
Emergency Preparedness and Infection Prevention in the Ambulatory Surgery Setting

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Acute and Communicable Disease Prevention



Oregon
Health
Authority

Who is Acute & Communicable Disease Prevention (ACDP)?

Mission: Prevent the emergence and spread of communicable diseases



- Collect and analyze disease data
- Study risk factors
- Protect exposed individuals and families
- Develop guidelines for disease prevention and control
- Plan and respond to public health emergencies

Who is ACDP?



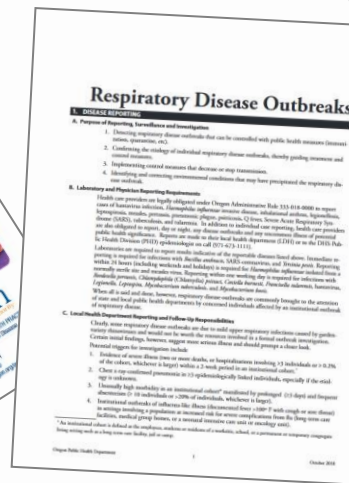
Clinicians, epidemiologists, microbiologists, data managers, policy and research analysts, communicators, educators, support staff

Who is ACDP?



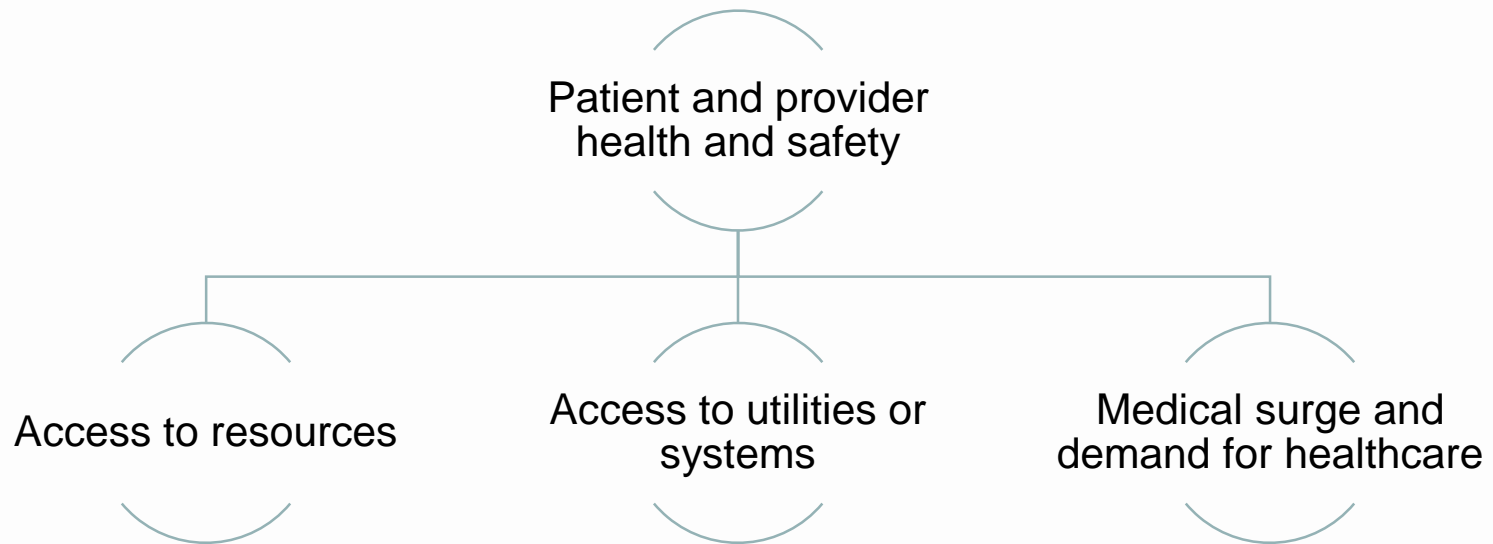
How can ACDP help you?

- Support local health departments (LHDs) and healthcare facilities
 - Information and data for situational awareness
 - Infection control consultation
 - Outbreak management and technical assistance
 - Toolkits and guidelines for the prevention and control of infectious diseases



Public health emergencies

- Natural disasters: Severe weather, wildfires, earthquakes
- Outbreaks: Disease transmission
- Many potential impacts on healthcare facilities



Consider infectious disease!

- Emergency planning in outpatient healthcare facilities often focuses on natural disasters
- Perception: risk of infectious disease transmission is low in outpatient settings
 - Control over patient population
 - Duration of encounter
 - Elective procedures
 - Ability to postpone care
- Even so...
 - Transmission can occur in any setting
 - How can we protect patients and healthcare personnel (HCP)?

Impact of outbreaks

- Regulatory or legal action against HCP, facility
- Patient, HCP morbidity and mortality
- Loss of patient confidence
- Cost of remediation, care
- Patient notification

THE IMPACT OF UNSAFE MEDICAL INJECTIONS IN THE U.S.

