ambulance, PPE doffing, and waste removal
  ALL SUPERVISED
- Post-mission medical surveillance

Ideal Decontamination Location

- Space for vehicles and work area for wiping-down of equipment, collecting biomedical waste, and doffing PPE
- Protection from weather elements
- Secure from bystanders/media/photo ops
- Clear separation of clean and dirty areas
- Bathroom facilities—running water
Selection of PPE should then be based on:

- CDC-recommended standard and transmission-based guidelines
- Risk of exposure to bodily fluids
- Operating environment
- Competencies to use the PPE ensemble
Patient Destination

Photos courtesy of Alex Isakov.

Community Considerations

Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States

Identify, Isolate, Inform: Emergency Department Evaluation and Management of Patients with Possible Ebola Virus Disease
Important Themes

- Vigilance and good infection control practice
- Identify, isolate, and inform
- Education and training
- PPE should reflect patient condition and operating environment
- Maintenance of competencies
- Supervised PPE doffing and disinfection may guard against exposure
- Regionalization of care

Additional Resources

Location, Location, Location!
Emergency Department

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The ED Environment?
Characteristics of EDs

- **Accessible**: To public and EMS
- **Dynamic**: Fluctuating volume and activity over 24-hour period
- **Diverse (acuity)**: Both low- and high-severity patients in close proximity
- **Interconnected (provider)**: Interactions with many other hospital services
- **Crowded**: Unscheduled care and system constraints

Take-Home Points

- The ED is a dynamic environment that is focused on triage, evaluation, and stabilization
- “3-I” model = Identify, Isolate, Inform
- Decontamination and isolation: prevent or decrease transmission
- Triage: prioritization of incoming patients/identification of suspect cases
- Personnel safety and staging: scene resource management
3-I: Identify, Isolate, Inform

**Identify:**
- Exposure history
- Signs and symptoms

**Challenge:**
- Triage process

**Isolate:**
- Don PPE
- Isolate/cohort patient
- Decontamination as needed

**Challenge:**
- Transmission prevention
3-I: Identify, Isolate, Inform (cont.)

- **Inform:**
  - Notification of:
    - Hospital infection control
    - Public Health Dept.

- **Challenge:**
  - Communication
  - Response coordination

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**Triage**

- **Triage process**
  - Sorting
    - Emergency Severity Index
    - START/jumpSTART
    - SALT
  - Prioritization and cohorting to ED location
  - Initial identification of suspect cases
    - Exposure + symptom
    - Screening tools (EMR)
  - Re-triage from EMS
Triage (cont.)

- Challenges
  - Incorporating identification of suspect cases into process
  - Interoperability of triage schemes
  - Throughput bottleneck
  - Walk-in vs EMS triage
  - Shortage of isolation locations

Triage (cont.)

- Mitigation Strategies
  - Clear case definitions
  - PPE
  - Consistent triage process
  - Pre-arrival notification by EMS
  - Identify isolation areas for suspect cases
PPE and Decontamination

- Depends on suspect exposure
- “In most cases, decontamination will not be necessary”
- Must be integrated with screening and isolation procedures
- OSHA recommendations

Decontamination

Multiple triage/decon schema exist:
- HOT/RED/ “Dirty”
- WARM/YELLOW/ “Less Dirty”
- COLD/GREEN/BLUE “Clean”

CDC: www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html
California EMSA: Patient Decontamination Recommendations for Hospitals
www.emsa.ca.gov/Media/Default/PDF/emsa233.pdf
Photo: Clement Yeh
Decontamination (cont.)

- Challenges
  - Time to set up
  - Delay in care
  - Provider fatigue
  - PPE
  - Environmental impact

- Mitigation
  - Establish standard donning/doffing procedures
  - Frequent drills/exercises
  - Infection control involvement

Photo: Clement Yeh

California EMSA: Patient Decontamination Recommendations for Hospitals
www.emsa.ca.gov/Media/Default/PDF/emsa233.pdf

Safety and Staging

- Staging: gathering people and equipment before use
- ED is a high-traffic area
- Often overcrowded
- During a disaster, may be further overwhelmed with personnel
- Risks to patients and providers

Photo: Michelle Lin
Safety and Staging (cont.)

- **Challenges**
  - Routine risk of contact with potentially infectious bodily fluids
  - Multiple patient-provider contacts
  - Time constraints
  - Access to PPE
  - Training

- **Mitigation**
  - Infection-control procedures
    - PPE
    - Access control
    - Health screening for personnel
    - Mass prophylaxis/vaccination for staff
  - Locate staging area for personnel away from ED
  - Security ingress/egress control for area
Key Questions

- How does your ED identify and triage suspect cases?
- What is the decontamination and isolation procedure?
- How does your ED manage provider/staff resources?
- How do you minimize risk to ED providers?

Additional Resources

Location, Location, Location!
Inpatient Care: ICU/Med-Surg

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Medical Director of Critical Care Bellevue Hospital

You Have Identified a PUI—Now What?

- Where will ongoing clinical care be provided?
- Who will provide clinical care?
- How will we keep patients and staff safe?
Where Will Clinical Care Be Provided?

- Biocontainment unit?
- Emergency department?
- Intensive care unit?
- Med/Surg unit?

Where? Factors to Consider

- Level of care
  - Critical care may be needed
- Continuity of operations
  - Minimize disruption to hospital functions
The Team

- Nurses
- Physicians
- Laboratory staff
- Environmental services
- Biosafety
- Infection prevention and control
- Emergency management
- Administration
Assembling a Clinical Team

- Voluntary or expected duty
- Small team or large team
- Clinical skill set needed
- Characteristics of team members

Volunteer Team or Expected Duty?

- Factors to consider:
  - Response time
  - Feasibility
  - With either model, the organizational commitment to staff safety is paramount
Small Team or Large Team?

Factors to consider:
- Response time
- Training needs
- Diversity of clinical skills
- Team cohesiveness
- Staffing needs are resource intensive

Clinical Skill Set

Factors to consider:
- Anticipated patient acuity
- Procedures
- Limit number of providers entering the room to the minimum necessary
- Telemedicine consultation
Team Member Characteristics

- Commitment to safety and training
- Work well together
- Able to make decisions based on available data
  - Laboratory testing
  - Radiologic imaging
  - Emphasis on POC testing/imaging

Patient and Staff Safety

- Patient screening—early identification
- PPE selection and training
- Psychosocial support
Psychosocial Support for Patients and Staff

- Effects of isolation
- PPE and provider-patient relationship
- Public and media attention
- Fear
- Stigma
Bellevue Employees Face Ebola at Work, and Stigma of It Everywhere

By ANDROMA HARTOCOLLIS and NATE SCHWEBER  OCT. 29, 2014

Staff Support

- Huddles/debriefing
- The basics: food, water, a place to rest
- Option of lodging
- Communication
  - Clear
  - Transparent and honest
- Mental health services
  - Individual and group

Team Building

- Patient safety culture (AHRQ)
  - Acknowledgment of risk and the determination to achieve consistently safe operations
  - Blame-free environment
    - Report errors or near misses without fear of reprimand or punishment
  - Encouragement of collaboration across ranks and disciplines
    - Seek solutions to patient-safety problems
  - Organizational commitment of resources to address safety concerns
- Open communication
- Acknowledge contributions

Additional Resources

- Preparation and Planning. Centers for Disease Control and Prevention. [https://emergency.cdc.gov/planning/](https://emergency.cdc.gov/planning/)
- National Ebola Training and Education Center (NETEC). [www.NETEC.org](http://www.NETEC.org)

Location, Location, Location!
Transporting Infectious Patients Within Your Facility

Patricia Lafaro RN, BS, CIC
Director, Infection Prevention Robert Wood Johnson University Hospital
Transport of Ebola Patient—The Extreme

- Takes a well thought-out plan
- What will the care team hand-off look like?
- How to get from the ED to the receiving unit
- Route with shortest distance
- Route with least amount of potential contact
- Coordination with security, environmental services, nursing, infection prevention, engineering, and emergency preparedness
- Need to run the route
- Prepare for the unexpected

PPE for Transport (cont.)
SARS and MERS

- Patients should not leave room unless absolutely necessary
- Diagnostic tests that will not change the course of treatment of the patient should not be performed if they require transporting the patient
- Risk-benefit of moving patient through facility
- Plan the route
- Plan how to handle the equipment
- Assess need for number of transporters
- What needs to travel with the patient?
- Take the route that has least amount of risk of traffic
- Only patient and the transporter should be in the elevator

Transporting Patients With SARS/MERS

- Staff should ready patient for transport
  - Patient to perform hand hygiene
  - Clean gown
  - Mask patient (surgical mask)
  - Staff to contact receiving department
  - Stretcher/wheelchair should be draped with clean linen
  - Transporter to perform hand hygiene and put on PPE (gown, gloves, N95) to enter room
  - Assist patient to stretcher or wheelchair
  - Wrap patient in clean linen (do not take anything from bed)
  - Wipe areas of stretcher/wheelchair with disinfectant wipe
Transporting Patients With SARS/MERS (cont.)

