

Healthcare Infection Control and Recent Public Health Responses
Dr. Ryan Fagan, Centers for Disease Control
Broadcast live from 2015 APIC conference www.apic.org

Live broadcast from ...


APIC 2015 June 27-29
Nashville, TN

Healthcare Infection Control and Recent Public Health Responses

Dr. Ryan Fagan, MD, MPH&TM
Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
NO DISCLOSURES

The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion



www.webbertraining.com June 28, 2015

Outline

- Why outbreak investigations are important and brief overview of resources and recent CDC HAI outbreak activities and resources
- Examples
 - Ebola
 - MERS
 - Fungal meningitis
 - Unsafe injection practices
 - Duodenoscopes
- What CDC is doing
- Major questions and open issues for healthcare infection control

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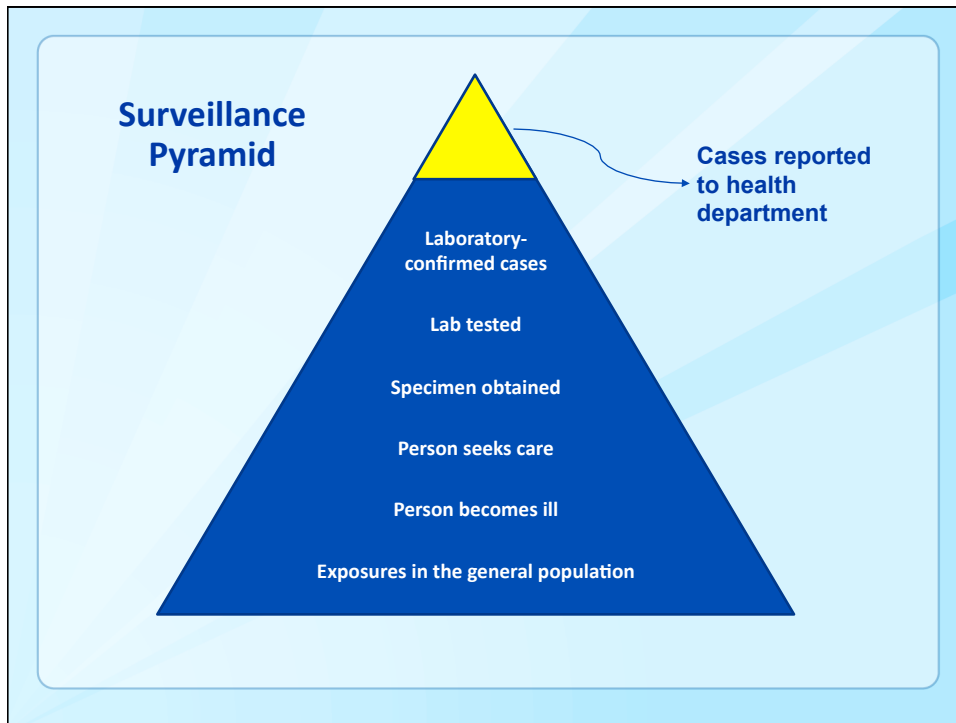
Why Outbreak Investigations Are Important

- **Prevent additional cases and future outbreaks**
- **Advance understanding of infection control gaps and challenges**
 - May be 'sentinel events' that indicate broader underlying problems
 - New diseases
 - Something new about an old disease
 - Unintended consequences
- **Help shape both educational and policy efforts to improve patient safety**
- **Reassure public**
- **Minimize economic and social disruption**

Challenge: How to Recognize an HAI (or Any) Outbreak?

- **Most public health jurisdictions require reporting of outbreaks:**
 - "An outbreak or unusual number or clustering of diseases or other conditions of public health importance"
- **But the definition of 'unusual' can vary:**
 - Any case of a very rare or serious communicable disease
 - Unusual syndromes or patient populations
 - Illnesses involving organisms that are not normally pathogenic
- **Many Challenges**
 - Baseline surveillance data may be limited
 - Linking illnesses among patients who may be evaluated across different providers, departments, facilities, health jurisdictions
 - Outbreaks involving common pathogens may be harder to recognize
 - Most facilities have limited resources to recognize and investigate possible outbreaks

<http://www.epi.alaska.gov/pubs/conditions/ConditionsReportablePg06.pdf>



Who's in Position to Recognize HAI Outbreaks?

- Often, IPs are! *But unlike what Smokey says about fires, not just you (IPs)*
- It helps us to hear from you about possible outbreaks
- We can't learn from outbreaks if we don't know about them



Healthcare Associated Infection (HAI) Outbreaks: CDC 2014 Annual Highlights

- CDC (DHQP) participated in 88 response activities
 - Variety of settings
 - Acute care (40)
 - Ambulatory care (34)
 - Long-term care (6)
 - 31 different states, including 3 multistate activities
 - 6 foreign countries (Guinea, Kingdom of Saudi Arabia, Liberia, Nigeria, Switzerland and the United Arab Emirates)
 - 12 Epi-Aids

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HAI Outbreaks: CDC 2014 Annual Highlights

- Wide variety of organisms
 - Bacterial (38)
 - Gram negative (18) – 13 unique genera
 - CRE (9)
 - NTM (5)
 - Viral (34)
 - HCV (13)
 - HBV (11)
 - Ebola (4)
 - Fungal (5)
 - *Aspergillus spp* (2)
 - *Rhizopus spp* (1)

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Healthcare-associated Infections (HAIs)

Healthcare-associated Infections

- Data and Statistics
- Types of Infections
- Diseases and Organisms
- Preventing HAIs
- Map: HAI Prevention Activities
- Research
- Patient Safety
- Outpatient Settings
- Laboratory Resources
- Outbreak and Patient Notifications**
- CDC Statement LA CRE
- Outbreaks & Patient Notifications
- Outbreak Resources
- Multistate Meningitis Outbreak
- Widgets, Buttons and Badges

[Healthcare-associated Infections](#)

Outbreaks and Patient Notifications

Healthcare-associated infection (HAI) outbreaks and patient notifications are often the result of either failures in infection control practices or contaminated devices or medications.