Unsafe Injection Practices Have Devastating Consequences¹

Syringe reuse and misuse of medication vials have resulted in dozens of outbreaks and **THE NEED TO ALERT MORE THAN 150,000 PATIENTS...**

...to seek testing for bloodborne pathogens such as **HEPATITIS B, HEPATITIS C AND HIV,²** and have led to...



Patient illness and death



Legal charges/ malpractice suits



Loss of clinician licenses



Criminal charges

In just one clinic, syringe reuse to access medication vials for multiple patients resulted in an outbreak and one of the largest public health alerts in U.S. history.



1000
= patients
notified

**50,000
PEOPLE EXPOSED
TO INFECTION**



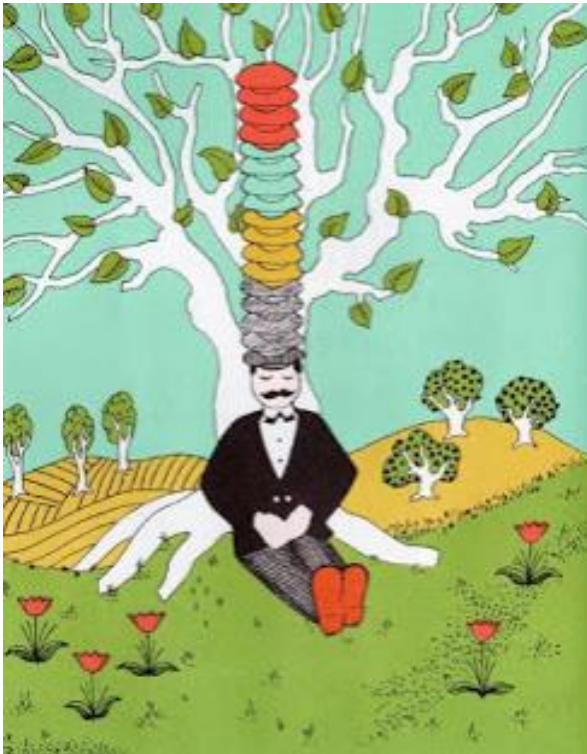
= 1 million

**\$16~\$20
MILLION
IN COSTS**

Transmission in ambulatory surgery centers (ASCs)

- Infections result from onsite contamination
 - Infection control breaches
 - Injection safety
 - Medication management
 - Equipment processing/sterilization
 - Hand hygiene
 - Environmental cleaning
 - Asymptomatic patients may still spread disease
 - Contamination can be brought in from other sources
 - HCP
 - Visitors/family
 - Service and therapy animals
 - Patient care equipment, medications, cleaning products

Infection prevention challenges in the ASC setting



- Duration of encounter
- Post-discharge surveillance
- Notification of relevant issues
- Competing priorities

What do the literature show?

2000-2012

- Los Angeles County investigated 6 outbreaks in ASCs resulting in 26 cases of illness from 2000-2012

2001-2011

- >18 outbreaks of viral hepatitis associated with unsafe injection practices in outpatient settings, including ASCs

2008

- Centers for Medicare & Medicaid Services (CMS) infection control audit found 68% (n=46) of 68 ASCs surveyed had ≥ 1 lapse in infection control; 18% (n=12) had lapses in >3 of 5 infection control categories

2015

- An assessment of 4,045 ASC patients revealed 35 had confirmed surgical site infections (SSI)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4517738/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4439188/>

Case study: Surgical site infections following abdominoplasty (Oregon)

- 2 cases: SSIs involving deep wounds caused by *Mycobacterium fortuitum* following abdominoplasty
- Non-tuberculous mycobacteria (NTM)
- Performed by the same surgeon during the same week
- Oregon Patient Safety Commission (OPSC) conducted an on-site facility infection prevention assessment

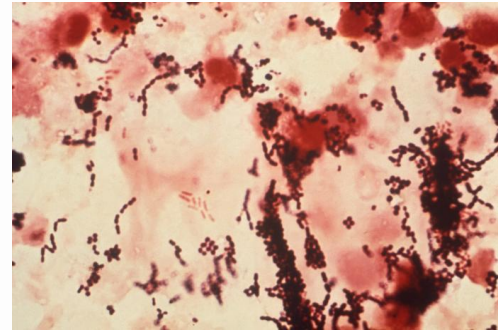
Case study: Surgical site infections following abdominoplasty (Oregon)

- No definitive source for NTM was identified; majority of assessed practices met infection control standards
- Infection prevention gaps identified in
 - Sterilization
 - Biological and chemical indicators
 - Documentation of autoclave loads
 - Documentation and labeling of packages
 - Positioning of instruments within autoclave
 - Condition of instruments
 - Environmental cleaning
 - Single-use devices
 - Safe injection practices