- Remove PPE and perform hand hygiene
- Transport patient by route with least amount of traffic and potential exposure
- Patient should be taken directly into testing area and avoid being in a waiting area
- Staff receiving patient should have appropriate PPE on to assist patient
- Transporter should perform hand hygiene and don PPE to remove linen and clean stretcher
- Remove PPE and perform hand hygiene

Transporting Various Isolation Patients

Creating Negative Pressure Environment
Creating Negative Pressure Environment

Transporting Patients With CRE or C. auris

- Assess the need for tests; only those that will change the course of therapy should be performed
- Risk-benefit of moving patient
- Plan the route
- What equipment needs to go with the patient?
- Assess need for number of transporters
- Take the route that has the least amount of risk of traffic
- Only the patient and the transporter should be in the elevator
Transporting Patients With CRE or C. auris (cont.)

- Staff should ready patient for transport
  - Patient to perform hand hygiene
  - Clean gown
  - Any open wounds should be covered with a bandage
- Staff to contact receiving department
- Stretcher/wheelchair should be draped with clean linen
- Transporter to perform hand hygiene and put on PPE (gown, gloves) to enter room
- Assist patient to stretcher or wheelchair
- Wrap patient in clean linen (do not take anything from bed)
- Wipe areas of stretcher/wheelchair with disinfectant wipe
- If vent or other equipment is traveling, it needs to be disinfected

Transporting Patients With CRE or C. auris (cont.)

- Remove PPE and perform hand hygiene
- Transport patient by the route with the least amount of traffic and potential exposure
- Patient should be taken directly into testing area and should avoid being in a waiting area
- Staff receiving patient should have appropriate PPE on to assist patient
- Transporter should perform hand hygiene and don PPE to remove linen and clean stretcher
- Remove PPE and perform hand hygiene
Sequence for PUTTING ON PPE

- The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet, or airborne infection isolation precautions; the procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. **GOWN**
   - Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
   - Fasten in back of neck and waist

2. **MASK OR RESPIRATOR**
   - Secure ties or elastic bands at middle of head and neck
   - Fit flexible band to nose bridge
   - Fit snug to face and below chin
   - Re-check respirator

3. **GOGGLES OR FACE SHIELD**
   - Place over face and eyes and adjust to fit

4. **GLOVES**
   - Extend to cover wrist of isolation gown

Sequence for REMOVING PPE

- Except for respirator, remove PPE at doorway or in anteroom; remove respirator after leaving patient room and closing door.

1. **GLOVES**
   - Grasp the glove on contaminated hand
   - Grasp a glove with opposite glove hand
   - Pull
   - Hold removed glove in gloved hand
   - Slip fingers of ungloved hand under remaining glove at fingers
   - Pull glove off over first glove
   - Discard gloves in waste container

2. **GOGGLES OR FACE SHIELD**
   - Grasp at epiglottis of face shield or the rim of a respirator
   - To remove, twist by head band or ear loops
   - Place in designated receptacle for reprocessing or in waste container

3. **GOWN**
   - Gown front and sleeves are uncontaminated
   - Decontaminate
   - Pull away from neck and shoulders, tucking inside of gown only
   - Turn gown inside out
   - Fold or roll into a bundle and discard

4. **MASK OR RESPIRATOR**
   - Mask or respirator is contaminated
   - Do not touch
   - Remove by head band or ear loops
   - Discard in waste container

Perform hand hygiene between steps if hands become contaminated, and immediately after removing all PPE.
How to Safely REMOVE PPE—Example 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials: remove all PPE before exiting the patient room except a respirator, if worn; remove the respirator after leaving the patient room and closing the door; remove PPE in the following sequence:

1. GOWN AND GLOVES
   - Gown and gloves and the outside of gloves are contaminated.
   - If you touch the inside of your gown or gloves, immediately wash your hands or use an alcohol-based hand sanitizer.
   - If you touch your face, mouth, or nose between steps check your hands and fantasize. Hands should be washed or an alcohol-based hand sanitizer should be used.
   - With hands relaxed and out, lift gown behind you and pull away from your body as if for a tail, discarding outside of gown only with gown.
   - While removing the gown, fold or roll the gown inside-out into a bundle.
   - As you are removing the gown, pull off your gloves. All of your outer hands, under hands, forearms, and wrists should be cleaned with soap and water or an alcohol-based hand sanitizer.

2. GOGGLES OR FACE SHIELD
   - After cleaning goggles, if wearing a face shield, immediately wash your hands or use an alcohol-based hand sanitizer.
   - Remove goggle as last item from the torso by lifting headband and without touching the face of the goggle or face shield.
   - If the nose, mouth, or eye is contaminated, use an alcohol-based hand sanitizer.

3. MASK OR RESPIRATOR
   - Face or mask/respirator is contaminated — DO NOT TOUCH!
   - Before removing mask/respirator, wash your hands or use an alcohol-based hand sanitizer.
   - Grasp below brace or straps of the mask/respirator, then the nose of the mask/respirator, and remove both.
   - Remove mask/respirator by placing in a protective mask container.

4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE

Perform hand hygiene between steps if hands become contaminated and immediately after removing all PPE

*An infectious waste container is used to dispose of PPE that is potentially contaminated with Ebola virus.

Key Points

- Look at your facility and plan ahead
- Educate staff to proper PPE donning and doffing
- Consider all the moving parts
- Remember we are a 24-hr operation
- Always disinfect your hands
Perhaps this will be next??

UBER Transport

Always Perform Hand Hygiene
References

- [www.cdc.gov/sars/guidance/i-infection/healthcare.html](http://www.cdc.gov/sars/guidance/i-infection/healthcare.html)
- [www.cdc.gov/hicpac/mdro/mdro_4.html](http://www.cdc.gov/hicpac/mdro/mdro_4.html)
- [www.cdc.gov/hai/organisms/cre/](http://www.cdc.gov/hai/organisms/cre/)
- [www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf](http://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf)

Additional Resources

- Guidance on Personal Protective Equipment (PPE) To Be Used By Healthcare Workers during Management of Patients with Confirmed Ebola or Persons under Investigation (PUIs) for Ebola who are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE. [www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html](http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html)
Location, Location, Location! Labor and Delivery

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The Caveats of Labor and Delivery

- At least 2 patients
- Several components
  - Triage
  - Labor and delivery room
  - Operating room
  - Postpartum care
  - Nursery care: NBN, NICU
The Caveats of Labor and Delivery (cont.)

- Blood and body fluid exposure
  - Mean blood loss of a vaginal delivery is 500 cc and of a Cesarean delivery is 1,000 cc
  - Amniotic fluid
- Multiple people exposed throughout the process

The Labor and Delivery Team

- Triage RNs
- Nurse practitioners and midwives
- Labor and delivery RNs
- Medical staff
- Obstetricians, residents, fellows, and medical students
- Lab personnel
- Pediatricians and the NICU team
- Environmental services
- Surgical team
- Postpartum ward
  - RNs
  - Lactation consultants
  - Social work
  - Pediatric services
The Caveats of the Obstetric Patient

- Pregnant women have increased morbidity and mortality with certain infectious agents
- Anatomic and physiologic changes in pregnancy
  - Impacts absorption, distribution, metabolism, and excretion of certain medications
  - Trauma and increasing resource needs
- Physical and emotional stress worsens obstetric outcomes

Recent Experiences

- Pandemic influenza
- SARS and MERS
- Ebola
- Zika virus
- Hurricane Katrina
- 9/11/2001
- MDR-TB
Recent Legislation Regarding Emergency Preparedness and Pregnancy

- Pandemic and All-Hazards Preparedness Reauthorization Act of 2013
  - Pregnant women are classified as a population with special clinical needs
- Special Medical Needs: Definitions and Related Terms
  - DHHS document

Hospital Disaster Preparedness for Obstetricians and Facilities Providing Maternity Care

- Standing Emergency Preparedness Team at the state and local level with an obstetrician/gynecologist, a pediatrician, and maternity nursing leadership on the team
  - Dallas Ebola response
  - Zika preparedness
Hospital Disaster Preparedness for Obstetricians and Facilities Providing Maternity Care

- Regionalization of maternity care
  - Levels of care
    - Stabilization and transfer to a central facility if possible
  - Surge capacity protocols
    - Obstetric and neonatal needs
    - Resource allocation for mother and neonate
      - Increase in preterm neonates

Labor and Delivery Considerations

- Family involvement
  - Visitation restrictions
- Lactation and early parental bonding
- Critical care team relationship
  - ICU care and the pregnant woman
- Dealing with the organized chaos of labor and delivery
- Extra space and providers
Thinking Outside the Box