CDC investigates outbreaks of HAIs and other adverse events that are caused by contaminated devices and drugs, emerging pathogens, or breaches in infection prevention and control practices. This is done in collaboration with public health partners, including state, county, and city health departments, and federal regulatory agencies, such as the United States [Food and Drug Administration \(FDA\)](#).

It is important to note, many healthcare outbreaks are identified and investigated by individual facilities with the assistance of local or state health departments. CDC provides both phone and on-site consultation, as well as laboratory assistance, at the request of state health departments. On-site assistance is typically for outbreaks that cause severe illness, are very large, or unusual (e.g., emerging pathogens). During and after an outbreak, CDC advises the public about what they can do to protect themselves, advises the medical and public health community about how to prevent future infections, and works closely with policymakers, regulatory agencies and industry to learn how to prevent similar outbreaks in the future.

[Resources for state health departments investigating HAI outbreaks and patient notifications](#)

• <http://www.cdc.gov/hai/outbreaks/index.html>

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Free and Public Resources

- **CDC HAI Outbreak Investigation Toolkit**
- <http://www.cdc.gov/hai/outbreaks/outbreaktoolkit.html>
 - Video presentation about outbreak investigation in healthcare settings
 - Outbreak investigation abstraction form with users guide
- **Outbreak Database (worldwide)** <http://www.outbreak-database.com/Home.aspx>

Ranking	DOI	Matchcode	Title	Author	Language	Publication Type	Study Type	Reference Year	Articles Related	Further
(in %)	(DOI)	(MC)	(T)	(AU)	(LA)	(PT)	(ST)	(Y)	(A)	(AR)
1	10.1186/1745-2875-10-10	hepatitis-B	Outbreak of hepatitis B infection associated with endoscopic long-term care facility	Miao ME, Shavano V, et al.	English	original	observatory	2012	0	0
2	10.1186/1745-2875-10-10	hepatitis-B	Outbreak of hepatitis B infection associated with endoscopic long-term care facility	Lambert R, et al.	English	report	case report	2012	0	0

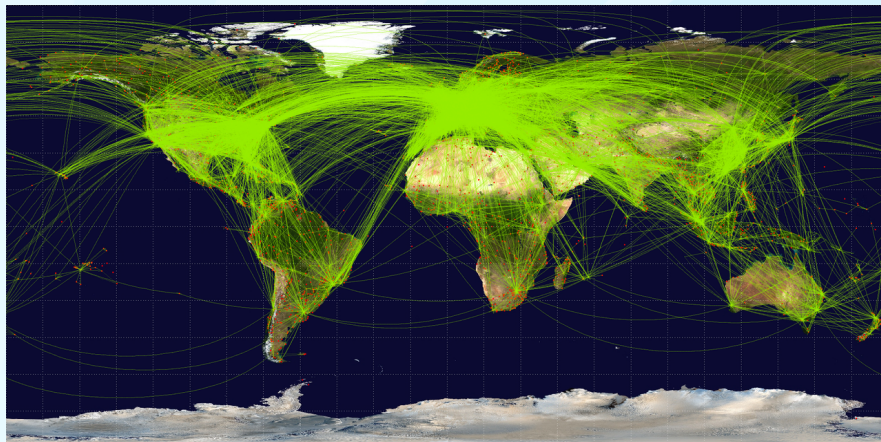
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TRAVEL AND COMMUNICABLE DISEASES

Communicable disease X (Ebola, MERS, TB, measles...) – Coming soon to a neighborhood near you? Lessons learned about communicable disease and air travel

Travel Medicine and Infectious Disease (2015) 13, 3e5

World Airline Route Map*



*"World-airline-routemap-2009" by Jpatokal - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - <https://commons.wikimedia.org/wiki/File:World-airline-routemap-2009.png#/media/File:World-airline-routemap-2009.png>

Usefulness and applicability of infectious disease control measures in air travel: A review

Y.L. Huizer ^a, C.M. Swaan ^{a,*}, K.C. Leitmeyer ^b, A. Timen ^a

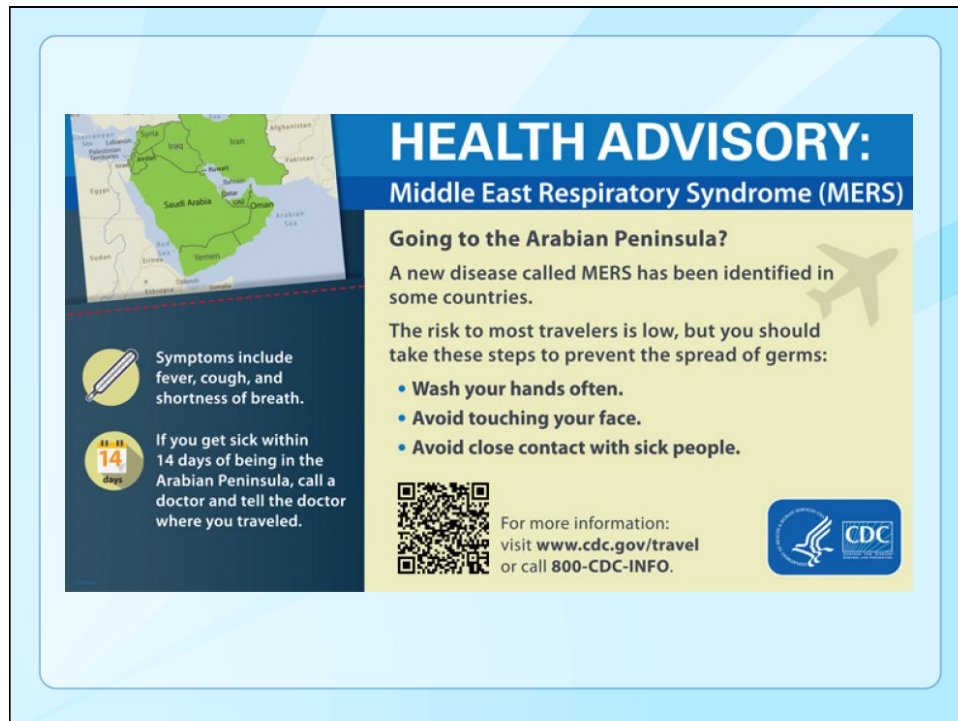
- Air travels remains a major contributor to the spread of communicable diseases
- Control measures are resource intensive and effectiveness is largely dependent on (and frequently limited by) behavior of individuals
 - Entry & exit screening
 - Traveler information
 - Quarantine, isolation, health monitoring
 - Contact tracing
 - Hygiene measures (face masks, hand hygiene, etc)
 - Travel restrictions
 - Animal
 - Vector control
 - Contaminated materials