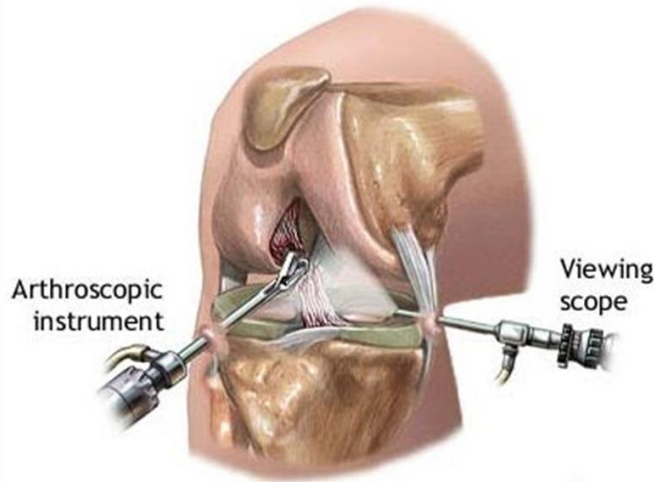
Case Study: Surgical site infections following ACL repair (Oregon)

- Infection preventionist at an ASC called to report three patients
 - Aged 18-32
 - Healthy apart from ACL surgery



- ACL surgery sites infected with *Finegoldia magna* (formerly *Peptostreptococcus magnus*)
 - Onsets: 1.5 year period, 2016-2017
 - Cases presented with septic arthritis, fever 17-34 days after surgery
 - All cases required multiple wash outs, 2-4 month antibiotic courses
 - One case had graft removed

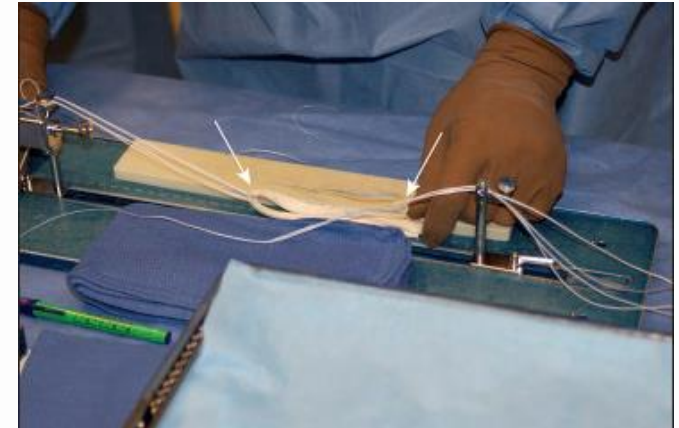
Case Study: Surgical site infections following ACL repair (Oregon)



- Epidemiologists from ACDP and LHD visited to observe surgeries, reprocessing, and infection control practices
- All three surgeries occurred in the same operating room in an ASC
 - ACL surgeries performed in all four operating rooms (ORs) at facility
 - Other surgeries also performed in this OR
- Two different surgeons, no staff common to all three surgeries
- Autologous hamstring grafts in all three surgeries, arthroscopic equipment used

Case Study: Surgical site infections following ACL repair (Oregon)

- ACDP epidemiologists
 - Observed two ACL surgeries
 - Took 23 environmental swabs
- Overall, facility looked clean and well-run
 - Some opportunities for improved masking
 - Small OR = some risk of cross-contamination with sterile areas
- Graft preparation tool used (pictured)
 - Graft handled by surgical assistant for ~25 minutes
 - Tool was ~8 years old, has cannulated area in the center, white Teflon board, many dents and cuts in metal



Case Study: Surgical site infections following ACL repair (Oregon)

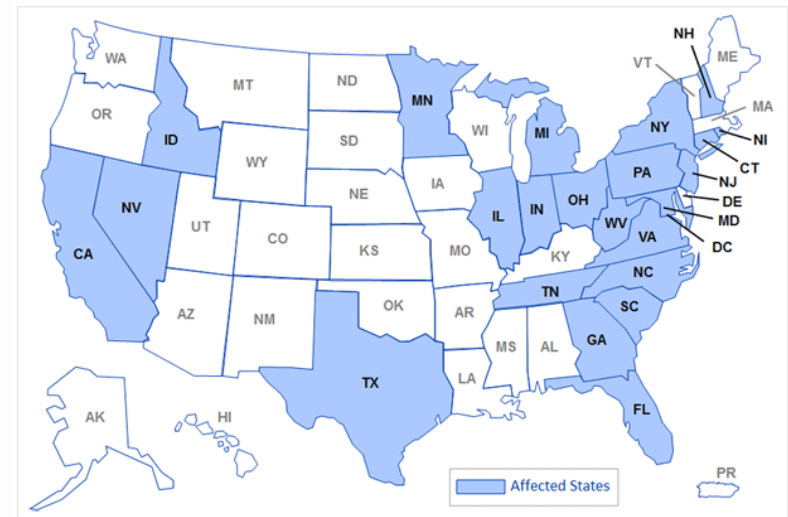
- No *F. magna* identified in environmental swabs, but Centers for Disease Control & Prevention (CDC) reported identification of
 - *Enterococcus faecium/lactis* from the outflow vent on the left side of OR
 - *Bacillus licheniformis* from inflow component of the suction waste management system
 - *Streptococcus oralis/mitis* from the fiberoptic light on arthroscopic telescope
- First two can be addressed through environmental cleaning; last is an oral colonizer
- Recommendations
 - Reinforce mask use and ensure OR staff are covering nose, mouth, facial hair during procedures and room turnover
 - Perform regular compliance observations for mask use and hand hygiene
- No new cases to date

