

CIC Study Group

Week 8



HAI Prevention Program

Agenda

- Review
 - Chapter 5 Infection Prevention and Behavioral Interventions
 - Chapter 122 Infectious Disease Disasters: Bioterrorism, Emerging Infections, and Pandemics
 - Chapter 36 Pneumonia
- Group Member Spotlight
- Next week's assignment

Chapter 5

Infection Prevention and Behavioral Interventions

Key Concepts

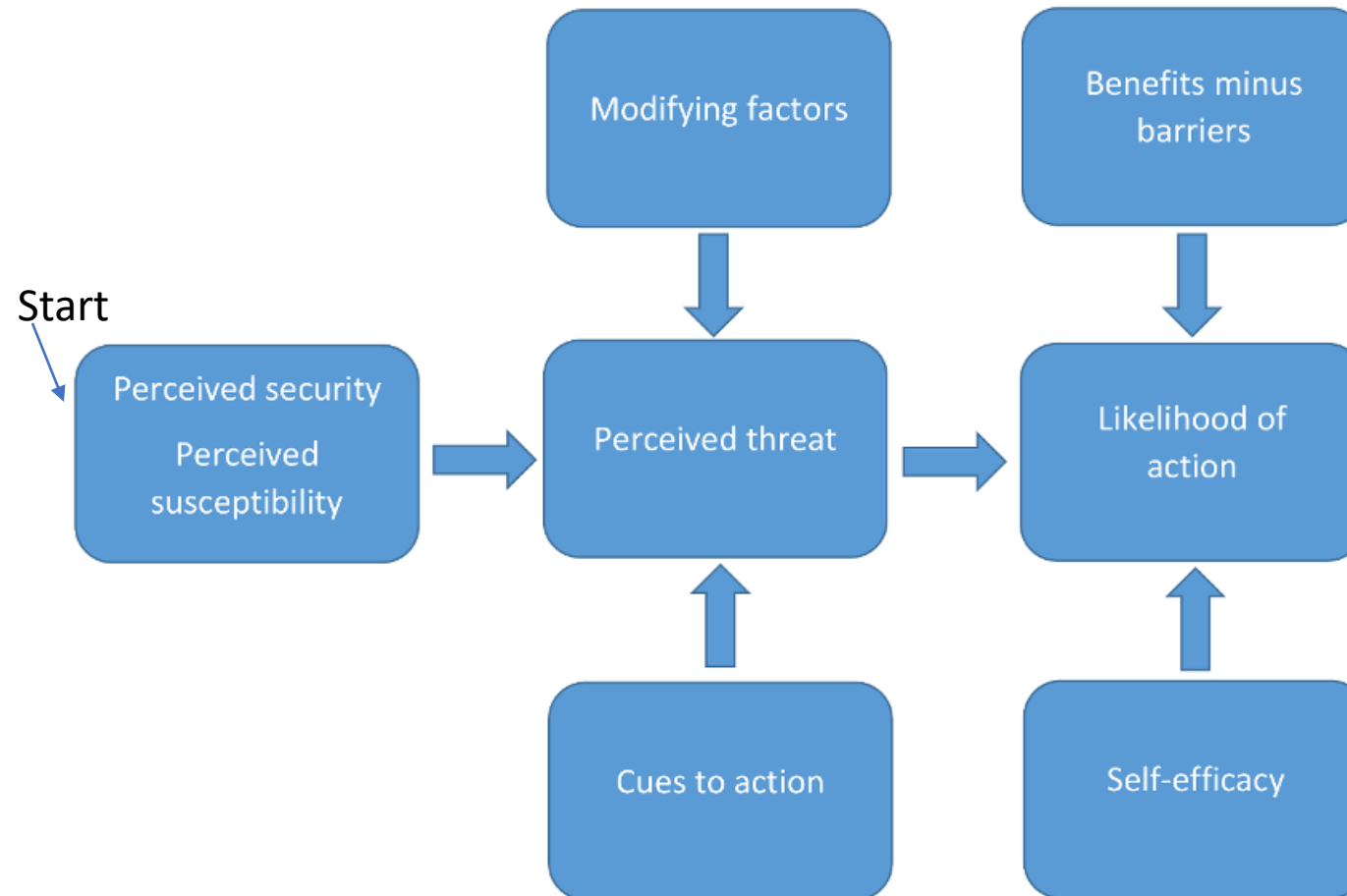
- Program to influence human behavior aspects of infection control.
- Behavioral science makes practitioners more efficient and effective.
- Help focus on factors likely to be important while avoiding investments in factors unlikely to be important.
- Behavioral science practices are not fully successful, but use of theory will help improve success.