- Changes in “Standard of Care”
  - Early discharge
  - Portable triage and labor and delivery units
  - Telemedicine
  - Telephone triage
  - Home birth kits
- The use of simulation
  - Johns Hopkins Biocontainment Unit
- Social media

Ethical Considerations

- Allocation of resources when demand exceeds supply
  - Where in the allocation list should a pregnant woman be?
    - Does “pregnancy” move her up?
- The practical versus the subjective
  - “Save my baby at all costs”
    - Mom versus baby
Protection of Healthcare Providers

Morbidity and Mortality Weekly Report (MMWR)

Preventing Transmission of Zika Virus in Labor and Delivery Settings Through Implementation of Standard Precautions — United States, 2016

Guidance for Screening and Caring for Pregnant Women with Ebola Virus Disease for Healthcare Providers in U.S. Hospitals

OSHA
Occupational Safety and Health Administration

Pandemic Influenza Preparedness and Response Guidance for Healthcare Workers and Healthcare Employers

National Emergency Preparedness Guidance

Reproductive Health Emergency Preparedness Training Course  www.cdc.gov

- An online course for federal, state, and local public health and other health professionals that highlights preparedness and response resources and tools specific to the field of reproductive health in emergencies

Birth and emergency preparedness in antenatal care

World Health Organization

Obstetrics and Gynecology

Emergency Preparedness in Obstetrics

Shea Harri, MPH, and David Mandell, MD, MPH.
Conclusions

- There are many components (both physical plant and personnel) that need to be involved in planning and carrying out an emergency response on Labor and Delivery.
- The rights of the patient, her unborn child/neonate, and her family need to be weighed against the required response.
- Education and preparedness are vital for a safe and effective response.

Additional Resources

Location, Location, Location!
Pediatrics

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Children in Emergencies

- Children make up 23% of the US population
- In 2012, 15.7% of hospital stays were for patients 0-17 years of age
- Pediatric hospitals account for 5% of US hospitals
  - Varied geographic distribution
- Easy to overwhelm capacity quickly with an influx of children during an emergency

Hinton CF, et al. MMWR Infectious Disease Rep 2015;64:072-4
Unique Needs and Challenges

- Parents or guardians
- Other family members (eg, siblings)
- Family-centered care
- Specialized equipment and med dosing
- Developmental challenges
  - Hand hygiene and cough etiquette
  - Isolation, containment, restraint
- Fear and anxiety

Pediatric Aspects of Hospital Preparedness

- Pediatric-specific HICS roles
- Pediatric-specific disaster surge formulary
- Pediatric principles of surge capacity
- Pediatric decontamination strategies
- Pediatric aspects of sheltering in place and evacuation
### Pediatric-Specific HICS Roles

<table>
<thead>
<tr>
<th>HICS Position</th>
<th>Rationale for Pediatric-Specific Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical technology specialist-pediatricians</td>
<td>Works within the incident command group to identify potential pediatric care–related concerns and strategies</td>
</tr>
<tr>
<td>Family care unit</td>
<td>Helps coordinate issues of reunification and psychosocial issues of family (not victims)</td>
</tr>
<tr>
<td>Supply unit</td>
<td>Concerned with obtaining and distributing pediatric-specific equipment</td>
</tr>
<tr>
<td>Inpatient unit</td>
<td>Responsible for overall inpatient pediatric care (includes pediatric intensive care unit level care)</td>
</tr>
<tr>
<td>Outpatient unit</td>
<td>Responsible for overall outpatient pediatric care</td>
</tr>
<tr>
<td>Casualty care unit</td>
<td>Responsible for overall emergency department pediatric care</td>
</tr>
<tr>
<td>Mental health unit</td>
<td>Responsible for pediatric victim psychosocial and behavioral response</td>
</tr>
<tr>
<td>Food service unit</td>
<td>Responsible for nutritional needs of children</td>
</tr>
<tr>
<td>Victim decontamination unit</td>
<td>Responsible for providing age-appropriate communication and assistance while pediatric patients are undergoing decontamination</td>
</tr>
<tr>
<td>Access control unit</td>
<td>Responsible for security of pediatric patients (injured and well) and enforcing disaster credentialing identification/reunification policies as they relate to access control</td>
</tr>
</tbody>
</table>

---

### Family-Centered Care and Infections

**The impact of SARS and its relevance to family-centered care**

- **Infectious agent**: SARS
- **Impact on patient, parent, and healthcare provider**:
  - Emotional upheaval
  - Communication challenges
  - Role changes
- **Impact on family-centered care**:
  - Difficulty coping
  - Loss of control (ie, decision making and information sharing)
  - Loss of parenting role

---


I almost cried to a point because it is so sad and you would see them as you walked by the door. You know, walk by the hallway and you could hear them. We have monitors down our hallways because of the isolation and everything is closed and you could hear, hear them crying. That was... the worst.

- Healthcare provider

We went in looking like aliens to them and sure, they didn’t recognize us and there’s a lot of times when you try to smile from behind the mask and you realize they can’t see your smile. ‘Cause you’re used to that ‘cause it’s a comfort for children. That was one of the hardest things in terms of communication.

- Healthcare provider

But being separated from them, you know, you almost felt like you lost them. You feel hopeless...It’s a hard feeling to be pulled away from them when you realize that you’re not seeing them in a few days. And it’s not your choice.

- Parent

The Challenge

“It was clear that there was not a single approach that was uniformly viewed as creating the greatest safety for healthcare providers, while also fully taking into consideration the ongoing social and emotional needs of the child and his or her parents or legal guardians.”

Caregiver Presence During Inpatient Care: Things to Consider

- Child’s developmental level, acuity, ability to follow directions and cooperate
- Available hospital resources
  - PPE and training for caregiver
  - Staffing to observe caregiver
  - Videoconferencing and other technology
- Caregiver health status (e.g., pregnancy)
- Impact for other children in family
- Risk to healthcare providers and other patients
## Options for Implementation

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2*</th>
<th>Option 3*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver remains in separate room</td>
<td>Caregiver remains at bedside</td>
<td>Caregiver primarily in separate room but joins child at bedside intermittently</td>
</tr>
<tr>
<td>Videoconferencing to interact with child</td>
<td>Requires proficiency in PPE</td>
<td>Requires staffing for observation of donning/doffing</td>
</tr>
<tr>
<td></td>
<td>Requires staffing for observation of donning/doffing</td>
<td>Requires safe method of movement within facility</td>
</tr>
</tbody>
</table>

*See next slide for caveats to options 2 and 3


## Caveats if Caregiver Is Present

- Only one caregiver should be designated for bedside presence
- **Informed consent about potential risks must be obtained and documented**
  - Must agree to comply with public health guidance for monitoring and movement of exposed individuals
- **Must agree to comply with hospital personnel at all times (including leaving bedside)**
  - Visits should be scheduled and controlled
    - Screening for symptoms on arrival
    - Daily instruction on PPE and hand hygiene
- **Must be trained in PPE donning and doffing and observed/assisted during process**
  - Must wear PPE before entering room and during all contact with child
  - Should limit exposure to blood and body fluid at the bedside
  - Must agree to follow all infection-control protocols
- **Movement within facility should be restricted**
  - Must agree to any additional guidelines from hospital or public health
  - Must agree to strict confidentiality (no press, social media, etc.)
- **If caregiver develops symptoms, must be prepared to provide care or transfer**

What Would Really Happen?

Hallway

I'm sorry, but you'll have to leave now

Ebola treatment room

Never! I won't leave my child!!

Mom!! Don't leave me! Please!

Parent

Patient

Parental Presence at the Bedside of a Child With Suspected Ebola: An Expert Discussion

Issues to Consider

Potential PRO:
- Parent may provide psychosocial comfort and reassurance to child
- May enable more effective nursing care
- Forcible separation may cause high level of stress for family and child
- In absence of caregiver, care may be perceived differently by family
- Presence may lower risk of legal liability for staff and facility
- Allowing presence demonstrates that facility values involvement in child’s care
- If caregiver agrees to procedures and accepts risk, is denying access morally acceptable?

Potential CON:
- Close contact may increase the risk of Ebola to caregiver
- Potential increased risk for healthcare personnel, family, and community
- Caregiver presence may interfere with the care of the patient in an emergency
- Caregiver time away from family may add stress to family unit
- Potential emotional response from child upon caregiver departure after wearing PPE for multiple hours
- Could create hysteria among other patients and families
- Who assumes responsibility for the risk if the caregiver becomes infected in the facility?

Practical Considerations

- PPE is complex and requires repeated trainings to develop competency
- Assisting inexperienced person with doffing increases the risk for HCWs
- Cannot wear enhanced PPE 24 hours/day for multiple days
  - Showering, bathroom use problematic
- Distractions for HCWs increases risk
- Extra people are a safety concern given limited size of treatment area
- Potential for contamination of clean zones in facility
- How can effective PPE education and instruction be ensured for families requiring interpreter services?
- Should PPE be allocated to family members when supply is limited?
Family-Centered Care and High-Consequence Pathogens: Thinking Outside the Room

“Temporary physical separation of the infected child from parents is the most effective option for safe care delivery.”


