Infection Prevention Best Practices: IP and ARB?

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Role of IP in Combating ARB

- Preventing transmission of (antibiotic-resistant) bacteria among patients and healthcare personnel
  - = Fewer people colonized/infected with ARB
- Preventing development of infections (with resistant or susceptible bacteria) in patients in healthcare settings
  - = Reduced antibiotic use through primary prevention

Preventing Transmission

- Basic practices are critical but not exciting
  - Hand hygiene!!
  - Standard Precautions
  - Contact Precautions
  - Environmental cleaning

- Require education, dedication, attention, audits, feedback
  - Ongoing resources
  - Challenge: competing demands
- Constant vigilance

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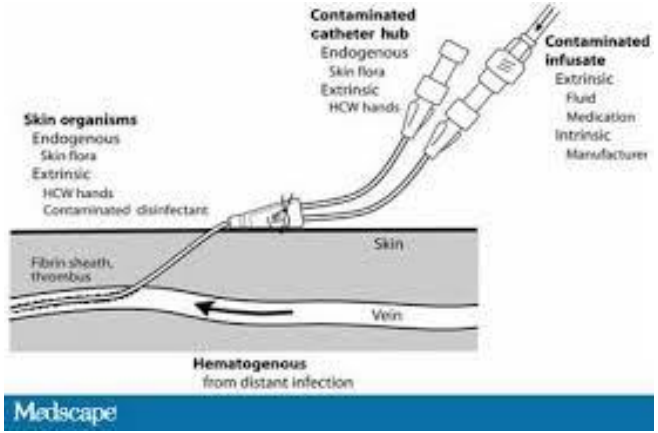
Preventing Infections

- Central Line Associated Bloodstream Infections (CLABSI)
- Catheter Associated Urinary Tract Infections (CAUTI)
- Ventilator Associated Complications/Pneumonia (VAC/VAP)
  - Many of these infections are facilitated by (life-saving) patient level, single use devices that allow pathogens 'internal access'.

- Surgical Site Infections (SSI)
- *Clostridium difficile* infections



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NATIONAL

ACUTE CARE HOSPITALS

HEALTHCARE ASSOCIATED INFECTIONS PROGRESS

Healthcare-associated infections (HAIs) are infections patients can get while receiving medical treatment in a healthcare facility. Working toward the elimination of HAIs is a CDC priority. The standardized infection ratio (SIR) is a summary statistic that can be used to track HAI prevention progress over time; lower SIRs are better. The infection data are reported to CDC's National Healthcare Safety Network (NHSN). HAI data for nearly all U.S. hospitals are published on the Hospital Compare website. This report is based on 2014 data, published in 2016.

CLABSIs — ↓ 50% LOWER COMPARED TO NAT'L BASELINE*

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS

When a tube is placed in a large vein and not put in correctly or kept clean, it can become a way for germs to enter the body and cause deadly infections in the blood.

- U.S. hospitals reported a significant decrease in CLABSIs between 2013 and 2014.
- 10% Among the 2,442 hospitals in U.S. with enough data to calculate an SIR, 10% had an SIR significantly higher (worse) than 0.50, the value of the national SIR.

CAUTIs — 0% NO CHANGE COMPARED TO NAT'L BASELINE

CATHETER-ASSOCIATED URINARY TRACT INFECTIONS

When a urinary catheter is not put in correctly, not kept clean, or left in a patient for too long, germs can travel through the catheter and infect the bladder and kidneys.

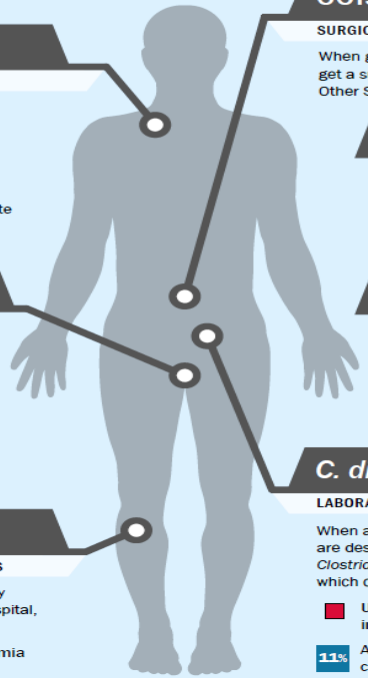
- U.S. hospitals reported a significant decrease in CAUTIs between 2013 and 2014.
- 12% Among the 2,880 U.S. hospitals with enough data to calculate an SIR, 12% had an SIR significantly higher (worse) than 1.00, the value of the national SIR.

MRSA Bacteremia — ↓ 13% LOWER COMPARED TO NAT'L BASELINE*

LABORATORY IDENTIFIED HOSPITAL-ONSET BLOODSTREAM INFECTIONS

Methicillin-resistant *Staphylococcus aureus* (MRSA) is bacteria usually spread by contaminated hands. In a healthcare setting, such as a hospital, MRSA can cause serious bloodstream infections.