Background

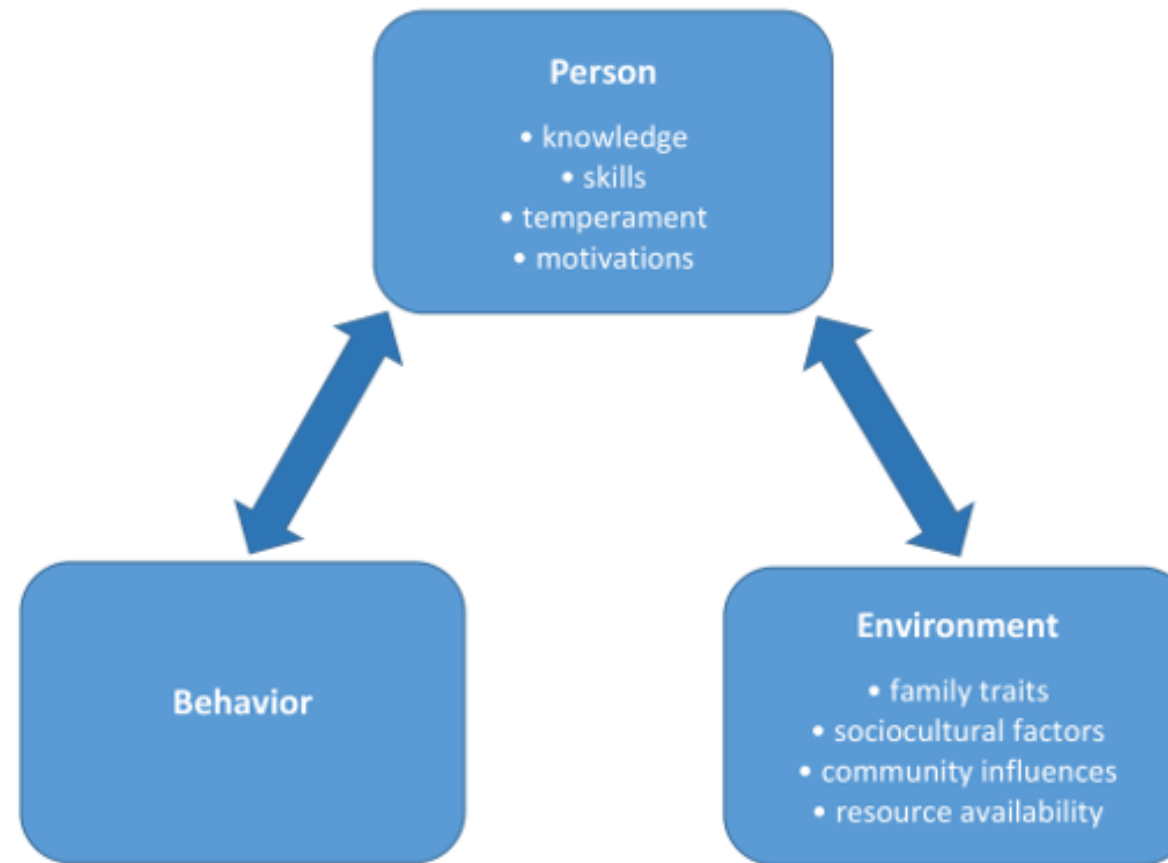
- Two types of challenges when implementing change:
 - Technical = that can be solved by the knowledge of the experts.
 - Adaptive = requires new learning.
- Technical is easier than adaptive work but is only about 20% of change, it is the 'what'.
- Adaptive is the 'how' and 'where' the community that needs to change must engage in the process.

The Health Belief Model (HBM)

Figure 5-1.



Social Cognitive Theory (SCT)



Reciprocal determinism from Social Cognitive Theory. [4](#)

(Figure 5-2: APIC Text Online Reciprocal determinism from SCT)

Transtheoretical Model or Stage Theory

Precontemplation	"I won't"	Unaware, no desire, no reason
Contemplation	"I might"	Weighing change pros and cons
Preparation	"I will"	Making plans to change behavior
Action	"I am"	Currently adopting change
Maintenance	"I have"	Change made, avoiding relapse

(Figure 5-3 from the APIC Text Online Chapter 5)

Conclusion

- There are two additional behavioral science theories applicable to infection prevention:
 - Diffusion Theory.
 - Organizational Development Theory.
- When planning and implementing education:
 - Include representatives of target group in planning.
 - Repetition of concepts over time with various tools/ resources.
 - Employ active learning.
 - Encourage and recognize mastery.
 - Multisensory learning is more effective.