Practical Tips: Managing Children in Isolation

- Involve the patient in discussions
- Explain reasons for your chosen approach
- Provide information to parents
  - Dedicated family liaison role
- Use communication technology
  - Phone
  - Secure video and audio conferencing
- Work collaboratively
  - Child life, social work, ethics team, chaplains

Helping Children Deal With Disasters

<table>
<thead>
<tr>
<th>Listen to them</th>
<th>Try to make them feel safe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask them what they know or have heard</td>
<td>Let them know that many people are working hard to take care of hurt people and keep us safe</td>
</tr>
<tr>
<td>Ask them how they’re feeling</td>
<td>Try to keep to their regular routines</td>
</tr>
<tr>
<td>Let them know you understand their feelings</td>
<td></td>
</tr>
<tr>
<td>Don’t laugh at their fears, even if they seem silly</td>
<td></td>
</tr>
<tr>
<td>Let them ask questions; answer briefly and honestly</td>
<td></td>
</tr>
<tr>
<td>It’s OK to answer “I don’t know”</td>
<td></td>
</tr>
</tbody>
</table>


Additional Resources

- **Middle East Respiratory Syndrome (MERS): Resources for Preparedness.** Centers for Disease Control and Prevention.  
  [www.cdc.gov/coronavirus/mers/preparedness/resources-preparedness.html](http://www.cdc.gov/coronavirus/mers/preparedness/resources-preparedness.html)

  [www.ncbi.nlm.nih.gov/pmc/articles/PMC2190272/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2190272/)
Location, Location, Location!
Environmental Services

Kalpana Rengarajan, PhD, MPH, JM, RBP
Director Research Safety / Biosafety Officer
Environmental Health and Safety Office
Office of Research Administration
Emory University

Specific Protocols for Solid Waste Management

- Anteroom
- Patient room
- End of shift
- Spill clean up
- Moving waste from patient room to autoclave
Solid Waste Management

**In patient room:**
- Solid waste is collected in red biohazardous waste bag; the bag should not be more than HALF FULL
- 200 mL to 300 mL of water inside the bag; tie the bag closed
- Bag is wiped down with bleach wipes and disposed in waste bag
- Bag is placed in another red biohazardous waste bag; tie the bag closed
- Second bag is wiped down with bleach wipes
- Bag is transferred into the anteroom

Solid Waste Management (cont.)

**In the anteroom:**
- Bags of solid waste coming out of the patient room are immediately placed into an autoclave bag and secured
- Bag is wiped down with bleach wipes
- Bag is then placed in roller drum located directly outside of the anteroom
- Roller drum is then moved to staging area or the autoclave room as appropriate
- A new empty roller drum is then placed outside the anteroom
- Roller drums are wiped down once bags are removed for autoclaving
Solid Waste Management (cont.)

**Autoclave:**
- Bags are placed in the autoclave
- A 3M ATTEST test pack is used with every run
- Autoclave is run on the GRAVITY setting (1 hour)

Solid Waste Management (cont.)

**Unloading the Autoclave:**
- Once autoclave cycle is complete and has cooled, waste bags are removed and placed in a lined Regulated Medical Waste box
- 3M test pack is analyzed.
- All runs are validated and documented
Solid Waste Management (cont.)

- The boxes picked up weekly or as needed by a dedicated truck and transported as regulated medical waste for incineration

Autoclave Validation

- Stericycle manifest (yellow sheet) signed by driver/pick-up contact
- Printout of bar code details affixed to boxes that were picked up
- Stericycle “Generator Certificate of Pre-Treatment” signed by both parties
- Emory autoclave tracking document signed by both parties
- Copies of autoclave load printouts
- “Certificate of Destruction” from Stericycle
Solid Waste Management

Documentation is key!

Liquid Waste Management

- All liquid waste materials are pre-treated before disposal
  - Commode was pretreated with MicroChem (for final concentration of 5%)
  - If patient is nonambulatory, bedside/autoclavable commode pretreated with MicroChem was used; solidifier was then added before disposal by solid waste disposal waste stream
  - If patient used a bag for vomitus, solidifier added to bag and then disposed by solid waste disposal process
Facility Decon

**Patient Room Example:**
- Personnel don with complete PPE
- Patient belongings to be gathered and placed on the bed
- All surfaces, drawers, bathrooms to be wiped with microchem
- Equipment to be wiped according to manufacturer’s instruction
- Waste is double bagged, wiped, and handed over to anteroom personnel
- Anteroom personnel place the waste in autoclave bag, tie, and place in the waste drum in hallway
- Room is then ready for VHP decontamination

CDC Guidance for Safe Handling of Human Remains of Ebola Patients in US Hospitals and Mortuaries

**According to CDC Guidelines:**
- The body should be wrapped in a plastic shroud and placed in a leak-proof bag, then placed in another leak-proof bag
- Care for potential contamination and disinfection at every point along the way
- The CDC does not recommend embalming or washing the body
- Remains should not be removed from the bags
- Remains should be cremated or buried promptly in a hermetically sealed casket
- See CDC Web site for detailed guidance

[Website Link](https://www.cdc.gov/vhf/ebola/hcp/guidance-safe-handling-human-remains-ebola-patients-us-hospitals-mortuaries.html)
Be Prepared

Minimum supplies consist of the following:

1. 50 Stericycle boxes
2. 3 cases of red bags
3. 1 case of autoclave bags
4. 1 bag of autoclave bag rubber bands
5. 1 incubator
6. 1 case spore testing pack
7. 2 cart covers
8. 1 spill kit
9. 1 pair heat-resistant gloves
10. Policies and procedures
11. 2 binders (1) autoclave (1) waste packaging
12. 12 Rubbermaid® barrels with lids and casters

After patient has been discharged, clean supplies are shrink-wrapped and sent to our offsite distribution center
Waste Management

Take home messages...

- **There will be a lot more waste than you anticipate**
  - **Be proactive:** Start talking to all those involved
  - **Communications:** Discuss with local authorities and your biomedical waste vendors—build your partnerships now
  - **Be very systematic**
  - **Think sustainable:** Have a plan, a back-up plan, and a back-up to the back-up plan
  - Know the rules, regulations, and guidelines
  - If you have access to **Biorisk Management** professionals, involve them in the process
  - **Document everything**

Additional Resources

Location, Location, Location!
Labs / Pathology / Mortuary

Kalpana Rengarajan, PhD, MPH, JM, RBP
Director Research Safety / Biosafety Officer
Environmental Health and Safety Office
Office of Research Administration
Emory University

Laboratory
- Dedicated laboratory for PUIs and/or known positive patients is preferred
- Must protect testing staff from blood and body fluid exposures
- Must provide clinically relevant test results
PUIs

- Risk assessment to determine risks of lab testing
- Lab testing may be performed in main laboratory during evaluation
- Collection of samples by personnel trained in appropriate PPE
- Transport
- Monitor disposition of ALL specimens

Known Positive Patients

- A dedicated lab is preferred for known Positives
- Greater control of specimen disposition
  - Fewer opportunities for spills
  - Less anxiety among staff
  - Simpler waste management
Lab Staffing

- Point-of-care staff and select main lab staff work in this lab area
- Many of the instruments fall under the point-of-care section
- All staff should be trained and should maintain competency on all equipment in the lab
- Must meet regulatory requirements for scope of testing

Characteristics of Lab Staff

- Strict adherence to procedures
- Strict adherence to PPE
- Willingness to report incidents/near misses
- Adherence to occupational injury management monitoring requirements
- Willingness to be on-call separate from routine lab duties
Lab Layout Considerations

- Testing with open sample tubes performed in Class II safety cabinet
- Hematology analyzer does not require the opening of tubes, so not in safety cabinet
- Sample for PCR mixed with lysis reagent and closed pouch loaded in safety cabinet, then PCR performed outside of safety cabinet

Lab PPE

- Paper scrubs
- Coverall
- Regular gloves
- Extended-cuff gloves
- Booties
- PAPR hood
- Apron

Public Health Image Library Available at: https://phil.cdc.gov/phil/details.asp?pid=10758
Why Full PAPR in the Lab?

- Comfort!!!!
- Better vision
- It is what the staff trained to use
- Unknown pathogen

After Testing...

- Interior and exterior surfaces of safety cabinet, table, stool, etc. cleaned with germicidal wipes
- Floor cleaned with germicidal wipes
- Doff PPE
- Periodic decontamination of the lab (“HPV” or hydrogen peroxide vapor)
Specimen Transportation Considerations

- **Within healthcare facility**
  - Durable, leak-proof container
  - May use the same or similar containers as used for shipping
  - Do not use pneumatic tube system
  - Minimize the risk of breakage or spill

Specimen Transportation Considerations (cont.)