Travel Medicine and Infectious Disease (2015) 13, 19e30

Implications for Healthcare Infection Control

- Healthcare providers remain critical to controlling the spread of communicable diseases
- Travel histories should be routinely sought from patients to facilitate early detection of possible communicable diseases in travelers
 - Avoid missed opportunity to implement appropriate isolation and infection control measures, as well as potential life saving treatment for ill traveler
 - Healthcare personnel (HCP) and patients are at risk
 - These events are increasingly common and will likely continue to occur
 - *Note that many HCP volunteer overseas*

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HEALTH ADVISORY:
Middle East Respiratory Syndrome (MERS)


Going to the Arabian Peninsula?
A new disease called MERS has been identified in some countries.
The risk to most travelers is low, but you should take these steps to prevent the spread of germs:

- Wash your hands often.
- Avoid touching your face.
- Avoid close contact with sick people.

Symptoms include fever, cough, and shortness of breath.

If you get sick within 14 days of being in the Arabian Peninsula, call a doctor and tell the doctor where you traveled.




For more information: visit www.cdc.gov/travel or call 800-CDC-INFO.



Middle East Respiratory Syndrome (MERS)

- **May 2014, 2 unlinked imported cases to the U.S.***
 - Indiana
 - Florida
- **Both cases were among HCP who lived and worked in Saudi Arabia**
- **Both hospitalized in the U.S. and recovered**

Interim Infection Prevention and Control Recommendations for Hospitalized Patients with Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

   <http://www.cdc.gov/coronavirus/mers/infection-prevention-control.html>

UPDATED June 2015 On this Page

*<http://www.cdc.gov/coronavirus/mers/us.html>

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ASIA PACIFIC 20 COMMENTS

MERS Virus's Path: One Man, Many South Korean Hospitals

한국어로 읽기 | Read in Korean

By CHOE SANG-HUN JUNE 6, 2015

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SEOUL, South Korea — At first, doctors thought the 68-year-old man might have simple pneumonia. He coughed and wheezed his way through four hospitals before officials figured out, nine days later, that he had something far more serious and contagious.

Along the way, health officials said, the man infected dozens who then became potential carriers themselves and infected dozens more and counting.



<http://www.nytimes.com/2015/06/09/world/asia/mers-virus-path-one-man-many-south-korean-hospitals.html>

- ❑ **“The original diagnosis that missed what became South Korea’s first case of Middle East respiratory syndrome, or MERS, was possibly caused by incomplete information from the patient about his travels”**
- ❑ **South Korea outbreak summary, WHO***
 - 126 cases (including 10 HCP) and 11 deaths
 - Single transmission chain involving 44(!) hospitals where transmission occurred or confirmed patient visited before diagnostic confirmation
 - >3,600 contacts

*<http://www.who.int/csr/don/12-june-2015-mers-korea/en/>

Ebola: Dallas Experience, September-October 2014

- **First ever Ebola Case diagnosed in US**
 - Index patient was a traveler from Liberia
 - Two nurses who cared for the index patient subsequently became infected
- **Healthcare associated transmission had major disruptive impact on hospital and community**





<http://www.nbcdfw.com/news/local/Ebola-Hazmat-Crew-Finishes-Work-at-Dallas-Apartment-278267921.html>

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Dallas Experience, September-October 2014

- **Key CDC Investigation Findings**
 - No specific exposures that led to transmission were identified
 - Hypothesis that transmission of Ebola virus occurred in the early part of the index patient's MICU stay
 - Index patient had a high viral load and copious diarrhea during this period
 - Use of unconventional and unfamiliar PPE
 - Consistent with typical incubation period of 9-12 days
 - Absence of infection among others who cared for the index patient is noteworthy
 - Standard practice
 - Unconventional practice

Insights

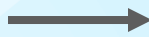
- **Sense of fear**
 - Unorthodox use of PPE may paradoxically increase risk of transmission.
- **In emotionally charged situations where fear is a factor, there may be advantages to providing guidance that is more prescriptive, minimizes potential for error and self contamination, increases confidence, and allays fear among healthcare workers**
 - Including trained observers to alert healthcare worker to possible contamination during care, and ensure safe donning and doffing

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Dallas Experience, Summary and Conclusions

- **Decisions on guidance must be based on science and experience**
 - Must be prepared to adapt as experience changes
- **The Dallas experience provided lessons that prompted important updates in guidance and approach**

More permissive,
less prescriptive



More structured,
prescriptive

Uniform approach to
patient management
across all healthcare
facilities



Tiered
approach to
management

The screenshot shows the CDC website page for Ebola (Ebola Virus Disease). On the left is a sidebar with a list of topics: About Ebola, 2014 West Africa Outbreak, Outbreaks, Signs and Symptoms, Transmission, Risk of Exposure, Prevention, Diagnosis, Treatment, Sierra Leone Vaccine Trial, Information for Specific Groups, U.S. Healthcare Workers and Settings (highlighted), Preparing for Ebola - A Tiered Approach, Personal Protective Equipment (PPE), Evaluating Patients, and Cleaning and Disinfecting. The main content area is titled "U.S. Healthcare Workers and Settings" and features a grid of links: PREPARING FOR EBOLA - A TIERED APPROACH, EMERGENCY SERVICES, PERSONAL PROTECTIVE EQUIPMENT (PPE), HOSPITALS, EVALUATING PATIENTS, OUTPATIENT AND AMBULATORY CARE SETTINGS, CLEANING AND DISINFECTING HEALTHCARE ENVIRONMENTS, LABORATORIES, and International (Non U.S.) Settings. A "More From CDC" section includes "Interim U.S. Guidance for Monitoring and Movement of Persons with Potential Ebola Virus Exposure".