Pop Quiz!

- What is the term that refers to a behavior change approach, based on the observation in a community, where an individual exists who has found uncommon practices and behaviors that enable them to achieve better results than their peers?

Positive deviance (PD)

Chapter 122

Infectious Disease Disasters: Bioterrorism, Emerging Infections, and Pandemics

Key Terms

- BioSense
 - a) US national repository of medications and supplies needed for a disaster
- Strategic National Stockpile
 - b) US national syndromic surveillance program for early detection of infectious disease disasters
- Surge Capacity
 - c) Collecting and analyzing nontraditional data for early detection of an infectious agent
- Syndromic surveillance
 - d) Ability of a facility to handle large influx of affected individuals during a disaster

Common Characteristics

- Ability to be dispersed in aerosols:
 - 1-5 micron sized.
 - Penetrate distal bronchioles.
- Deliver aerosols with simple technology.
- Feasibility to infect large numbers of the population if delivered from a line source.
- Ability to spread:
 - Infection.
 - Disease.
 - Panic.
 - Fear.

Bioterrorism

- Intentional use of a biological agent or derivative of such an agent to inflict harm or death onto a civilian population.
- Historical example:
 - Francisco Pizzaro 'gifting' the Inca people with clothes laden with smallpox inoculate.

Biological Warfare

- Target of the attack is military personnel.
- Historical example:
 - Mongols catapulting bodies of plague victims over the city walls in Caffa.



(Image Source: <https://contagions.wordpress.com/2012/06/28/plague-at-the-siege-of-caffa-1346/>)

Bioterrorism Preparedness

- Helps mitigate potential negative outcomes.
- Required by health care and public health regulating agencies as part of a comprehensive emergency management program.
- Depends on:
 - Agent used.
 - Amount disseminated.
 - Dispersal method.
 - Release conditions.
 - Pre-existing immunity.
 - How quickly it is identified.

Category	A	B	C
Definition	Pose the highest risk to national security because they • Can be easily disseminated or transmitted from person to person • Result in high mortality rates • Have potential to cause public panic and social disruption • Require special preparedness actions	Pose the second highest risk because they • Are moderately easy to disseminate • Result in low mortality rates • Require enhancement of diagnostic and surveillance capability	Emerging pathogens that could be engineered for mass dissemination because they: • Are available • Are easily produced and disseminated • Have potential for high mortality rates
Examples	• <u>Anthrax</u> • Botulism • Plague • <u>Smallpox</u> • <u>Tularemia</u> • Viral hemorrhagic fevers (e.g. <u>Ebola</u>, Marburg)	• West Nile Virus • <u>Caliciviruses</u> • Hepatitis A • Ricin toxin • Salmonella • Diarrheagenic E. coli	• <u>Influenza</u> • <u>SARS</u> • Rabies • <u>Multi-drug resistant tuberculosis</u> • Yellow fever • Tickborne hemorrhagic fever

(Source Rush Emergency Medicine Webpage: <https://rushemergencymedicine.org/2019/01/09/bioterrorism-in-a-rush/>)

Emerging Infections

- New to a population or geographical region or whose incidence rate has increased during the past 20 years or is likely to increase in the near future.
- Factors affecting emergence of infectious disease:
 - Social = war, human migration, urbanization.
 - Microbial = genetic mutation, recombination.
 - Environmental = climate change, deforestation.
- Examples:
 - Black Death in Europe.
 - SARS-CoV.



- Peer reviewed journal.
- Promote recognition of new and re-emerging infectious diseases around the world.
- Fully electronic.
- <https://www.cdc.gov/media/eid-summaries.htm>

Pop Quiz!