Case Study: New England Compounding Center (multi-state outbreak)

- 2012: Start of 20-state outbreak investigation
- Contaminated preservative-free steroids compounded by the New England Compounding Center (NECC) directly injected into spine and joints
- Fungal meningitis and peripheral joint infections
 - Case count: 753
 - Deaths: 64
- Laboratory-confirmed organisms from NECC product samples included *Paenibacillus*, *Bacillus*, *Lysinibacillus*, *Kocuria*, *Penicillium*, *Cladosporium*, *Aspergillus*, and *Brevibacillus spp.*

Case Study: New England Compounding Center (multi-state outbreak)

- Facilities that received medications from recalled lots included
 - Hospitals
 - Pain management
 - Physical medicine (orthopedics)
 - Ambulatory surgery centers
- Approximately one third of facilities that received contaminated medications were ASCs



The take away

- Practice setting influences risk of certain types of events
 - Lots of surgeries = lots of risk for surgical site infections
 - General focus on SSI prevention: equipment processing, injection safety, hand hygiene
 - Particular focus for emergency preparedness: personal protective equipment (PPE), vaccination, travel monitoring, using data for action
- We do not always have control or knowledge about everything that happens in our facility
 - Medications
 - Cleaning products
 - Medical devices

October 8, 2014

New Delhi Metallo- β -Lactamase-Producing Carbapenem-Resistant *Escherichia coli* Associated With Exposure to Duodenoscopes

Lauren Epstein, MD, MSc^{1,2}; Jennifer C. Hunter, DrPH^{1,2}; M. Allison Arwady, MD^{2,3}; [et al](#)

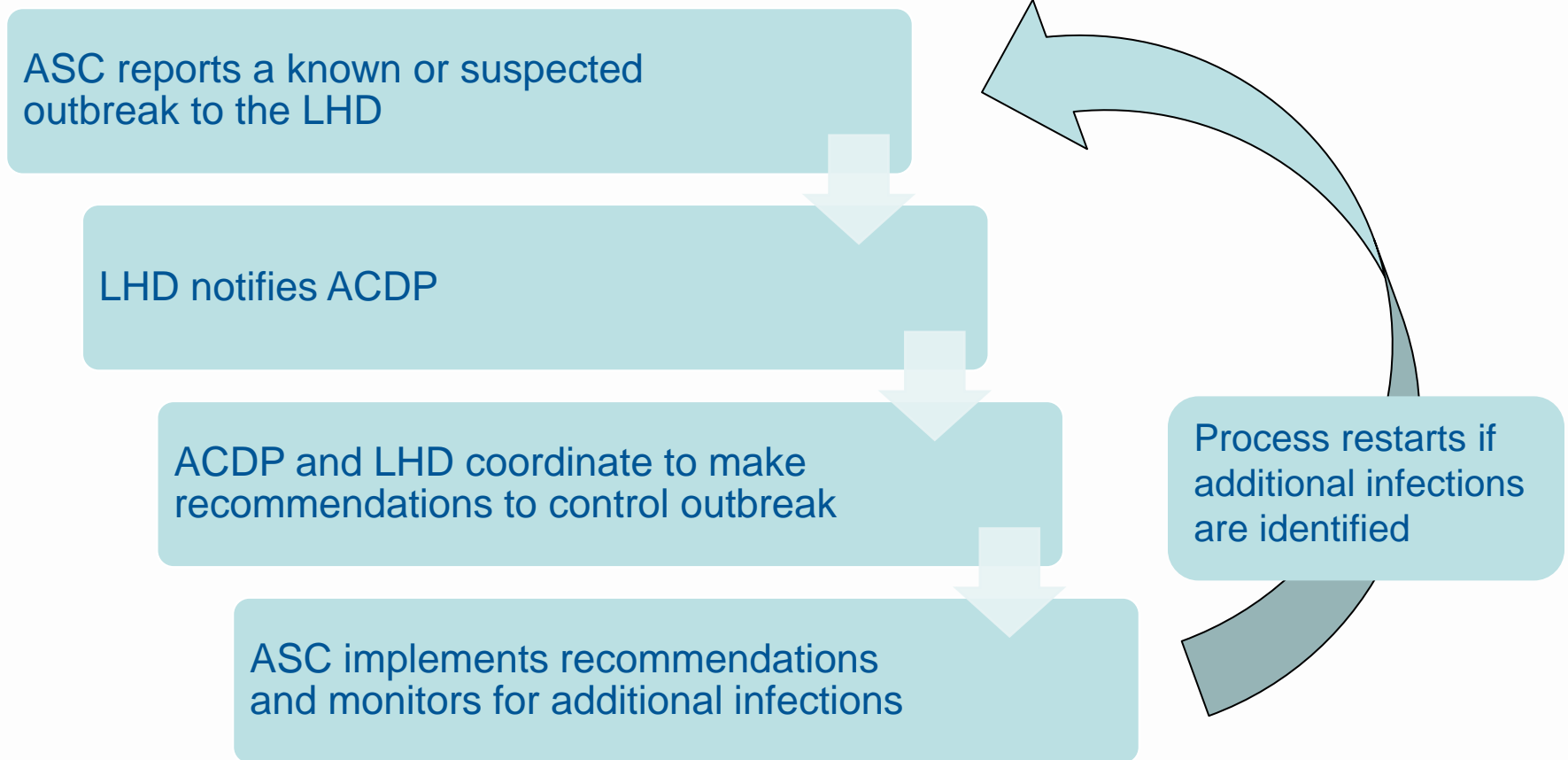
[» Author Affiliations](#) | [Article Information](#)