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Frontline Healthcare Facility

- Quickly identifies and isolates patients with possible Ebola
- Facility infection control and site and local public health officials
- Has enough Ebola personal protective equipment (PPE) for at least 12-24 hours of care
- Prepares for patient transfer, if needed

Ebola Assessment Hospital

- Safely receives and isolates a patient with possible Ebola
- Provides immediate laboratory evaluation and coordinates Ebola testing
- Cares for a patient for up to 5 days (including evaluation and management of alternative diagnoses) until Ebola diagnosis is confirmed or ruled out
- Has enough Ebola PPE for up to 5 days of care
- Transfers a patient with confirmed Ebola to an Ebola treatment center in consultation with public health officials

Ebola Treatment Center

- Safely receives and isolates a patient with confirmed Ebola
- Cares for patients with Ebola for duration of illness
- Has enough Ebola PPE for at least 7 days of care (full restock as needed)
- Has workable staffing plan to manage several weeks of care
- CDC Ebola Response Teams (CERT) are ready to deploy to provide assistance as needed

All of the hospitals will be prepared to do the following:

- Ensure staff are appropriately trained and have documented competency in safe PPE practices
- Have systems in place to safely manage waste disposal, cleaning and disinfection
- Adhere to infection control protocols

News

FOR IMMEDIATE RELEASE
 June 12, 2015

Contact: ASPR Press Office
 202-205-8165

HHS selects nine regional Ebola and other special pathogen treatment centers

<http://www.cdc.gov/vhf/ebola/healthcare-us/preparing/hospitals.html>

What Do Our Experiences with Ebola Preparedness Say about Transmission of Common HAI Pathogens?

Multistate Point-Prevalence Survey of Health Care-Associated Infections

Shelley S. Magill, M.D., Ph.D., Jonathan R. Edwards, M.Stat., Wendy Bamberg, M.D., Zintars G. Beldavs, M.S., Ghinwa Dumyati, M.D., Marion A. Kainer, M.B., B.S., M.P.H., Ruth Lynfield, M.D., Meghan Maloney, M.P.H., Laura McAllister-Hollod, M.P.H., Joelle Nadle, M.P.H., Susan M. Ray, M.D., Deborah L. Thompson, M.D., M.S.P.H., Lucy E. Wilson, M.D., and Scott K. Fridkin, M.D., for the Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Study

Table 3. Reported Causative Pathogens, According to Type of Infection.*

Pathogen	All Health Care-Associated Infections (N=506)	Pneumonia (N=110)	Surgical-Site Infections (N=110)	GI Infections (N=96)	UTIs (N=65)	Bloodstream Infections (N=59)
	no. (%) rank			number (percent)		
<i>Clostridium difficile</i>	61 (12.1) 1	0	0	61 (70.9)	0	0
<i>Staphylococcus aureus</i>	54 (10.7) 2	18 (16.4)	17 (15.5)	1 (1.2)	2 (3.1)	7 (14.0)
<i>Klebsiella pneumoniae</i> or <i>K. oxytoca</i>	50 (9.9) 3	13 (11.8)	15 (13.6)	1 (1.2)	15 (23.1)	4 (8.0)
<i>Escherichia coli</i>	47 (9.3) 4	3 (2.7)	14 (12.7)	1 (1.2)	18 (27.7)	5 (10.0)

- Estimated 720,000 HAIs in U.S. hospitals in 2011*
 - 75,000 related deaths
 - Role of healthcare personnel (HCP) and unrecognized contamination (hands, surfaces, equipment) during patient care
- Common HAI pathogens typically don't cause illness among HCP but can be silently transferred via contaminated hands or equipment