- **Between facilities**
  - On the roads or in other conveyances requires adherence to hazardous materials regulations of USDOT
  - Shipping containers designed to minimize risk of spill
Culture of Safety

- Shared accountability for safety
- Effective and assertive communication is central to the safety of the team
- Direct patient care communication
- Daily team huddles

Deceased Patient

- Understand key points in caring for a deceased patient
- Identify resources to support protocol development
- Identify equipment needed to manage the care of the body of the deceased patient
- Understand standards for transportation of human remains
- Understand mortuary care and the disposition of human remains
Teamwork

- Partner with your local and state public health department
- Know and understand your state regulations regarding human remains
- Infection can be transmitted in postmortem care settings
- Only personnel who are trained to handle infected human remains and wearing recommended PPE may touch or move any remains
- Do not wash or clean the body
- Do not embalm the body
- It is preferred that no autopsy be performed, but if an autopsy is necessary, consult your state health department and the CDC regarding necessary precautions
- Do not remove any inserted medical devices from the body (eg, IV lines, ET or other tubing, or implanted electronic medical devices)

Preparations

- Cremation is preferred, but if cremation is not an option because of safety concerns, the body should be buried in a standard metal casket or other comparable burial method
- Take a photo of the patient for identification purposes
- Visitation of patient remains can be facilitated through a video link
- Do not allow direct access to remains
- Make counseling services available to family
- Complete all necessary documentation before removing patient remains to comply with hospital and local/state health department regulations
- Have a preexisting MOU with a crematory and funeral director for cremation services after receipt of permission from family and the local health department
Preparations (cont.)

- Persons handling the remains should wear single-use (disposable) gloves with extended cuffs and a long-sleeved disposable gown.
- Minimize the transportation of remains that contain virus to the extent possible.
- Coordinate all transportation, including local transport for mortuary care or burial, with relevant local and state authorities in advance.
- Coordinate interstate transport with the CDC by calling the Emergency Operations Center at (770) 488-7100.
- Avoid transporting non-cremated remains via aircraft.
- Human remains transported for interment, cremation, or medical research at a college, hospital, or laboratory are excluded from the US Department of Transportation’s Hazardous Materials Regulations (49 CFR, Parts 171-180); see §173.134(b)(14).

In Conclusion

Treat your patient with respect and dignity.

Remember to care for your patient’s loved ones and your staff.
Location, Location, Location!
Differences & Similarities
STAC vs LTAC vs SNF

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Los Angeles, CA
Director
R.M. Alden Research Laboratory
Santa Monica, CA
Financial Disclosures

- Speakers Bureau: Bayer HealthCare Pharmaceuticals, Merck & Co., Inc.

CDC Core Elements of Antibiotic Stewardship are **the SAME** for STAC, LTAC, and ECF

- Leadership commitment
- Accountability
- Drug expertise
- Action—policy & practice change to improve antibiotic use
- Tracking of antibiotic use
- Reporting of outcomes
- Education

www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
The Joint Commission Standard on Antimicrobial Stewardship; (MM.09.01.01) **Went into effect Jan. 1, 2017**

- Requires antimicrobial stewardship to be an organizational priority
- Education required to all who order, dispense, administer, and monitor—this includes independent licensed practitioners
- Education needs to be ongoing and needs to include patients and families
- A multi-disciplinary antimicrobial stewardship team will be established and will meet regularly
- The hospital's ASP will implement and approve protocols and policies to drive anti-infective management
- The ASP will demonstrate action and will follow up about their activity (the AS committee will need to show action and results; not just meet)

New Antimicrobial Stewardship Standard: [https://www.jointcommission.org/assets/1/6/New_Antimicrobial_Stewardship_Standard.pdf/](https://www.jointcommission.org/assets/1/6/New_Antimicrobial_Stewardship_Standard.pdf/)

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**Antibiotic Stewardship Program Issues**

- Scope of the issue
- What is an LTAC vs SNF?
- How are strategies selected?
  - Community vs academic hospital
  - LTAC
  - SNF

- Organisms frequency
  - Acinetobacter, CRE, CDI, MRSA

- Variations in susceptibility

- Pharmacy antibiotics and infection prevention targets
- Cost savings
- Transition of care

Courtesy of Dr. Ellie Goldstein.
US vs. California Hospitals Data
(Non-Federal, Acute Care)

<table>
<thead>
<tr>
<th></th>
<th>CA</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Care Hospitals</td>
<td>345</td>
<td>3,975</td>
</tr>
<tr>
<td>Discharges Annually (Millions)</td>
<td>3.1</td>
<td>31.7</td>
</tr>
<tr>
<td>Beds</td>
<td>74,806</td>
<td>756,103</td>
</tr>
<tr>
<td>Patient Days</td>
<td>14,316,135</td>
<td>150,008,809</td>
</tr>
<tr>
<td>Gross Patient Revenue</td>
<td>$357,873,341</td>
<td>$2,966,834,751</td>
</tr>
</tbody>
</table>

California Laws

**Senate Bill 739  Effective Jan 1, 2008**
- Requires that **general acute care hospitals** develop a process for evaluating the **judicious use of antibiotics**, the results of which shall be monitored jointly by appropriate representatives and committees involved in quality improvement activities

**Senate Bill 1311  Effective July 1, 2015**
- Adopt and implement ASP in **accordance with guidelines** established by federal government and professional organizations
- Establish a **physician-supervised** multidisciplinary antimicrobial stewardship committee
- At least one physician or pharmacist who has undergone **specific training** related to stewardship
- Report ASP activities to appropriate hospital committees that are undertaking quality improvement activities

The California Antimicrobial Stewardship Program Initiative. [https://www.cdph.ca.gov/programs/dap/Pages/AntimicrobialStewardshipProgramInitiative.aspx](https://www.cdph.ca.gov/programs/dap/Pages/AntimicrobialStewardshipProgramInitiative.aspx)
### CDPH ASP Definition*—11 Elements

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Antimicrobial stewardship policy/procedure adopted</td>
<td>5. Annual antibiogram developed, distributed, and medical staff educated</td>
<td>9. Antimicrobial formulary reviewed annually and changed based on antibiogram</td>
</tr>
<tr>
<td>2. Physician-supervised multidisciplinary committee formed</td>
<td>6. Institutional guidelines for management of common infection syndromes developed</td>
<td>10. Prospective audits performed, with intervention/feedback to prescribers</td>
</tr>
<tr>
<td>3. Physician or pharmacist ASP leader received specific stewardship training</td>
<td>7. Antibiotic usage patterns monitored using DDD or DOT</td>
<td>11. Formulary restriction with preauthorization adopted</td>
</tr>
<tr>
<td>4. ASP activities reported to hospital quality improvement committees</td>
<td>8. Medical staff/committees provided with ongoing ASP education</td>
<td>*As Recommended by HAI Advisory Committee, Dec 2013</td>
</tr>
</tbody>
</table>

*As Recommended by HAI Advisory Committee, Dec 2013

---

### Observations From the ASP Collaborative

- What stewardship interventions/targets is your ASP currently implementing, or planning to implement in 2015?

![Bar chart showing ASP interventions/targets in 2015 and current status](chart.png)

*Responses from 81 hospitals

---

*Antimicrobial Stewardship Program Toolkit Examples for Program Implementation 2015.

*Responses from 81 hospitals

---

*Core Elements of Hospital Antibiotic Stewardship Programs

---

*Courtesy of Dr. Erin Epson, CDPH.
What Is an LTACH?

- Facility that provides diagnostic and medical treatment or rehabilitation to patients with chronic illness or complex medical conditions whose average length of stay exceeds 25 days.
- Specialty-care hospital designed for patients with serious medical problems that require intense, special treatment for an extended period of time—usually 20 to 30 days.
- Average length of stay of 25 to 30 days.
  - Three to 6 concurrent active diagnoses and an acute episode on top of several chronic illnesses and comorbidities that cannot be treated effectively at an alternative level of care.
  - Multiple acute complexities as determined by a physician assessment and subsequent documentation requiring daily physician intervention.


What Is the Scope of the Issue?