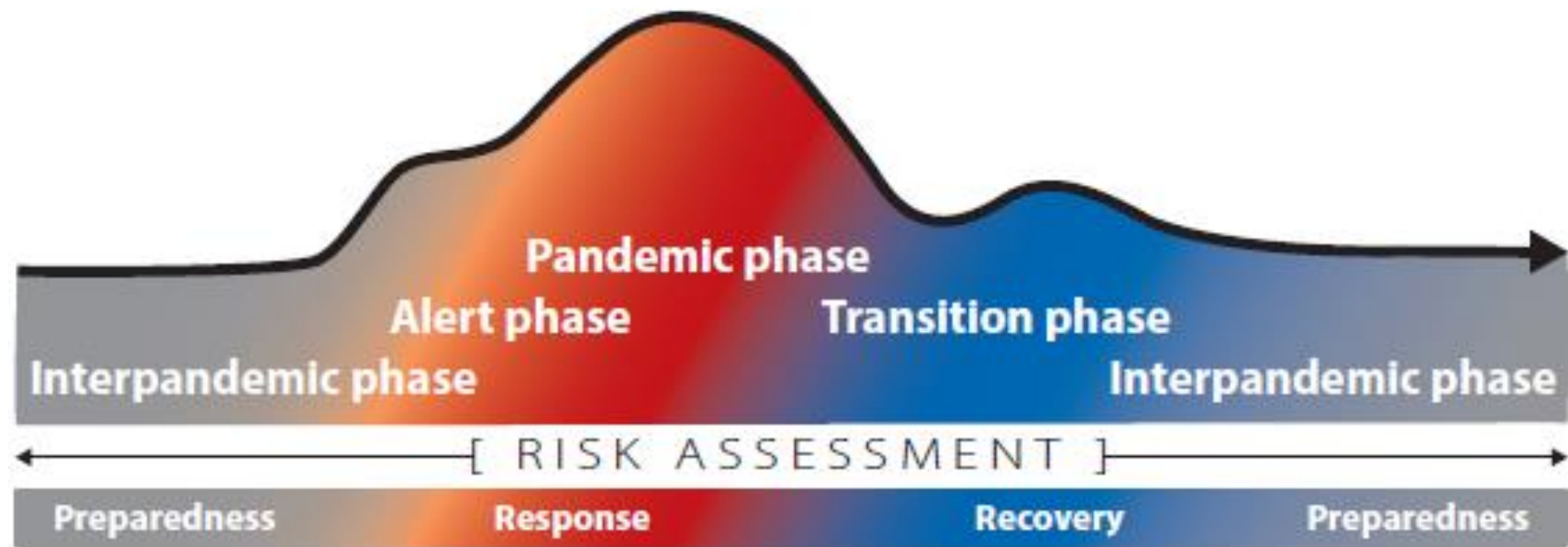
- What term refers to a widespread occurrence of an infectious disease in a community at a particular time?
 - Epidemic
- What term refers to a global outbreak of disease in humans that affects at least two continents and or exceeds the expected rates of morbidity and mortality?
 - Pandemic
- What term refers to a disease or condition regularly found among particular people or in a certain area?
 - Endemic

Six Phases of a Pandemic

- Higher risk of human cases:
 - Phase 2
- Evidence of increased human-to-human transmission:
 - Phase 4
- Efficient and sustained human-to-human transmission:
 - Phase 6
- No or very limited human-to-human transmission:
 - Phase 3
- Low risk of human cases:
 - Phase 1
- Evidence of significant human-to-human transmission:
 - Phase 5

The Continuum of Pandemic Phases

Figure 1. The continuum of pandemic phases^a



^a This continuum is according to a "global average" of cases, over time, based on continued risk assessment and consistent with the broader emergency risk management continuum.

(Image Source: <https://www.cdc.gov/flu/pandemic-resources/planning-preparedness/global-planning-508.html>)

Pop Quiz!

Which of the following bioterrorism agents has the highest fatality rate?

- A. Q fever
- B. Ricin
- ☒ C. Smallpox
- D. Severe acute respiratory syndrome (SARS)

Infectious Disease Disasters

- Have a robust emergency management plan.
- There are various resources online to help with creating/ improving a facilities emergency management plan.
 - EX: Pandemic Influenza Plan written by DHHS is designed for local and state disaster planners and public health departments.
- Identification.
- Early detection.