*N Engl J Med 370:13 nejm.org march 27, 2014

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UNSAFE INJECTION PRACTICES AS UNINTENDED CONSEQUENCES

Mishandling of Medications
Reuse of Syringes

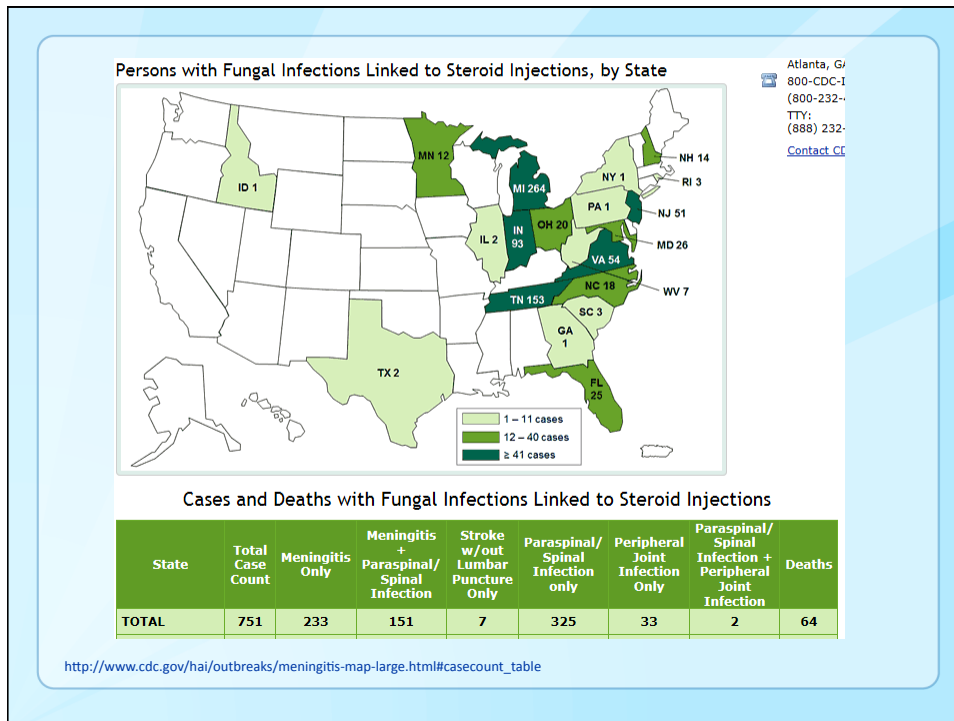


Vials of the steroid distributed by New England Compounding Center (NECC) - implicated in a meningitis outbreak - are pictured in this undated handout photo obtained by Reuters October 14, 2012. Reuters file

“The 2012 outbreak shocked Americans and set off investigations by Congress and the Food and Drug Administration. The FDA’s since overhauled how it manages so-called compounding pharmacies - which the law and regulations had treated as mom-and-pop operations, but which often act more like large-scale pharmaceutical manufacturers.”

<http://www.nbcnews.com/health/health-news/feds-file-murder-charges-fungal-meningitis-outbreak-n270106>

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CURRENT OPINION

Lessons learned in the multistate fungal infection outbreak in the United States

Causes and root causes of a multistate fungal meningitis outbreak

Peter G. Pappas

- Public health investigation triggered by reporting of initial cases by individual facilities to local health depts (TN, then MI, VA, OH, IN, others) and subsequently to CDC and FDA

"Over a period of a few weeks following the report of the first case ... the source of the outbreak was determined, new cases were averted, and a proactive approach to early case identification and treatment was initiated. The precise and rapid means by which this outbreak was abrogated represents one of the more important achievements of the public health community in recent years."
- Favorable market for large scale sterile compounding
 - Small hospitals and clinics unable to support industry standards for sterile compounding
 - Problems with drug shortages from other sources

Curr Opin Infect Dis 2013, 26:545-550; J Am Pharm Assoc (2003). 2015 Mar-Apr;55(2):118

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Financial Pressure, Single-Use Vials and Repackaging: Endophthalmitis Example

- **March 2013 outbreak in Georgia and Indiana**
 - Serious infection with potential permanent vision loss
 - Rare organisms: *Granulicatella adiacens* (human oral flora) and *Abiotrophia*
 - Contamination during compounding pharmacy repackaging of single use, 4-mL vials of bevacizumab (\$550 each!)
 - Numerous prior outbreaks worldwide →

Endophthalmitis Outbreak Associated with Repackaged Bevacizumab

Laura S. Edison, Hope O. Dishman,
 Melissa J. Tobin-D'Angelo, C. Richard Allen,
 Alice Y. Guh, and Cherie L. Drenzek

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 21, No. 1, January 2015

1. **Endophthalmitis outbreak associated with repackaged bevacizumab**
 Edison LS, Dishman HO, Tobin-D'Angelo MJ, Allen CR, Guh AY, Drenzek CL. *Emerg Infect Dis*. 2015 Jan;21(1):171-3. doi: 10.3201/eid2101.141940. No abstract available. PMID: 25531166 Free PMC Article [Similar articles](#)
2. **Bevacizumab: a report of 2 patients**
 Matthews JL, Dubovy SR, Goldberg RA, Flynn HW Jr. *Ophthalmology*. 2014 Mar;121(3):702-8. doi: 10.1016/j.ophtha.2013.10.015. Epub 2014 Jan 16. PMID: 24439760 [Similar articles](#)
3. **An outbreak of fungal endophthalmitis after intravitreal injection of compounded combined bevacizumab and triamcinolone**
 Sheyman AT, Cohen BZ, Friedman AH, Ackert JM. *JAMA Ophthalmol*. 2013 Jul;131(7):964-9. doi: 10.1001/jamaophthol.2013.88. PMID: 23640284 [Similar articles](#)
4. **Streptococcus endophthalmitis outbreak after intravitreal injection of bevacizumab: one-year outcomes and investigative results**
 Goldberg RA, Flynn HW Jr, Miller D, Gonzalez S, Isom RF. *Ophthalmology*. 2013 Jul;120(7):1448-53. doi: 10.1016/j.ophtha.2012.12.009. Epub 2013 Feb 28. PMID: 23453511 Free PMC Article [Similar articles](#)
5. **Acute intraocular inflammation caused by endotoxin after intravitreal injection of counterfeit bevacizumab in Shanghai, China**
 Wang F, Yu S, Liu K, Chen FE, Song Z, Zhang X, Xu X, Sun X. *Ophthalmology*. 2013 Feb;120(2):355-61. doi: 10.1016/j.ophtha.2012.07.063. Epub 2012 Oct 18. PMID: 23044126 [Similar articles](#)
6. **An outbreak of streptococcus endophthalmitis after intravitreal injection of bevacizumab**

Hemodialysis Center Example

SERRATIA LIQUEFACIENS BLOODSTREAM INFECTIONS FROM CONTAMINATION OF EPOETIN ALFA AT A HEMODIALYSIS CENTER

LISA A. GROHSKOPF, M.D., M.P.H., VIRGINIA R. ROTH, M.D., DANIEL R. FEIKIN, M.D., M.S.P.H.,
 MATTHEW J. ARDUINO, DR.P.H., LORETTA A. CARSON, M.S., JEROME I. TOKARS, M.D., M.P.H., STACEY C. HOLT, M.M.Sc.,
 BETTE J. JENSEN, M.S., RICHARD E. HOFFMAN, M.D., M.P.H., AND WILLIAM R. JARVIS, M.D.

