The Role of Law and Policy in Addressing Healthcare-Associated Infections

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Deputy Assistant Secretary for Health
Director, Office of Disease Prevention and Health Promotion (ODPHP), U.S. Department of Health and Human Services (HHS)

October 30, 2019
Agenda and Featured Speakers

• Healthy People Background and the Role of Law and Policy in Addressing Healthcare-Associated Infections
  o Don Wright, MD, MPH, Deputy Assistant Secretary for Health; Director, ODPHP, HHS

• Preventing Infections and Combating Antibiotic Resistance in Healthcare — Centers for Disease Control and Prevention Strategy
  o Arjun Srinivasan, MD, MPH, Associate Director for Healthcare Associated Infection Prevention Programs, Division of Healthcare Quality Promotion, CDC

• Overview and National Perspective
  o Peter Pronovost, MD, PhD, Chief Clinical Transformation Officer, University Hospitals

Speaker Notes: Thank you for joining us for a discussion of how law and policy can be used to address Healthcare-Associated Infections such as CLABSI and to help us meet Healthy People objectives. First, I will provide an overview of Healthy People, the Law and Health Policy Project, Healthcare-Associated Infections, and ways that legal and policy strategies can prevent HAIs. Next, Captain Arjun Srinivasan from CDC's Division of Healthcare Quality Promotion, will discuss CDC's strategy to prevent infections and combat antibiotic resistance in healthcare. Then, Peter Pronovost will discuss the national perspective.
Agenda (continued)

- Perspective from the States
  - Marion Kainer, MD, MPH, Director of Healthcare Associated Infections & Antimicrobial Resistance Program, Tennessee Dept. of Health (former)

- Slow Progress on HAIs: Some Cautionary Notes
  - Bernard Black, JD, MA, Nicholas D. Chabraja Professor, Northwestern University Law School and Kellogg School of Management

- Summary and Lessons Learned
  - Peter Pronovost

- Question and Answer Session
Healthy People Background and the Role of Law and Policy in Addressing Healthcare-Associated Infections
What Is Healthy People?

• Provides a strategic framework for a national prevention agenda that communicates a vision for improving health and achieving health equity

• Identifies science-based, measurable objectives with targets to be achieved by the end of the decade

• Requires tracking of data-driven outcomes to monitor progress and to motivate, guide, and focus action

• Offers a model for international, state, and local program planning
Law and Health Policy Project

Reports and Related Products
- Reports and community “Bright Spots”

Webinar Series
- Focused on specific HP2020 topics
- Shares community examples of innovative uses of law and policy to improve health outcomes

Supporting the Development of Healthy People 2030 (HP2030)
- HP2030 Listening Session: 2018 Public Health Law Conference

For more information: www.healthypeople.gov/2020/law-and-health-policy
What is Law and Policy?

We consider law and policy broadly to include statutes, regulations, case law, sub-regulatory guidance, and even guidance documents. Each branch of government — whether executive, legislative, or judicial — also has a unique role in shaping laws and policies.
Healthcare-Associated Infections (HAI) — Definition and Common Types

• Healthcare-Associated Infections (HAIs) are infections that people acquire while receiving treatment for another condition in health care settings:
  - Inpatient hospitals
  - Ambulatory settings
  - Long-term care facilities
  - Any healthcare setting where people receive care

Majority of hospital-acquired HAIs include:
• Central line-associated blood stream infections (CLABSI)
• Catheter-associated urinary tract infections (CAUTI)
• Surgical site infections
• Methicillin-resistant Staphylococcus aureus (MRSA)
• Clostridium difficile (C. difficile)
HAIs by the Numbers

- 1 in 31 U.S. hospital patients has a HAI at any given time
- Resulting in $33 billion in potentially preventable health care costs annually (2009)

Icon made by Freepik from www.flaticon.com
Healthy People HAI-1: Reduce Central Line-Associated Bloodstream Infections (CLABSIs)

Central Line-Associated Bloodstream Infections (standardized infection ratio)

Baseline (2015) 1.00

HP2020 Target 0.50

Most Recent Data (2017) 0.81

38.3% Decrease Needed

HP2020 Objective: HAI-1
Data Source: National Healthcare Safety Network (NHSN), CDC/NCEZID

Speaker Notes:

Central line bloodstream infections are usually serious infections that typically increase hospital stays, risk of mortality, and cost of care. They can be associated with the presence of a central line, or central vascular catheter.

In 2015, this objective adopted a new updated definition, revised baseline, and targets. A standardized infection ratio is used for this objective, and in 2015, the baseline was 1.00.

By 2020, the proposed goal is to achieve a standardized infection ratio of 0.5 or a 50% reduction of HAI infections by 2020. Based on the most recent data (2017), we are at 0.81, which indicates we still need a 38.3% decrease in central-line associated bloodstream infections to meet the 2020 target.
Maintained as a living document
The Role of Law and Policy in Preventing HAIs
Legal and Policy Tools for the Public’s Health

1. Direct Regulation
2. Deregulation
3. Taxation
4. Spending
5. Redress through Civil Litigation

- Alter the Built or Physical Environment
- Alter the Socioeconomic Environment
- Alter the Information Environment

State HAI Prevention Plans

Prevention Projects

State Prevention Collaboratives consist of multiple hospitals within a state which:

- Target an infection as a team.
- Implement prevention strategies through culture change.
- Share experiences between facilities.
- Measure their progress as a group.
- Provide feedback to directors and staff.