Syndromic Surveillance

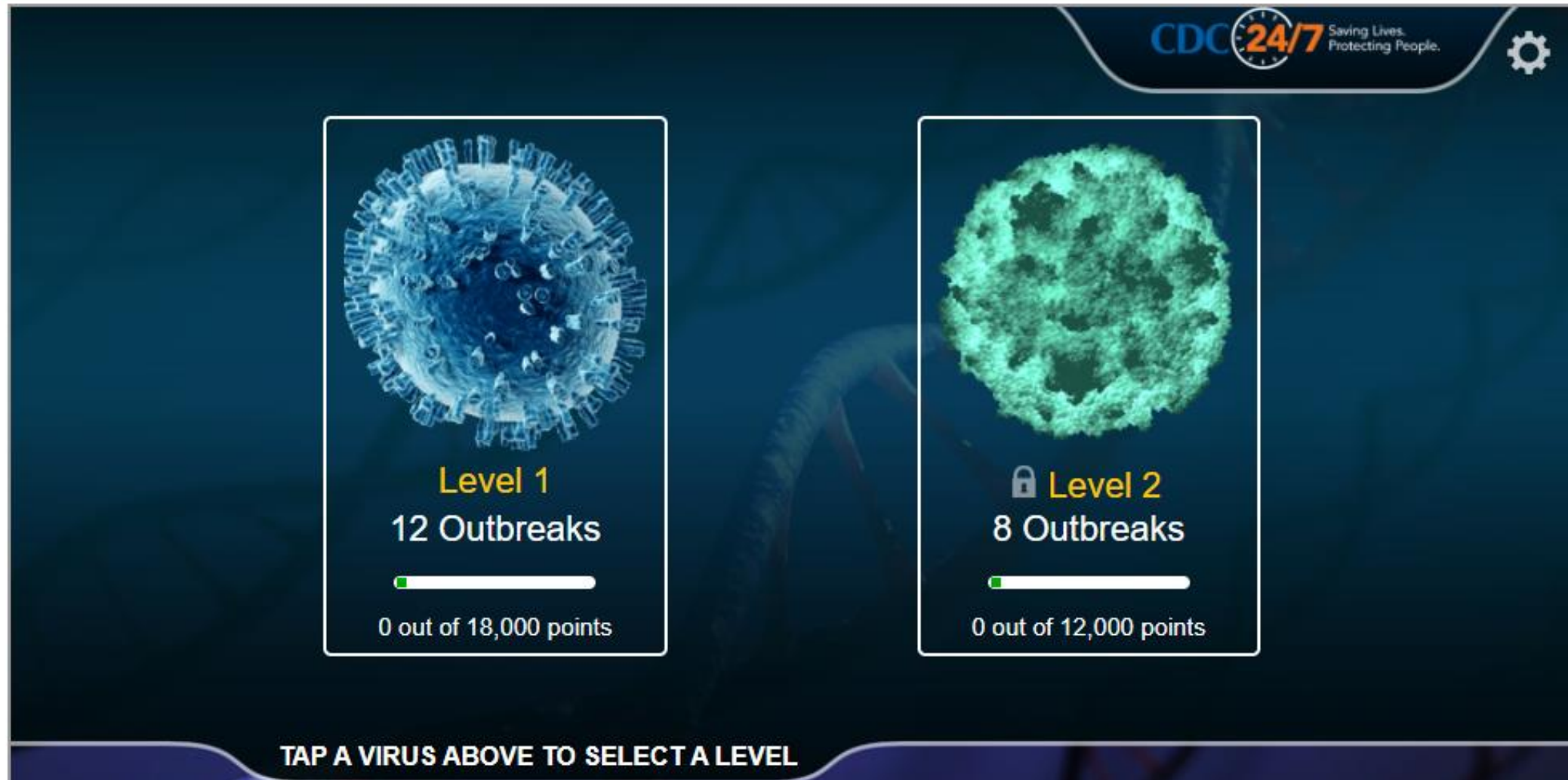
- Historically refers to collection and analysis of syndrome-related data.
- Now consists of collecting and analyzing any nontraditional data for early detection of an infectious disease disaster, including the use of epidemiological trends and proxy measures.
- Some Public Health entities are even using social media to compliment syndromic surveillance.

Table 122-2 Syndromic Surveillance Indicators

Indicator
Flu-like illness ^a
Flaccid muscle paralysis
Severe bleeding disorder with no discernable source
Rash
GI symptoms
No. of patients seen in an emergency department
Chief symptom (i.e., No. of patients presenting with flu-like illness as their chief symptom)
No. of patients admitted to a hospital
No. of EMS or ambulance runs
No. of calls to nurse or physician help lines/triage centers
Over-the-counter pharmaceutical sales (i.e., nonprescription medications to treat flu or GI symptoms)
No. of individuals who use an Internet search engine (e.g., Google or Yahoo) to look up information about flu-like symptoms
Cattle or livestock morbidity or mortality rates
Domestic animal morbidity or mortality rates
Number of laboratory tests conducted at veterinary clinics
School absenteeism rates
Staff absenteeism rates at local businesses

(Source APIC Text online Chapter 122)

Solve The Outbreak



Pop Quiz!