- **Financial pressure**
 - Single-use 1-mL vials of epoetin alfa (\$85 each)
 - Single-use can lead to the waste of \$1.1 million worth of medication annually, for a facility serving 150 patients, for which no reimbursement is received
 - 'There is concern that with constraints on reimbursement and increasing privatization, dialysis providers are motivated to control costs, sometimes to the detriment of patient care.'
- **Contamination occurred after single-use vials were punctured more than once**

[N Engl J Med](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4284426/). 2001 May 17;344(20):1491-7.

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[Mayo Clin Proc. 2014 Jul;89\(7\):878-87. doi: 10.1016/j.mayocp.2014.04.007. Epub 2014 Jun 2.](http://dx.doi.org/10.1016/j.mayocp.2014.04.007)

Outbreaks of infections associated with drug diversion by US health care personnel.

[Schaefer MK¹](#), [Perz JF²](#).

⊕ Author information

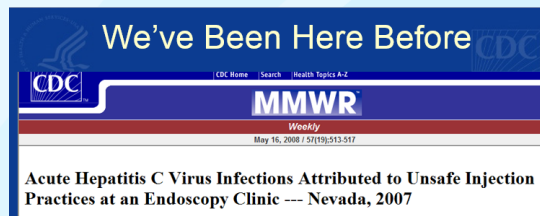
- Tampering with injectable controlled substances
- Unauthorized access to drugs can be an unintended consequence of processes designed to improve efficiency (e.g., prefilled labeled syringes, extra supplies for procedures)
- Outbreaks reveal gaps in prevention, detection, and response to drug diversion in U.S. healthcare facilities
- Highlight need for:
 - Security measures
 - Active monitoring systems
 - Response that includes assessment of harm to patients, notification to public health as well as enforcement agencies



<http://www.newsweek.com/2015/06/26/traveler-one-junkies-harrowing-journey-across-america-344125.html>

Unsafe Injection Practices: We've Been Here Before (Again)

Slide from CDC
(Arjun Srinivasan)
Presentation at
APIC 2009



- Outbreaks are reflections of the intense financial pressures that are a reality in healthcare
- Keep these 'hidden costs' in mind as we think about issues related to improving healthcare, patient safety, and medication safety

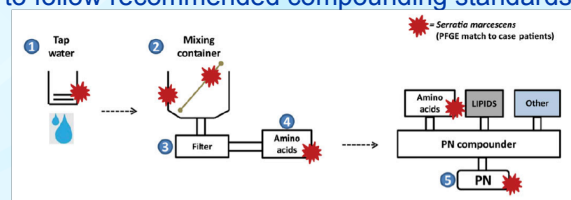
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ANOTHER EXAMPLE: PARENTERAL NUTRITION

Outbreak of *Serratia marcescens* Bloodstream Infections in Patients Receiving Parenteral Nutrition Prepared by a Compounding Pharmacy

Neil Gupta,^{1,2} Susan N. Hocevar,^{1,2} Heather A. Moulton-Meissner,² Kelly M. Stevens,³ Mary G. McIntyre,³ Bette Jensen,² David T. Kuhar,² Judith A. Noble-Wang,² Rick G. Schnatz,⁴ Shawn C. Becker,⁴ Eric S. Kastango,⁵ Nadine Shehab,² and Alexander J. Kallen²

- 19 patients, 6 healthcare facilities, 9 deaths
- 43% of surveyed US hospitals >600 beds outsource nutrition support preparations
- Outbreak associated with compounding of nonsterile amino acid components initiated due to manufacturer shortage combined with failure to follow recommended compounding standards



Clinical Infectious Diseases 2014;59(1):1–8

34

ENDOSCOPES & CHALLENGES POSED BY NEW TECHNOLOGIES

We've Been *Here* Before, Too

- Another slide from APIC 2009 →

Issues with Endoscope Repair

- HEIC was alerted by microbiology lab of five cases of *P. putida* recovery from bronchoalveolar lavage over three days.
- They were able to identify the three bronchoscopes used in all five cases.
 - These bronchoscopes had been previously recalled and repaired by the manufacturer due to a problem with loosening of the biopsy port cap leading to sequestration of bacteria.

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... And It's a Hot Topic at APIC 2015
(So I'll Keep it Brief)

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APIC 2015 June 27-29 Nashville, TN

Program Planner

endoscope

- 900 Disinfection, Sterilization, and Antisepsis: Principles, Practices, Current Issues, New Research, and New Technologies
- 2602 Duodenoscopes
- How to Minimize Transmission Risks with Medical Devices: Lessons from the Recent CRE Outbreaks and New Research on HLD Efficacy and Human Papillomavirus (HPV)
- 2306 Reprocessing Endoscopes in Ambulatory Care Settings: What, When, Why, and Where?
- 2306 The Evidence behind New Guidelines for Reprocessing Flexible Endoscopes
- 3605 Using Performance Improvement Tools in Infection Prevention: Failure Modes and Effects Analysis in the GI Center

APIC 2015 LIVE ON STAGE

Pre-conference Brochure

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Cleaning and Disinfecting Duodenoscopes

Even when the devices are cleaned strictly in accordance with manufacturers' FDA-approved guidelines, "they have a lot of intricate mechanisms and pieces that are very difficult to disinfect," says Alex Kallen, an infectious-disease physician at the CDC who helped direct the investigation. "There definitely is a risk of (disease) transmission with these scopes."