- 522 LTACHs in US
  - 108 (21%) Select Medical Group
  - 100 (19%) Kindred Healthcare Group
  - 35 (7%) Vibra Group
- 42% are free-standing facilities
- 17% (90) remote or satellite campuses
- 41% (214) are hospital-within-hospital
  - All Dubis and Noland are H-in-H
- 89% of LHCs; 70% of Selects; 20% of Kindreds

Courtesy Dr. Sean Muldoon, unpublished data.
LTAC Information

- 28,666 beds; 40%-84% occupancy
- Size: varies 15-100 beds
- 217,380 discharges
- Medicare 66%, Medicaid 6.8%, Other 27.2%
- 6,735,486 patient days
- Case Mix Index 1.107, so sicker than the average Medicare patient
- LOS 31→24 days Outliers


The LTACH Patient

- Most patients come from other hospitals where they are heavily pretreated with multiple antibiotics
- Have resistant bacterial infections

**Failed prior therapies**

- Multiple lines
- Renal insufficiency
- Decubitus ulcers
- Foley catheters
- Ventilator dependent
- Altered mental status
- PEGs
- Malnutrition

Courtesy of Dr. Ellie Goldstein.
Utilization Review: Stay Types

The Sweet Spot  No Pay

Very Short Stay  Short Stay  Normal low  Normal High  High Cost Outlier

Time

Normal stay is 5/6 to 6/6 GM-LOS to get full DRG payment

Utilization Review: Stay Types 2013

Very Short Stay  Short Stay  Normal low  Normal High  High Cost Outlier

11.7%/12.2%  10.3%/11.3%  41.3%/41.1%  24.8%/26.6%  11.9%/8.9%

TIME

Courtesy of Dr. Drayton P. Graham.
### Table 3. General Network Measures of Healthcare Facility Network at Patient Transfer Thresholds of ≥1 and ≥10.

<table>
<thead>
<tr>
<th>Social Network Measure</th>
<th>Long-Term Care Facilities Network</th>
<th>Acute-Care Facilities Network</th>
<th>All Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥1</td>
<td>≥10</td>
<td>≥1</td>
</tr>
<tr>
<td>Number of Ties</td>
<td>426</td>
<td>63</td>
<td>2,379</td>
</tr>
<tr>
<td>Density</td>
<td>8.3%</td>
<td>43.2%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>18.7%</td>
<td>45.4%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Network Diameter (Number of Facility Pairs)</td>
<td>5 (23)</td>
<td>3 (67)</td>
<td>9 (1)</td>
</tr>
<tr>
<td>Facilities With a Geodesic Distance of 1</td>
<td>10.3%</td>
<td>44.6%</td>
<td>16.2%</td>
</tr>
<tr>
<td>Betweenness*</td>
<td>44 (0-446)</td>
<td>10 (0-75)</td>
<td>223 (0-1,067)</td>
</tr>
<tr>
<td>Out-degree*</td>
<td>5 (0-21)</td>
<td>15 (2-24)</td>
<td>2 (0-7)</td>
</tr>
<tr>
<td>In-degree*</td>
<td>3.5 (0-16)</td>
<td>13 (0-25)</td>
<td>1 (0-7)</td>
</tr>
</tbody>
</table>

*Median (Range). Doi:10.1371/journal.pone.0029342.t003

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### Sharing Patients—10 Patients

[Diagram of patient sharing]
Tailoring ASP to Local Needs

- CA MRSA US 300
- *C. difficile* 027
- *E. coli* ST 131 H30 Rx
- Pseudomonas
- KPC / CRE
- CRABS (*Acinetobacter*)

Emergence and Rapid Regional Spread of *Klebsiella pneumoniae* Carbapenemase–Producing *Enterobacteriaceae*

Sarah Y. Won, L. Silveira Munoz-Price, Karen Lohman, Bole Hota, Robert A. Weinstein, and Mary K. Hayden for the Centers for Disease Control and Prevention

LTAC ASP Program

- Review antibiotic time out
- Annual education  RPHs, MDs, RNs
- The 6 Ds: Diagnosis, Drug, Dosage, Duration, De-escalation/Device, Documentation
- Annual antibiogram
- Antibiotic utilization
- Annual formulary review
- Infection prevention outcomes

LTACH Stewardship Issues
The Perfect Infection Storm

- PICCs POA
  - Likely to stay in for > 20 days
- Foley — POA and likely to stay in for > 20 days
- PEGs nutritional diarrhea
- Ventilator-dependent; slow wean rates
- Decubitae necessitating Foley
- Few single rooms
- TOTALLY colonized, but limited POA micro data from transferring facility

Courtesy of Dr. Ellie Goldstein, unpublished data.
Antibiotic Resistance Threats in the US, 2013

<table>
<thead>
<tr>
<th>Gram-negative Organism</th>
<th>Cases (%)</th>
<th>Deaths (%)</th>
<th>Threat Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESBL-producing Enterobacteriaceae</td>
<td>26,000 (1.93)</td>
<td>1,700 (7.44)</td>
<td>Serious</td>
</tr>
<tr>
<td>CRE</td>
<td>9,300 (0.69)</td>
<td>610 (2.67)</td>
<td>Urgent</td>
</tr>
<tr>
<td>Multidrug-resistant <em>Pseudomonas aeruginosa</em></td>
<td>6,700 (0.5)</td>
<td>440 (1.92)</td>
<td>Serious</td>
</tr>
<tr>
<td>Multidrug-resistant <em>Acinetobacter spp.</em></td>
<td>7,300 (0.54)</td>
<td>500 (2.18)</td>
<td>Serious</td>
</tr>
</tbody>
</table>

- Estimated annual incidence of infection due to notable antimicrobial-resistant organisms
- Total: 1,349,766 cases and 22,840 deaths

Blood Cultures 2016
Academic vs Community vs LTAC

<table>
<thead>
<tr>
<th>Organism</th>
<th>Academic Rank (No)</th>
<th>Community Rank (No)</th>
<th>LTAC* Rank (No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coag Neg Staph</td>
<td>#1 (553)</td>
<td>#1 (222)</td>
<td>#4 (148)</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>#2 (198)</td>
<td>#7 (27)</td>
<td>#6 (104)</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>#3 (156)</td>
<td>22% CTRX R</td>
<td>#2 (85)</td>
</tr>
<tr>
<td><em>S. aureus</em></td>
<td>#4 (148)</td>
<td>31% MRSA</td>
<td>#5 (144) 90% MRSA</td>
</tr>
<tr>
<td>Klebsiella 29% CTRX R</td>
<td>#5 (111)</td>
<td>#4 (31)</td>
<td>#2 (175)</td>
</tr>
<tr>
<td>Alpha Strep</td>
<td>#6 (86)</td>
<td>#8 (18)</td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas</em></td>
<td>#8 (50)</td>
<td>#10 (16)</td>
<td></td>
</tr>
<tr>
<td><em>C. glabrata</em></td>
<td>#9 (40)</td>
<td>Rare</td>
<td>#3 (149)</td>
</tr>
<tr>
<td><em>C. albicans</em></td>
<td>#11 (13)</td>
<td>#13 (7)</td>
<td>#1 (188)</td>
</tr>
<tr>
<td><em>C. parapsilosis</em></td>
<td>#7 (89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>C. tropicalis</em></td>
<td>#8 (86)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* LTAC 512/1,083 43% are Candida species

Courtesy of Dr. Ellie Goldstein, unpublished data.
## Know Your Antibiogram
**Gram-Negative Bacteria Resistance Rates (%)—UCLA 2014**

<table>
<thead>
<tr>
<th>Organism</th>
<th>No. Tested</th>
<th>CTAZ</th>
<th>Pip/Taz</th>
<th>Carbapenem</th>
<th>Quinolone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E. coli</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>244</td>
<td>16%</td>
<td>5%</td>
<td>1%</td>
<td>33%</td>
</tr>
<tr>
<td>IP</td>
<td>97</td>
<td>29%</td>
<td>16%</td>
<td>1%</td>
<td>46%</td>
</tr>
<tr>
<td>ICU</td>
<td>93</td>
<td>44%</td>
<td>27%</td>
<td>10%</td>
<td>57%</td>
</tr>
<tr>
<td><strong>Klebsiella</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>99</td>
<td>10%</td>
<td>5%</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>IP</td>
<td>62</td>
<td>17%</td>
<td>16%</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>ICU</td>
<td>86</td>
<td>23%</td>
<td>27%</td>
<td>13%</td>
<td>22%</td>
</tr>
<tr>
<td><strong>P. aeruginosa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>299</td>
<td>6%</td>
<td>10%</td>
<td>9%</td>
<td>19%</td>
</tr>
<tr>
<td>IP</td>
<td>91</td>
<td>26%</td>
<td>31%</td>
<td>21%</td>
<td>29%</td>
</tr>
<tr>
<td>ICU</td>
<td>119</td>
<td>22%</td>
<td>32%</td>
<td>33%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*Courtesy of UCLA Health System. Antimicrobial Susceptibility Summary.*

## ESBL Rates 2006-2011
**Four Nearby LA Hospitals**

<table>
<thead>
<tr>
<th>Yr</th>
<th>Community</th>
<th>Teaching A*</th>
<th>Teaching B*</th>
<th>LTAC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E. coli</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>1%</td>
<td>7.1%</td>
<td>9.7%</td>
<td>75%</td>
</tr>
<tr>
<td>07</td>
<td>1.4%</td>
<td>13.2%</td>
<td>13.6%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3%</td>
<td>13%</td>
<td>13%</td>
<td>80%</td>
</tr>
<tr>
<td>13</td>
<td>5%</td>
<td>20%</td>
<td>30%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>K. pneumoniae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>3%</td>
<td>14.8%</td>
<td>18%</td>
<td>96%</td>
</tr>
<tr>
<td>07</td>
<td>5.6%</td>
<td>28%</td>
<td>18%</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>10</td>
<td>10%</td>
<td>19%</td>
<td>15%</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>13</td>
<td>9%</td>
<td>10%</td>
<td>15%</td>
<td>&gt; 90%</td>
</tr>
</tbody>
</table>