You have been notified that a possible smallpox patient has been identified in your community. The patient is being admitted directly to your facility. What type of precautions should your personnel take when caring for this patient?

- ☒ A. Airborne isolation with negative pressure ventilation
- B. Resistant Organism Precautions
- C. Airborne isolation with positive pressure ventilation
- D. Droplet precautions

Pop Quiz!

Infection prevention and control priorities in a disaster include all the following EXCEPT:

- A. Sterilization of instruments and disinfection of equipment
- ☒ B. Obtaining medication from vendors not affected by disaster
- C. Maintaining ability to prepare food for employees and victims
- D. Drinking water for employees and victims

Chapter 36

Pneumonia

Key Concepts

- Leading cause of death from infection among hospitalized patients.
- Classified according to origin site:
 - Community acquired.
 - Health care-associated.
- It is an inflammatory process of the lung parenchyma.
 - Local or systemic.
- Microaspiration of oropharyngeal secretions is the most common route by which these microbial agents reach the lung.
- Once it is in the lungs the microorganism can kill the defense cells .

Setting Matters!

- **Community-acquired pneumonia (CAP):**
 - Occurring in patient admitted to hospital from community.
- **Health care-associated pneumonia (HCAP):**
 - Reside acute care for 2 or more days within 90 days of current infection.
 - Resided in nursing home or long-term care.
 - Received IV antibiotic therapy, chemotherapy, or wound care within 30 days.
 - Attended hospital or hemodialysis clinic.
- **Hospital-acquired pneumonia (HAP):**
 - Developing ≥ 48 hours after admission.
- **Ventilator-associated pneumonia (VAP):**
 - HAP that develops in patient intubated and received mechanical vent for at least 48 hours.

Basics for Pneumonia

- Microbiology workup requires 1-3 days for culture and sensitivity.
- Initial treatment is usually empiric.
- Prevention:
 - Immunization.
 - Smoking cessation especially for CAP.
 - Hand hygiene.
 - Respiratory therapy equipment maintenance.
 - Avoidance of endotracheal intubation.
 - Selective oral decontamination.
 - Subglottic secretion drainage.
 - Isolation of patients with resistant organisms.
 - Reduction in the use of nasogastric tubes.
 - Start enteral feeding 24 to 48 hours after intubation.
 - Compliance with use of ventilator bundles.

Pop Quiz!

- What is a basic/common confirmatory test for Pneumonia?
 - Chest X-ray = to look for inflammation in your lungs.



(a) Normal



(b) Bacterial Pneumonia



(c) Viral Pneumonia



(d) COVID-19 Pneumonia

Pop Quiz!

- **True** or False

- Pneumonia can be caused by bacteria, viruses and fungi?
- Bacteria
 - *Mycoplasma pneumoniae*
 - *Chlamydophila pneumoniae*
 - *Legionella pneumophila*
- Viruses
 - SARS-CoV-2
- Fungi
 - *Pneumocystis jirovecii*.

Group Member Spotlight

Group Member Spotlight

Amy Mamutaj, MPH, CPH, CIC

Current position:

- Dialysis Infection Prevention Coordinator

Education:

- USF MPH: Concentration in Infection Control
- UF BS: Microbiology, Minor: Nutritional Sciences



Group Member Spotlight

Exam Summary

- Had 5 weeks to study
- Questions were more straight-forward than the practice exams
- Lots of scenario-based questions
 - Occupational health exposures, PEP, work restrictions, etc.
- Construction and SPD
 - ICRA 2.0, air flows, filtration, etc.
- Tuberculosis, MMR, CDI

Exam Tips!

- Schedule that exam!
- Do as many practice questions as you can – complete all APIC study guide exams
 - Time yourself while completing practice exams
 - Review results and focus on weak points!
- **Resources:** FDOH CIC group, Washington State CIC group, CIC Epidemiologists on YouTube, APIC text
- Better to study a little bit everyday, use an agenda if you need to
 - Read APIC text, watch YouTube video/CIC Study group material, practice exam, read rationales, repeat
- Verbally summarizing/explaining to someone else

Week 9 Assignments

Action Items

- Assigned chapter readings:
 - Chapter 27 Hand Hygiene
 - Chapter 28 Standard Precautions
 - Chapter 29 Isolation Precautions
 - Chapter 30 Aseptic Technique