<http://www.usatoday.com/story/news/2015/01/21/bacteria-deadly-endoscope-contamination/22119329/>

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Dr. Ryan Fagan, Centers for Disease Control
Broadcast live from 2015 APIC conference www.apic.org

Recent Duodenoscope Clusters

Notification Dates	Manufacturer	Organism
July 2013	Pentax	NDM-Producing <i>E. coli</i>
November 2013	Olympus	NDM-producing <i>E. coli</i>
November 2013	Olympus	Plasmid AmpC-producing <i>E. coli</i>
May 2014	FujiFilm	KPC-producing <i>K. pneumoniae</i>
June 2014	Olympus	KPC-producing <i>K. pneumoniae</i>
February 2015	Olympus	OXA-48-type-producing <i>K. pneumoniae</i>
March 2015	Olympus	KPC-producing <i>K. pneumoniae</i>
March 2015	Olympus	ESBL-producing <i>E. coli</i>

Common Themes from CDC Duodenoscope Investigations

- **Clusters detected due to presence of very unusual organisms**
 - No reason CDC aware of that these organisms would be more likely to persist than other organisms
- **Duodenoscopes linked to transmission have been of variable ages (weeks old to years old)**
 - Have involved open and closed elevator wire endoscopes although closed more common
- **Facilities often perceived problems removing debris with what they felt was recommended procedures**
 - Employed other brushes or steps
- **Many facilities had some deviations from recommended practice**
 - Additional brushes
 - Detergents or disinfectants not on manufacturers list
- **Cultures positive months after last use**

Interim Duodenoscope Surveillance Protocol

Interim Protocol for Healthcare Facilities Regarding Surveillance for Bacterial Contamination of Duodenoscopes after Reprocessing

Highlights of CDC protocol:

- **Timing: Minimum of every 4 weeks or 60 procedures for each duodenoscope**
 - Other options including after each procedure or weekly (on Friday)
 - Holding duodenoscopes prior to culture results an option
- **Organisms: Defines high-concern and low-concern organisms**
 - High-concern – more often associated with disease
 - Low-concern - less often associated with disease; potentially a result of contamination during collection
- **Areas to target (minimum)**
 - Area around elevator mechanism
 - Instrument channel

<http://www.cdc.gov/hai/organisms/cre/cre-duodenoscope-surveillance-protocol.html>

Surveillance Cultures: Caveats

- **Short-term option – Not a recommendation or requirement**
 - May not be feasible everywhere
- **Protocol is needed for clusters (outbreaks)**
- **Not a substitute for good reprocessing practices**
- **Many challenges, requires discussion at facility level to identify solutions**
- **Has been used in outbreaks but not a validated protocol**
 - Sensitivity unknown – these results alone should not rule out transmission

* Citations, references, and credits – Myriad Pro, 11pt

Potential Long-term Solutions

- **Duodenoscope redesign**
 - Removable distal end caps
 - Single-use parts
- **New or modified reprocessing**
 - Validated high-level disinfection instructions
 - What should be required before instructions approved
 - Sterilization
 - Use of forced air drying cabinets
- **Improved/ validated reprocessing assessment**
 - ATP or other non-culture methods
 - Some of these best for cleaning – do not asses entire process
 - Surveillance cultures

WHAT ELSE IS CDC DOING?

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Supplemental Funding to Improve Healthcare Infection Control Assessment and Response Activities

- **2-3 year cooperative agreements between CDC and state and local health departments**
- **Infection control assessment programs**
 1. Expanded state HAI plans and advisory groups
 2. Inventory of healthcare settings in state
 3. Ebola assessment hospitals
 4. Outbreak reporting and response in healthcare facilities
- **Targeted healthcare infection prevention programs**
 1. Expand infection control assessments
 2. Infection control training
 3. Enhance surveillance capacity

<http://www.federalgrants.com/Domestic-Ebola-Supplement-to-Epidemiology-and-Laboratory-Capacity-for-Infectious-Diseases-ELC-Building-and-Strengthening-Epidemiology-Laboratory-and-Health-Information-Systems-Capacity-in-State-and-Local-Health-Departments-49276.html>

Project Status

- **Ebola assessment hospital work continues**

Ebola Assessment Hospital Capability	Capability Description	Minimum Capability in Place? (Y/N)!
Facility Infrastructure: Patient room(s)	Hospital has a private room with in-room dedicated bathroom or covered bedside commode, equipped with dedicated patient-care equipment, including separate areas immediately adjacent to patient room: one for putting on (donning) of personal protective equipment (PPE) and one for removing (doffing). These areas must be sufficient to allow a trained observer to safely and effectively supervise donning and doffing of PPE.	
Patient Transportation	Joint determination by state and local public health agency, emergency medical services, and hospital of interfacility transport plans (transfer of patients with confirmed EVD to the designated Ebola treatment	

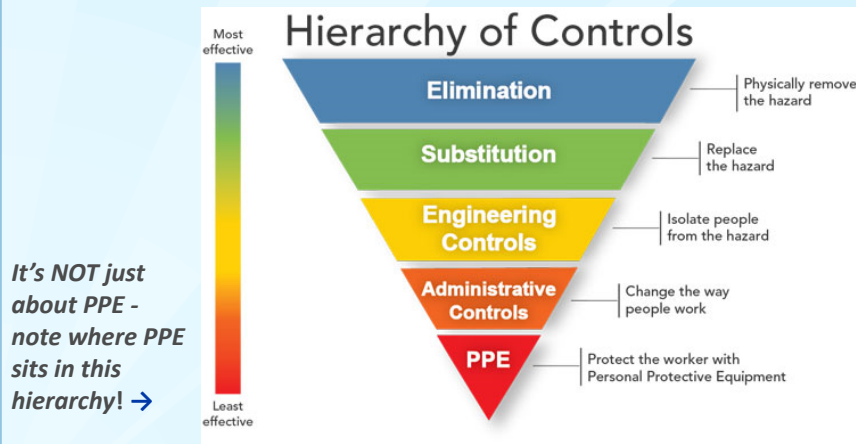
- **Setting-specific, expanded infection control assessment tools are under development**
- **CDC is partnering with APIC and many other groups to discuss future training, outbreak reporting and response, and surveillance activities – STAY TUNED!**

<http://www.cdc.gov/vhf/ebola/healthcare-us/preparing/assessment-hospitals.html>

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CDC, NIOSH Hierarchy of Controls