*Blood cultures only.
ESBL = extended spectrum β-lactamases.*

*Courtesy of Dr. Ellie Goldstein, unpublished data.*
Antibiotic Resistant Infections US Hospitals—2014 NHSN

- 4,000 STACs, 501 LTACs, 1,135 SNFs, 3,655 CLABSIs, & 3,791 CAUTIs

<table>
<thead>
<tr>
<th>Organism</th>
<th>CLABSI</th>
<th>CAUTI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Tested</td>
<td>%</td>
</tr>
<tr>
<td>Enterobacteriaceae ESBL +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAC</td>
<td>2,804</td>
<td>21.1%</td>
</tr>
<tr>
<td>LTAC</td>
<td>401</td>
<td>39.7%</td>
</tr>
<tr>
<td>Enterobacteriaceae Carb Resistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAC</td>
<td>3,199</td>
<td>4.9%</td>
</tr>
<tr>
<td>LTAC</td>
<td>480</td>
<td>14.6%</td>
</tr>
<tr>
<td>Pseudomonas MDRO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAC</td>
<td>810</td>
<td>15.7%</td>
</tr>
<tr>
<td>LTAC</td>
<td>138</td>
<td>31.9%</td>
</tr>
</tbody>
</table>


Three Nearby LA Hospitals
Resistance Variations—2016

<table>
<thead>
<tr>
<th>Organism</th>
<th>Community</th>
<th>Teaching</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acinetobacter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Isolates tested</td>
<td>32</td>
<td>49</td>
<td>104</td>
</tr>
<tr>
<td>Amp/sulbactam</td>
<td>25%</td>
<td>31%</td>
<td>76%</td>
</tr>
<tr>
<td>Carbapenem</td>
<td>45%</td>
<td>26%</td>
<td>89%</td>
</tr>
<tr>
<td>Amikacin</td>
<td>36%</td>
<td>26%</td>
<td>82%</td>
</tr>
<tr>
<td>Pseudomonas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Isolates tested</td>
<td>545</td>
<td>498</td>
<td>165</td>
</tr>
<tr>
<td>Cefepime</td>
<td>8%</td>
<td>21%</td>
<td>39%</td>
</tr>
<tr>
<td>Carbapenem</td>
<td>11%</td>
<td>20%</td>
<td>52%</td>
</tr>
<tr>
<td>Cipro</td>
<td>20%</td>
<td>22%</td>
<td>53%</td>
</tr>
<tr>
<td>Pip-Tazo</td>
<td>12%</td>
<td>23%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Courtesy of Dr. Ellie Goldstein, unpublished data.
Facilities Reporting at Least One CRE (CAUTI or CLABSIs) for NHSN Jan-June 2012

<table>
<thead>
<tr>
<th>Facility Characteristics</th>
<th>No. Facilities With CRE From CAUTI or CLABSIs</th>
<th>Total Facilities Performing CAUTI or CLABSIs Surveillance</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Acute Care Hospitals</td>
<td>181</td>
<td>3,918</td>
<td>4.6%</td>
</tr>
<tr>
<td>STACs</td>
<td>145</td>
<td>3,716</td>
<td>3.9%</td>
</tr>
<tr>
<td>LTACs</td>
<td>36</td>
<td>202</td>
<td>17.8%</td>
</tr>
</tbody>
</table>


CRKP Rates at Select LTAC by State, Jan 2014 to Mar 2015

Antibiotic Susceptibility Profiles of CRKP Isolates at LTACs, 2014-2015

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>No. of Isolates Tested</th>
<th>Susceptible n (%)</th>
<th>Intermediate n (%)</th>
<th>Resistant n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>885</td>
<td>298 (33.7)</td>
<td>63 (7.1)</td>
<td>524 (59.2)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>630</td>
<td>10 (1.6)</td>
<td>2 (0.3)</td>
<td>618 (98.1)</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>713</td>
<td>12 (1.7)</td>
<td>3 (0.4)</td>
<td>698 (97.9)</td>
</tr>
<tr>
<td>Gentamicin or tobramycin</td>
<td>630</td>
<td>11 (1.7)</td>
<td>3 (0.5)</td>
<td>616 (97.8)</td>
</tr>
<tr>
<td>Colistin or polymyxin B</td>
<td>690</td>
<td>579 (83.9)</td>
<td>--</td>
<td>111 (16.1)</td>
</tr>
<tr>
<td>Tigecycline</td>
<td>439</td>
<td>413 (94.1)</td>
<td>23 (5.2)</td>
<td>3 (0.7)</td>
</tr>
</tbody>
</table>


CRE in LTACs Southern California—2014

<table>
<thead>
<tr>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>POA</td>
<td>HAC</td>
<td>POA</td>
</tr>
<tr>
<td>Col</td>
<td>Inf</td>
<td>Col</td>
</tr>
<tr>
<td>BP</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Riv</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>RSH</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ont</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>La M</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>SG</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>W</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>LA</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>TOTALS</td>
<td>24</td>
<td>9</td>
</tr>
</tbody>
</table>

POA 89 → 16 INF
HAC 68 → 20 INF

Don’t take credit for POAs

Courtesy of Dr. Ellie Goldstein, unpublished data.
LTAC CRE Initiative

- CRE noted to occur in some system hospitals
- All sites with > 3/month or 10 CREs in quarter period become a "focus hospital"—regional variation

PLAN
- New isolation signage (purple)
- CRE screening on admission
- Proper cohorting
- Monitor PPE and hand hygiene compliance
- Daily CHG bathing
- CRE education to staff

Summary

- Multi-departmental initiatives
  - Microbiology lab rapid identification
  - Identify POAs
- Regular (daily) communication
- Disseminated and concordant ABX and micro ASP
- Tailor ASP to local susceptibility patterns
- Concurrent review
Staff Education and Acknowledgement
Physicians, Nurses, and Other Personnel

Diagnosis: Where is the infection, or is the therapy empiric? Do the cultures represent infection or colonization?

Drug: Does the drug choice cover the most likely pathogens on the antibiogram?

Dose: Is the dose appropriate for the patient’s age, weight, site of infection, and any renal or hepatic insufficiencies?

Duration: Antimicrobials should be given for the appropriate period of time and not any longer

De-escalation: Broad spectrum antimicrobials may be needed initially (empirically), but should be narrowed once cultures return, assuming the patient improves

Documentation: Initial and continued progress notes should reflect all of the D’s listed previously; many of the issues around antibiotic excess will resolve themselves if this disciplined prescriptive approach to the documentation is followed

Courtesy of Dr. Ellie Goldstein, unpublished data.
Microbiology

- **Blood culture guidelines**—only 2 sets of blood cultures within 48 hours except:
  - Suspected acute endocarditis: 3 sets from 3 separate sites over 1-2 hours
  - Suspected subacute endocarditis: 3 sets from 3 separate sites taking greater or equal to 15 minutes apart; if negative at 48 hours, may obtain 3 more sets
  - Acute change in the clinical condition of the patient
  - In absence of temperature above 100.8 or < 96 and an elevated or low WBC count, physician should clarify the blood culture order with the Laboratory Manager

- **Stool cultures and ova & parasites** are not routinely done after 72 hours of hospitalization except in HIV+ patients
  - *C. difficile* toxin A/B
    - Test will not be performed if previous positive result was obtained within the past 8 days
    - If patient on PO Vanco, *C. difficile* will not be performed unless physician contacts the Laboratory Department about extenuating circumstances

- **Wound culture** should not be performed routinely
  - Deep tissue cultures from the OR will be cultured
  - Abscesses will be cultured
  - Cultures obtained by physician, nursing supervisor, or wound care nurse will be accepted

- **Urine culture**
  - The lab will perform a C&S if there is evidence of pyuria as evidenced by: WBCs present on microscopic examination or leukocyte esterase + or nitrites + on dipstick; one specimen every 72 hours, unless specified by the physician

- **Stool cultures and ova & parasites**
  - One specimen every 72 hours (except AFB and bronchoscopy)

- **Catheter tips**
  - Catheter tips cultures are not performed routinely; if culture is needed, the ordering physician will need to contact the laboratory to clarify the need for the culture before the specimen is sent out:

*For exception, contact the Laboratory Manager, Infection Committee Chair, or Chief of Staff.*

McGeer Criteria
(October 2012 Update by Stone, et al.)