- U.S. hospitals reported a significant decrease in MRSA bacteremia between 2013 and 2014.
- 8% Among the 2,042 U.S. hospitals with enough data to calculate an SIR, 8% had an SIR significantly higher (worse) than 0.87, the value of the national SIR.



SSIs

SURGICAL SITE INFECTIONS *See pages 3-5 for additional procedures*

When germs get into an area where surgery is or was performed, patients can get a surgical site infection. Sometimes these infections involve only the skin. Other SSIs can involve tissues under the skin, organs, or implanted material.

SSI: Abdominal Hysterectomy — ↓ 17% LOWER COMPARED TO NAT'L BASELINE*

- U.S. hospitals reported no significant change in SSIs related to abdominal hysterectomy surgery between 2013 and 2014.
- 6% Among the 794 U.S. hospitals with enough data to calculate an SIR, 6% had an SIR significantly higher (worse) than 0.83, the value of the national SIR.

SSI: Colon Surgery — ↓ 2% LOWER COMPARED TO NAT'L BASELINE*

- U.S. hospitals reported a significant increase in SSIs related to colon surgery between 2013 and 2014.
- 8% Among the 2,051 U.S. hospitals with enough data to calculate an SIR, 8% had an SIR significantly higher (worse) than 0.98, the value of the national SIR.

C. difficile Infections — ↓ 8% LOWER COMPARED TO NAT'L BASELINE*

LABORATORY IDENTIFIED HOSPITAL-ONSET *C. DIFFICILE* INFECTIONS

When a person takes antibiotics, good bacteria that protect against infection are destroyed for several months. During this time, patients can get sick from *Clostridium difficile* (*C. difficile*), bacteria that cause potentially deadly diarrhea, which can be spread in healthcare settings.

- U.S. hospitals reported a significant increase in *C. difficile* infections between 2013 and 2014.
- 11% Among the 3,554 U.S. hospitals with enough data to calculate an SIR, 11% had an SIR significantly higher (worse) than 0.92, the value of the national SIR.

* Statistically significant

CDC

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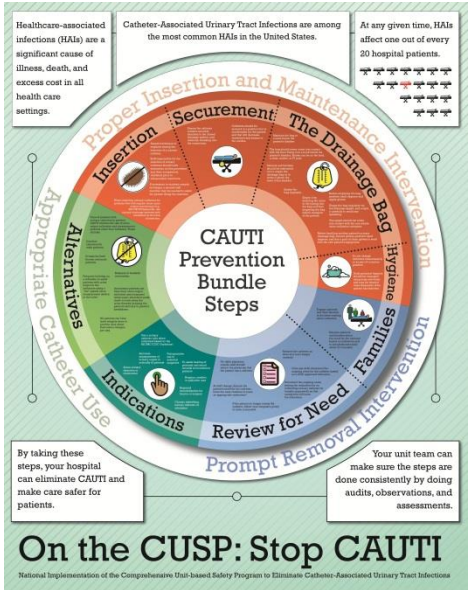
https://www.cdc.gov/nhsn/acute-care-hospital/index.html

Best Practices: Infection Prevention Bundles

- Combination of prevention practices
- For device associated infections:
  - Minimize device use and duration of use
  - Meticulous insertion technique (bundle)
    - Hand hygiene, skin preparation, sterile technique
  - "Care and Maintenance" (bundle)
    - Hand Hygiene before any contact with device or site, dressings, site cleaning, monitoring

Bundle Challenges

- Is each element equally critical?
- Evaluating element(s) tested in varying contexts
- How many elements can we practically add?
- Hard to study element removal
- Competing demands
- ? New products
  - New = exciting! Desire for a “silver bullet”
  - Evidence? $$?



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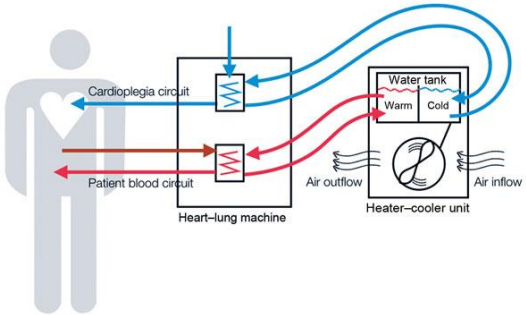
Preventing Transmission *and* Infection: New Devices = New Challenges

- Highly complex medical devices can transmit pathogens to patients, transfer them between patients and deposit them in anatomical sites at high risk of infection

Recent Examples:

- Endoscopes
  - Carbapenem-Resistant *Enterobacteriaciae* (CRE)
- Heater-Coolers
  - *Mycobacterium chimaera*



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Device Infection Challenges

- Engineering solutions with clinical implications
  - Designing for use vs designing for *cleaning*
- Critical needs vs critical risks
- Biofilm
- Aerosols
- Linking exposures to delayed clinical presentations in high risk patients
- Regulation and Oversight pre- and post-market

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Key Points

- Infection prevention is critical part of combating antibiotic resistance
- Challenges in all settings include
  - Resources
  - Competing demands
  - Device/equipment risks, benefits, requirements for safe use

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