JAMA. 2014;312(14):1447-1455. doi:10.1001/jama.2014.12720

Engaging public health in outbreaks

- Oregon Health Authority's (OHA) Oregon Administrative Rule (OAR) 333-018-0015 requires HCP to report “any known or suspected disease outbreak, including any outbreak associated with health care, regardless of whether the disease, infection, microorganism, or condition is specified in this rule”
 - https://secure.sos.state.or.us/oard/viewSingleRule.action;JSESSIONID_OARD=MNdnZcvCg8SzHloa857P9iTkwwHNgdE_1E3NUaJ5-tKz2NReAb09!-1397433681?ruleVrsnRsn=240367
- Facilities must report outbreaks immediately to their LHD
 - LHD phone numbers:
<https://www.oregon.gov/oha/PH/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/lhd.aspx>
- ACDP has an epidemiologist on call 24/7: (971) 673-1111

Engaging public health in outbreaks

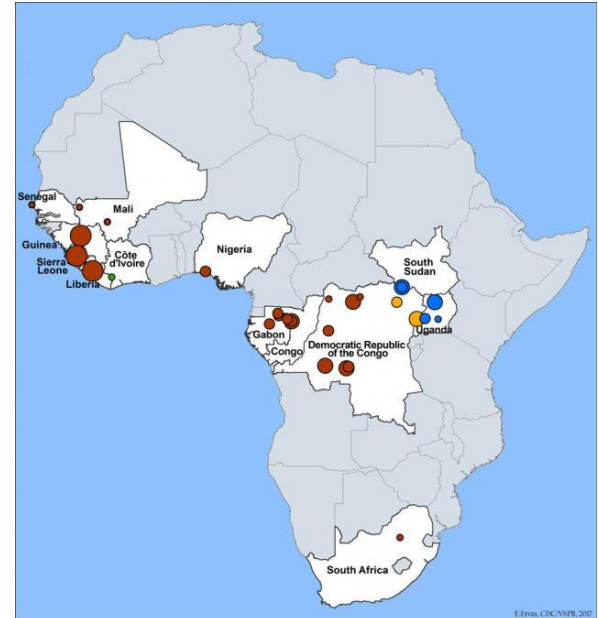


Preventing transmission

- Prevention, response, and preparedness are closely linked
 - Prevents exposures of HCP, patients, environment
 - Protects patient from undergoing care while health is compromised
- Maintain appropriate infection control practices at all times
- Focus on preventive measures (e.g., vaccination, situational awareness)
- Build upon education, training, practice, and evaluation
- Consider quality improvement projects

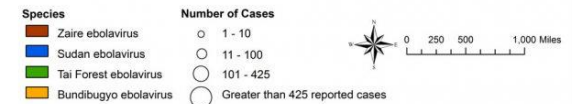
Monitoring patients for illness

- Global context
 - Ask patients about travel history, esp. if febrile
 - Ask patients about healthcare received outside of Oregon
- How will your facility handle monitoring as advisories come and go?



Ebola Virus Outbreaks by Species and Size, Since ~~1976~~ 2009

Country	Town	Cases	Deaths	Species	Year
Dem. Rep. of Congo	Bikoro	ongoing	ongoing	<i>Zaire ebolavirus</i>	2018
Dem. Rep. of Congo	Likati	8	4	<i>Zaire ebolavirus</i>	2017
Dem. Rep. of Congo	multiple	66	49	<i>Zaire ebolavirus</i>	2014
Multiple countries	multiple	28652	11325	<i>Zaire ebolavirus</i>	2014-2016
Uganda	Luwero District	6*	3*	<i>Sudan ebolavirus</i>	2012
Dem. Rep. of Congo	Isiro Health Zone	36*	13*	<i>Bundibugyo ebolavirus</i>	2012
Uganda	Kibaale District	11*	4*	<i>Sudan ebolavirus</i>	2012
Uganda	Luwero District	1	1	<i>Sudan ebolavirus</i>	2011



Leverage appropriate PPE

- “Specialized clothing or equipment worn by an employee for protection against infectious materials” – Occupational Safety & Health Administration (OSHA)
- Employers must provide PPE for HCP and ensure it is disposed or reprocessed appropriately
- Use if serving ill patients or if illness is discovered while a patient is already undergoing care
- CDC provides guidelines regarding what, when, and how to use PPE
 - Gloves: protect hands
 - Gowns/aprons: protect skin, clothing
 - Masks and respirators: protect mouth, nose, respiratory tract
 - Goggles: protect eyes
 - Face shields: protect face, mouth, nose, eyes