It's NOT just about PPE - note where PPE sits in this hierarchy! →

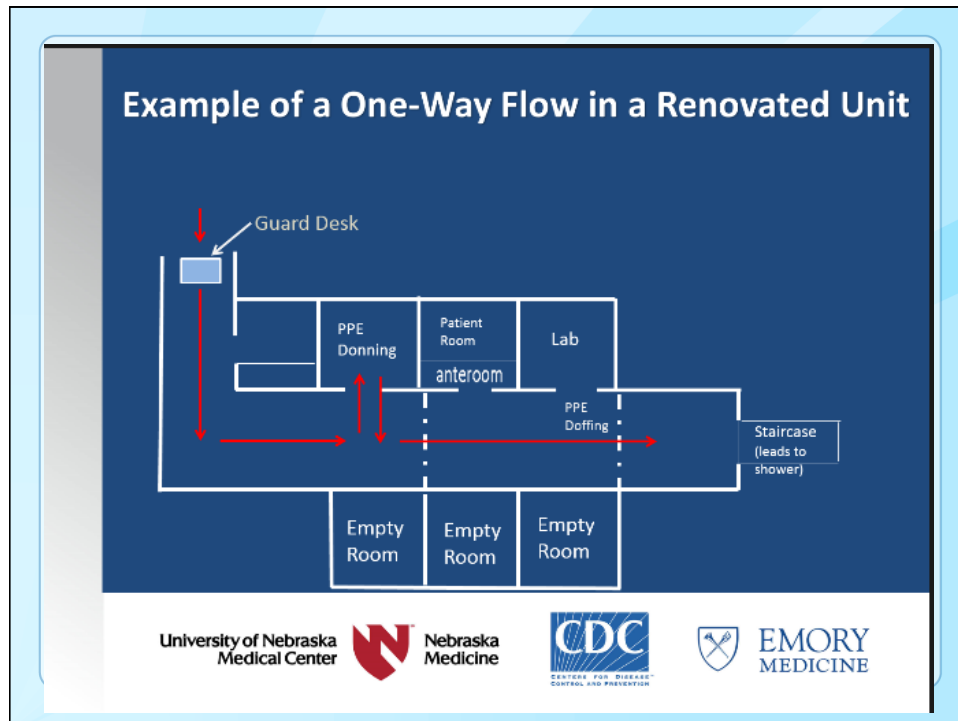
<http://www.cdc.gov/niosh/topics/hierarchy/>

Other Questions and Open Issues

- Higher frequency of routine cleaning of the patient care environment?
- How can facilities be better engineered for infection control?
 - One way flow
 - Sinks, drains (P traps), and splashes
 - On-site waste management (autoclave)
- What is the role of newer technologies for disinfection?
 - UV light, vaporized hydrogen peroxide
- Why aren't PPE donning and doffing (components, sequence) standardized for ALL patient care situations?
 - Simulating patient care (e.g., procedures) while wearing PPE
- Why aren't ALL HCP formally trained in the minimum infection prevention practices necessary to adhere to standard precautions?
- How to develop more timely and appropriate lab tests / diagnostics?

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Final Thoughts

- **IPs often in position to recognize potential outbreaks**
- **Your job - infection prevention and control – is very important – and difficult**
 - Reporting requirements
 - Constantly evolving threats from emerging diseases and unintended consequences of financial pressures and advancing technologies
 - Antimicrobial resistance, evolution of electronic health records to aid epidemiologic work, continued shift of care to outpatient settings, research needs
 - IPs can't do it alone, and there are new opportunities to partner more closely with local health jurisdictions
- **APIC and CDC continue to partner to improve guidance and identify potential solutions to gaps in outbreak detection, routine surveillance, infection control training**

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And, to the Many IPs, Other HCP, Health
Depts, and Federal Agencies Who Help
Us Recognize and Respond to Outbreaks

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Discussion

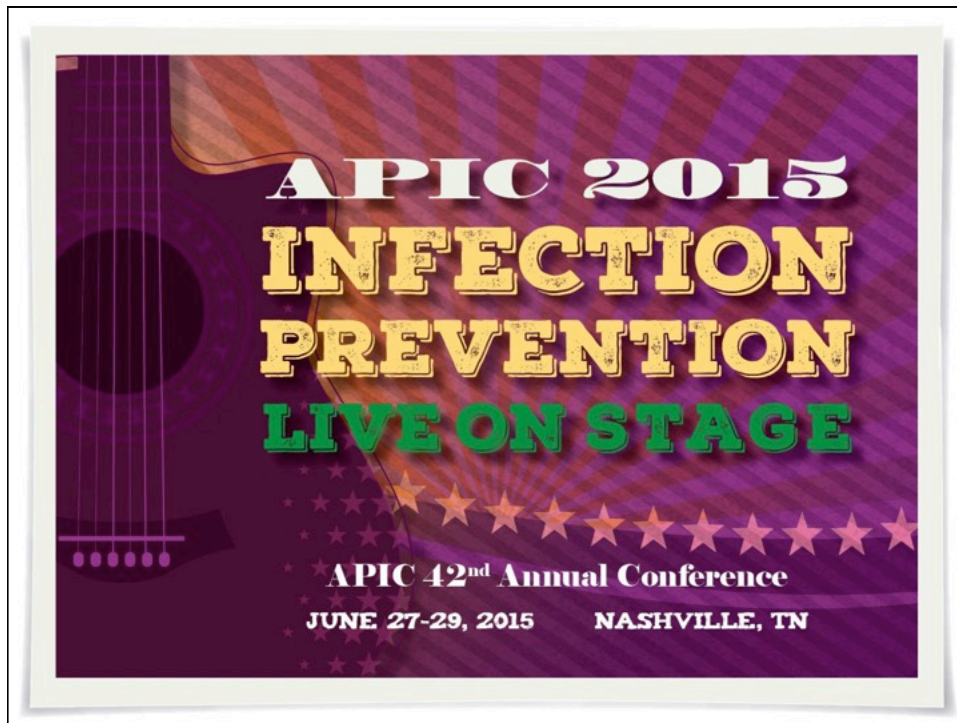
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