- Identification of infection should **not** be based on a single piece of evidence, but should always consider:
  - The **clinical presentation**
  - Microbiologic information
  - Radiologic information

**Goal:** to standardize identifying factors for infections in LTCF patients that are often difficult to assess

- Symptoms not expressed or misinterpreted
- Comorbidities can obscure signs and symptoms of infection

**Criteria for antibiotic initiation** falls into 4 main categories:

- **UTI**
- Respiratory infection
- Skin and soft tissue infection
- Fever of unknown origin
McGeer Criteria Flow Charts: Respiratory

Respiratory Tract Infections Criteria for Antibiotic Initiation

Pneumonia
(All 3 criteria must be present)

1. 2. Interpretation of a chest x-ray as pneumonia or new infiltrate
2. 3. At least 1 of the constitutional criteria (see below list)

Respiratory Sub-Criteria

1. At least 1 of the following respiratory subcriteria a-f below:
   a. New or increased cough
   b. New or increased sputum production
   c. O₂ saturation < 94% on room air or a reduction in O₂ saturation of > 3% from baseline
   d. New or changed lung examination abnormalities
   e. Pleuritic chest pain
   f. RR ≥ 25 BPM

Constitutional criteria:
- 2 temps of 38°C (100.4°F) or 1 temp of 38.3°C (101°F)*
- Leukocytosis (> 14,000 leukocytes/mm³)
- Acute changes in mental status from baseline (all must be present)
  - Acute onset
  - Fluctuating course
  - Inattention
  - Either disorganized thinking or altered LOC
- Acute functional decline:
  - A new 3-point increase in total activities of daily living (ADL-score)
  - Bed mobility, transfer, locomotion within LTCF, dressing, toilet use, personal hygiene, and eating

Lower Respiratory Tract
(Bronchitis or tracheobronchitis; all 3 criteria must be present)

1. Chest x-ray not performed or neg results for pneumonia or new infiltrate
2. At least 2 of the respiratory subcriteria (a-f)
3. At least 1 of the constitutional criteria (see list)

Microbiology Data 2015: Respiratory Organisms Cultured From LTCF Patients

<table>
<thead>
<tr>
<th>Organism</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. influenzae</td>
<td>10%</td>
</tr>
<tr>
<td>S. aureus</td>
<td>11%</td>
</tr>
<tr>
<td>Proteus sp.</td>
<td>42%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>54%</td>
</tr>
<tr>
<td>Strep Grp G</td>
<td>8%</td>
</tr>
<tr>
<td>Others*</td>
<td>19%</td>
</tr>
</tbody>
</table>

*Others = Acinetobacter, Chrysobacterium, Corynbacterium, E. cloacae, Klebsiella, Maravella spp, Mycobacterium, Salmon, grp B Strep, S. pneumoniae, E. coli

Courtesy of Bridget Olsen, RPh, unpublished data.
ASP Effects: Decreased Anti-Pseudomonal Use → Increased Pseudomonas aeruginosa (PSA) Susceptibility

LTCF pseudomonal Susceptibility Trending*
2009 - 2015

% Susceptibility


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pip/tazo</td>
<td></td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobra</td>
<td></td>
<td></td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imipenem</td>
<td></td>
<td></td>
<td></td>
<td>91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefepime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>Levofloxacin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71</td>
</tr>
</tbody>
</table>

*Linear trendlines

Sharp Coronado Hospital & Villa LTCF
Courtesy of Bridget Olsen, RPh, unpublished data.

Clostridium difficile in LTACs

- Los Angeles, 2007
  - 11.1% of admissions C. difficile Ag (+)
  - 5.5% unsuspected active disease
  - 8.3% Ag (−) developed CDAD

**Bundle approach** with a combination of infection control and antimicrobial management strategies

**Components:**
- Preemptive contact isolation
- Preemptive treatment
- Hand hygiene with soap and water
- Effective environmental cleaning

- Environmental cleansing with 1:10 hypochlorite solution or 10% bleach after discharge
- Discontinuation of contact precautions
- After resolution of diarrhea
- Some institutions continue until discharge because of *C. difficile* spores excretion
- **Probiotics?**

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**$ Saved by ASP Program**

**Part Time to Full Time ASP Pharmacist**

**2014 2- Quarters) + 2015**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>$ Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 2014</td>
<td>$36,423</td>
</tr>
<tr>
<td>Q2 2014</td>
<td>$41,225</td>
</tr>
<tr>
<td>Q3 2014</td>
<td>$43,670.90</td>
</tr>
<tr>
<td>Q4 2014</td>
<td>$63,366.64</td>
</tr>
<tr>
<td>Q1 2015</td>
<td>$65,336.55</td>
</tr>
<tr>
<td>Q2 2015</td>
<td>$76,295.12</td>
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</table>

**AMS Cost Saving 2016**

<table>
<thead>
<tr>
<th>Quarter</th>
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<tbody>
<tr>
<td>Q1 2016</td>
<td>$76,047.00</td>
</tr>
<tr>
<td>Q2 2016</td>
<td>$67,578.00</td>
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<tr>
<td>Q3 2016</td>
<td>$90,510.00</td>
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<tr>
<td>Q4 2016</td>
<td>$97,861.63</td>
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</tbody>
</table>

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Courtesy of Snezana Naumovski, PharmD and Dr. Ellie Goldstein, unpublished data.
Declination by Outlier Physicians
Jan-June 2014

<table>
<thead>
<tr>
<th>No Declinations per Proposed Intervention</th>
<th>Physician Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Reviewed</td>
<td>589</td>
</tr>
<tr>
<td>Appropriate</td>
<td>228  38.8%</td>
</tr>
<tr>
<td>Total Accepted</td>
<td>318  53.9%</td>
</tr>
<tr>
<td>Total Declined</td>
<td>43   7.3%</td>
</tr>
</tbody>
</table>

Five Physicians Take 80% of the Time

<table>
<thead>
<tr>
<th>Declined Physicians</th>
<th>MD A # XX915</th>
<th>MD B # XX599</th>
<th>MD C # XX303</th>
<th>MD D # XX790</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/48 31.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14/48 77.8%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6/29 20.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/12 77.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approaching ASPs Diverse Elements

- Teamwork—a culture of compliance
- Proper program preparation and focus
- Managing the outlier/noncompliant physician
- Finding the cause
  - Early, effective Rx
  - De-escalation
  - Duration of Rx
- Communications
- Interventions
- Credentialing

ABBREVIATIONS/ACRONYMS

Location, Location, Location: Managing Outbreaks in Ambulatory Care Settings
EDC = Emergency Department Communications
EMAR = electronic medication administration record
EVS = environmental services
FCO = flight communications operator
IC = infection control
MHLF = MetroHealth Life Flight
MHPD = MetroHealth Police Department – Department of Public Safety
PBX = private branch exchange
PPE = personal protective equipment
PSR = personnel status report
PUI = patient under investigation
SDCU = Special Diseases Care Unit

Location, Location, Location! EMS
CDC = Centers for Disease Control and Prevention
ED = emergency department
EMS = emergency medical services
EVD = Ebola virus disease
MDRO = multi-drug resistant organism
PPE = personal protective equipment

Location, Location, Location! Emergency Department
ED = emergency department
EMR = electronic medical record
EMS = emergency medical services
OSHA = Occupational Safety and Health Administration
PPE = personal protective equipment
SALT = Sort, Assess, Lifesaving, Interventions, Treatment, and Transportation
START = Simple Triage Algorithm and Rapid Treatment

Location, Location, Location! Inpatient Care: ICU/Med-Surg
AHRQ = Agency for Healthcare Research and Quality
COI = conflict of interest
NETEC = National Ebola Training and Education Center
POC = point of care
PPE = personal protective equipment
PUI = person under investigation
**Location, Location, Location! Transporting Infections Patients Within Your Facility**
CRE = carbapenem-resistant Enterobacteriaceae
ED = emergency department
MERS = Middle East respiratory syndrome
PPE = personal protective equipment
SARS = severe acute respiratory syndrome

**Location, Location, Location! Labor and Delivery**
DHHS = Department of Health and Human Services
ICU = intensive care unit
MDR-TB = multi-drug-resistant tuberculosis
MERS = Middle East respiratory syndrome
NBN = newborn nursery
NICU = neonatal intensive care unit
RN = registered nurse
SARS = severe acute respiratory syndrome

**Location, Location, Location! Pediatrics**
HCW = healthcare worker
HICS = Hospital Incident Command System
PPE = personal protective equipment
SARS = severe acute respiratory syndrome
US = United States

**Location, Location, Location! Environmental Services**
CDC = Centers for Disease Control and Prevention
DOT = Department of Transportation
EPD = Environmental Protection Division
VHP = vaporized hydrogen peroxide

**Location, Location, Location! Labs/Pathology/Mortuary**
CDC = Centers for Disease Control and Prevention
ET = endotracheal
HPV = hydrogen peroxide vapor
IV = intravenous
MOU = memorandum of understanding
PAPR = powered air purifying respirator
PCR = polymerase chain reaction
PPE = personal protective equipment
PUI = patients under investigation
USDOT = United States Department of Transportation