Leverage appropriate PPE

- When determining what PPE to use, consider the following:
 - Anticipated exposure (touch, splash)
 - Need for patient to be on transmission-based precautions (airborne, contact)
 - Durability and appropriateness of PPE (impermeable gown, extended cuff gloves)
 - Fit (available in all sizes needed for the workforce to be protected)
- Other considerations: Single use/reusable? Sterile/nonsterile? Purpose? Materials?
- Donning and doffing video (<https://www.cdc.gov/vhf/ebola/healthcare-us/ppe/training.html>)



Hand hygiene

- Cleaning hands is the single best way of reducing:
 - Spread of pathogens to patients
 - Risk of HCP colonization or infection with pathogens acquired from patients
- Select appropriate method (soap and water, antiseptic hand wash/rub, or surgical hand antisepsis)
- Know when and how to perform hand hygiene (e.g., before and after having direct contact with a patient's intact skin, after glove removal)
- Know when and how to use gloves
- Develop jewelry and nail care policies for staff, particularly those that are involved in clinical care or sterilization of equipment

Equipment reprocessing

- Major considerations
 - Single-use or multiple use?
 - Spaulding Criteria classify patient care items/equipment by risk
 - Critical items enter sterile tissue or the vascular system (purchased as sterile or sterilized with steam; liquid chemical sterilants; EtO/hydrogen peroxide gas plasma)
 - Semicritical items contact mucous membranes or non-intact skin (high-level disinfect)
 - Noncritical items come in contact with intact skin and not mucous membranes (disinfect)
 - What materials is the item made of?
 - Heat-sensitive? Long-term compatibility with method of cleaning/disinfection
 - Manufacturer's guidelines








Equipment reprocessing

- Liquid chemical sterilants: consider contact time, concentration, temperature, pH
- Steam or dry heat sterilizers: Biological, chemical, and mechanical indicators
- Review processes for pre-cleaning, loading, handling, and storage
- Immediate use steam sterilization (formerly flash sterilization)
 - Should not be used for convenience or to replace having sufficient equipment available
 - Consider use only when
 - A specific instrument is needed for an emergency procedure
 - Non-replaceable instrument has been contaminated and needs to be replaced to the sterile field immediately
 - When an item has dropped on the floor and is needed to continue a surgical procedure

Injection safety

- Clinicians self-report unsafe injection practices
 - Survey of 690 U.S. nurses and physicians
 - 12% of physicians and 3% of nurses indicate syringe reuse on multiple patients occurs in their workplace
 - During outbreak investigations, “Providers reported that they believed that changing the needles on the device was sufficient to prevent the transmission of infection”
- Outbreaks confirm this does occur
 - 1998-2008: 33 hepatitis B (HBV) and hepatitis C (HCV) outbreaks in U.S. healthcare settings resulting in 448 infected patients

Steps Every Healthcare Provider Should Take

-  Follow proper infection control practices and maintain aseptic technique during the preparation and administration of injected medications (e.g., perform hand hygiene).
-  Never administer medications from the same syringe to more than one patient, even if the needle is changed.
-  Never enter a vial with a used syringe or needle.
-  Do not use medications packaged as single-dose or single-use for more than one patient.
-  Do not use bags of intravenous solution as a common source of supply for more than one patient.
-  Limit the use of multi-dose vials and dedicate them to a single patient whenever possible.
-  Always use facemasks when injecting material or inserting a catheter into the epidural or subdural space.

Injection safety

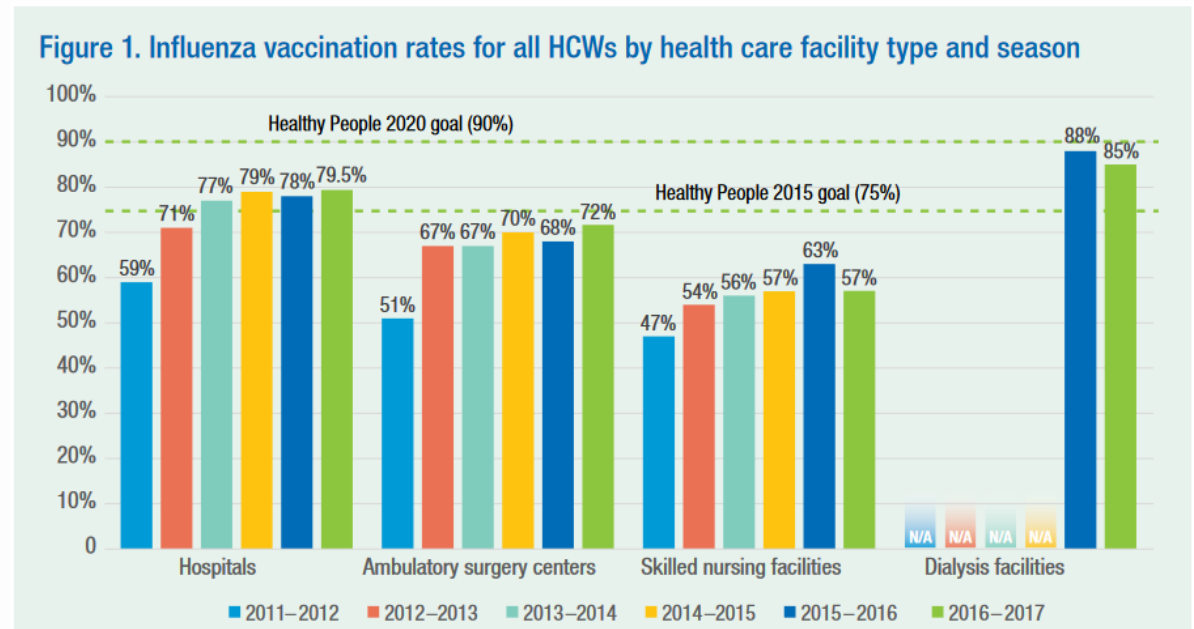
- Poor medication handling
 - Management and storage
 - Preparation
 - Compounding
 - Administration
- Poor hand hygiene
- Inappropriate equipment reuse and disposal, including blood glucometers
- Drug diversion
- Practice requirements
 - CDC's Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007) – III.A.1.b, IV.H (1-8)
 - OHA's OAR 333-019-0061, effective 1/1/18 requires all licensed healthcare providers to adhere to standard precautions defined in the CDC guideline

HCP influenza vaccination

- Influenza virus infections
 - 12,000-56,000 deaths and nearly 310,000 people hospitalized each year in the U.S.
 - Portland's 2016–2017 flu season: 1,466 flu-related hospitalizations
 - Five Oregon children's deaths over the past five years
- Immunizing HCP helps prevent the spread of influenza in health care settings. HCP may accidentally infect patients and coworkers with the influenza virus
- OHA requires Oregon hospitals, skilled nursing facilities, ASCs and dialysis facilities to report HCP influenza vaccination
- We compare rates to U.S. Department of Health and Human Services (DHHS) Healthy People 2020 target vaccination rate of 90%

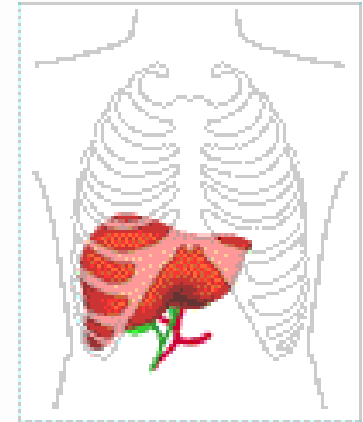
HCP influenza vaccination

- 2016-2017 influenza season
 - Skilled nursing facilities and ASCs did not meet 2015 Healthy People target (75%)
 - Oregon hospitals and dialysis facilities met the target rate



Exercise: Hepatitis C

- Your facility performs a surgical procedure on a patient known to be positive for hepatitis C
- Three weeks later, you are following up with another patient who received a procedure in the same room on the same day. You find that this person is now acutely infected with hepatitis C
- What special steps would you take when treating a patient positive for HCV?
- Would you find out about this?
- How?



Exercise: Hepatitis C

- Is this an outbreak?

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 - Yes! An unexpected number of similarly ill persons clustered by place and time should be reported.
 - OAR 333-018-0015: Health care providers must report “any known or suspected disease outbreak, including any outbreak associated with health care, regardless of whether the disease, infection, microorganism, or condition is specified in this rule”

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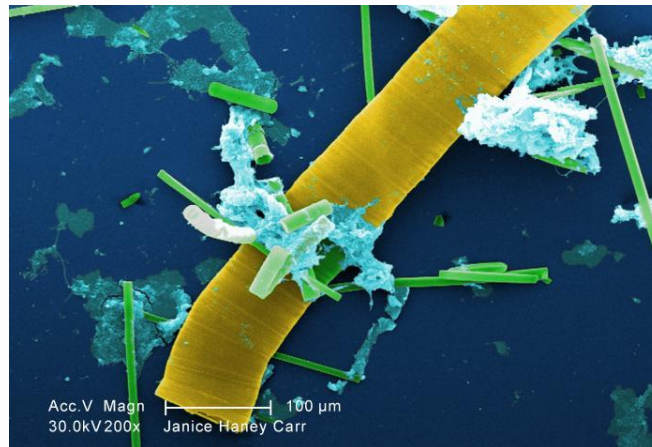
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- Who do I report it to? How? When?

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- Who do I report it to? How? When?
 - Report immediately to your LHD

Exercise: Algal bloom

- Your facility receives a notification that a bloom of cyanobacteria is currently underway at a nearby lake
- Small amounts of toxin have been found in the city's drinking water supply
- Exposure may damage the liver or kidneys; in some cases the nervous system may be impacted. It can also cause self-limiting gastrointestinal symptoms



Exercise: Algal bloom

- Messaging from public health indicates that a do not drink advisory is in place for people considered at increased risk from toxin exposure
 - Infants and children; people who are immunocompromised, receive dialysis treatment, or have pre-existing liver conditions; pregnant women and nursing mothers
 - Potentially the elderly and other sensitive populations

DO NOT DRINK THE TAP WATER – MAY 29, 2018

INFANTS, YOUNG CHILDREN, AND OTHER VULNERABLE INDIVIDUALS

Exercise: Algal bloom

- Your facility leadership wants to know what impact this will have on the procedures that are scheduled
 - Patients may be exposed either by drinking the water or through direct contact with mucus membranes, open wounds, or during surgical procedures
 - Health care facilities have been advised not to use tap water for patient care involving washing open wounds or exposed tissues; steam autoclaving; dental work; or dialysis
 - Tap water can be used to dilute disinfectants and clean surfaces

Exercise: Algal bloom

- Should my facility proceed with the scheduled procedures?

Exercise: Algal bloom

- Should my facility proceed with the scheduled procedures?
 - Evaluate your practice setting and patient population
 - Consider potential risk of cyanotoxin exposure, your facility's water treatment capability, and medical risk to patients

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 - Bottled or distilled water
 - Water treated by reverse osmosis
 - For dialysis, can use pre-packaged dialysate

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- How do I get all this information?
 - <https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/HARMFULALGAEBLOOMS/Pages/Blue-GreenAlgaeAdvisories.aspx>

Preparedness Cycle: All Hazards Approach























- Plan
 - Situational awareness
 - Risk assessment/planning
 - Policy/procedure development
 - Communications planning
- Organize/equip
 - Purchase appropriate PPE
 - Designate infection prevention lead
- Train
 - Complete self-guided training
 - Read policies/procedures
- Exercise
 - Practice PPE donning/doffing
 - Work through a policy/procedure
 - Drills and tabletops
- Evaluate/Improve
 - Continuous improvement
 - Lessons learned
 - Share best practices

2017 Oregon Public Health Hazard & Vulnerability Assessment

- Report provides summary data to inform public health emergency preparedness planning
 - Helps communities recognize relevant hazards and take steps to deal with them
 - Helps lessen impact on the community when emergencies occur
- Priorities identified by LHD emergency managers based on
 - Probability of occurrence
 - Public health consequences
 - Public health risk
 - Capabilities of individual health systems to respond to specific hazards

2017 Oregon Public Health Hazard & Vulnerability Assessment

Table 2. Top 10 hazards posing the largest risk to public health infrastructure, by region. (1 is largest.)

	Western Oregon	Central/Eastern Oregon
1	 Earthquake — Cascadia (3–5 minutes)	 Winter storm
2	 Public health emergency	 Wildfire (with urban interface)
3	 Flood — riverine	 Flood — riverine
4	 Winter storm	 Public health emergency
5	 Wildfire (with urban interface)	 Drought
6	 Earthquake — crustal (1 minute)	 Windstorm
7	 Landslide/debris flow	 Hazmat release — transportation
8	 Windstorm	 Landslide/debris flow
9	 Hazmat release — transportation	 Earthquake — crustal (1 minute)
10	 Hazmat release — fixed facility	 Hazmat release — fixed facility

Stay in touch & get involved

- Communicate with your LHD!
 - <https://www.oregon.gov/oha/PH/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/lhd.aspx>
- Join the Oregon/Southern Washington chapter of the Association for Professionals in Infection Control and Epidemiology (APIC)
 - <https://apic.org/>
- Request a free on-site infection control assessments through OPSC
 - Roza.p.tammer@state.or.us
- Subscribe to the Communicable Disease Summary & Flu Bites
 - <https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/CDSUMMARYNEWSLETTER/Pages/index.aspx>
 - <https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/DISEASESURVEILLANCEDATA/INFLUENZA/Pages/surveil.aspx>
- Attend Healthcare-Associated Infections Advisory Committee (HAIAC) meetings
 - <https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/HAI/PREVENTION/Pages/meetings.aspx>
- Become a member of CDC's One and Only Campaign to promote safe injection practice
 - <http://www.oneandonlycampaign.org/campaign-members>
- Review OHA's Injection and Needle Safety Toolkit
 - <https://www.oregon.gov/OHA/PH/DISEASESCONDITIONS/COMMUNICABLEDISEASE/HAI/PREVENTION/Pages/one-and-only.aspx>
- Sign up for the State Emergency Registry of Volunteers in Oregon
 - <https://www.oregon.gov/oha/PH/Preparedness/SERV-OR/Pages/index.aspx>

Additional resources

- CDC's Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007) – III.A.1.b, IV.H (1-8)
 - <https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html>
- OHA's OAR 333-019-0061, effective 1/1/18 requires all licensed healthcare providers to adhere to standard precautions defined in the CDC guideline
 - <https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=239050>
- Health Security, Preparedness, and Response
 - <https://www.oregon.gov/oha/PH/Preparedness/Partners/Pages/index.aspx>
- Acute and Communicable Disease Control
 - <https://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/COMMUNICABLEDISEASE/Pages/index.aspx>
- Healthcare-Associated Infections Program
 - <https://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/COMMUNICABLEDISEASE/HAI/Pages/index.aspx>

Questions & discussion

- Have you worked with your LHD or ACDP on an outbreak or infection control breach before? What was your experience like?
- What plans for outbreak detection and management does your facility currently have in place?

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