Prevention collaboratives your state may have:

- CLABSI: Central line-associated Bloodstream Infection
- CAUTI: Catheter-associated Urinary Tract Infections
- C. diff: Clostridium difficile Infection (CDI, C. diff)
- MRSA: Methicillin-resistant Staphylococcus Aureus
- SSI: Surgical Site Infection
- VAP: Ventilator-associated Pneumonia
- NDRG: Non-drug Resistant Organisms
- Long Term Care/Nursing Homes: Collaborative for Long Term Care Facilities
- CUSP: Comprehensive Unit-based Safety Program
- Other

CDC Resources

State-based HAI Prevention Activities

Financial and/or technical support provided by CDC
Legal and Policy Levers to Prevent HAIs

Laws that provide requirements for state health departments, healthcare facilities, and healthcare providers and promote best practices in HAI prevention include:

- Authorities granted to state health agencies
- Definitions for the infections and facilities covered under state laws
- HAI advisory councils
- Pilot phases for state programs
- Reporting requirements for facilities
- Licensure and training requirements for facilities and providers, including injection safety
- Financial incentives and disincentives
- Protection of HAI data

Contact Information

- For more on the Healthy People initiative, including the development of Healthy People 2030:
  - www.healthypeople.gov

- For the Law and Health Policy project:

- For any other questions, please contact:
  - Angie McGowan, Project Director (CDC Assignee), ODPHP: Angela.McGowan@hhs.gov
Preventing Infections and Combating Antibiotic Resistance in Healthcare Centers for Disease Control and Prevention Strategy

Detect & Contain

Prevent Infections

Patient Safety

Improve Use

Data for Action
- NHSN
- Emerging Infections Program (EIP)
- Outbreaks
- ARLN

Evidence-based Guidelines and Tools

Programs & Partnerships for Implementation

Innovation

Speaker notes:
- National Healthcare Safety Network (NHSN) (>22,000 healthcare facilities)
- Emerging Infections Program (EIP)
- AR Laboratory Network
- Other data sources (e.g., outbreaks, CMS data, electronic health data)

Implementation
- Evidence -based guidelines and interim guidance
- Site visits and on -site assessments
- Training and campaigns that reach clinicians, nurses, environmental services staff, and patients
- Tools and implementation aids

Support for state and local HA /AR programs
- Partnerships with healthcare systems, CMS-funded networks, ARQ, and others
- Payment policies and oversight, including work with payors and accreditation processes

Innovation:
- Additional data sources and analyses (e.g., modeling)
- New practices and strategies / learning about the unknown (Prevention Epicenters, BAA, SHEPheRD, DHQP lab)
Prevention of HAIs: National Level Progress, 2015-2018
NHSN, Acute Care Hospitals. Data to be released Fall 2019

Device-associated HAI Data, NHSN, 2015-2018

CAUTI: 19% decrease between 2015 and 2018
CLABSI: 26% decrease between 2015 and 2018

LabID Data, NHSN, 2015-2018

MRSA: 16% decrease between 2015 and 2018
CDI: 29% decrease between 2015 and 2018

CAUTI – Catheter-associated urinary tract infection; CLABSI – central line-associated bloodstream infection; MRSA – Methicillin-resistant S. aureus; CDI – C. difficile infection; *Baseline year
SSI prevention: some progress, but more work is needed

Acute care hospital quarterly standard infection ratio (SIR), 2016 Q1 – 2018 Q4

Annual acute care hospital SIR vs. 2020 Target

Surgical Site Infection (SSI): Colon Surgery

Surgical Site Infection (SSI): Abdominal hysterectomy

- Continue to work with partners (e.g., CMS, healthcare systems, state HAI/AR programs, American College of Surgeons (ACS) and accreditation groups)
- Continue to promote adherence to CDC guidelines, e.g. SSI prevention guideline updated in 2017
Improve antibiotic use

Progress: Number of hospitals with stewardship programs increased to 80%

Focus for 2020: Continue to work with partners (e.g., Joint Commission) to improve the quality of stewardship programs

Progress: 5% overall decrease in outpatient antibiotic use, driven by 13% decrease in children

Focus for 2020: Decrease inappropriate outpatient prescribing by targeting specific populations (i.e., older adults), drugs (i.e., fluoroquinolones), settings (i.e., urgent care and ambulatory clinics), and infections (i.e., URI and UTI)
Detect, contain, and control emerging threats: emerging resistance

- Labs in all states are testing isolates to detect resistance threats.
- Dedicated staff in state health departments are supporting investigations to limit spread of those threats.
- >40,000 isolates tested
- Hundreds of responses initiated.
- We are learning:
  - Some settings are historically linked to amplification (skilled nursing facilities (SNFs))
  - Close connection to international efforts
Another Related Challenge: Sepsis

- Each year, at least 1.7 million adults in America develop sepsis.
- Nearly 270,000 Americans die as a result of sepsis.
- 1 in 3 patients who die in a hospital have sepsis.
- Preventing infections and antibiotic resistance will help prevent sepsis from occurring at all and, if it does occur, make it easier to treat effectively.
- CDC has developed a toolkit to help hospitals track sepsis more effectively.
- Many patients who develop sepsis have underlying health conditions and regular interactions with healthcare - how can we better protect patients?
Protect patients and improve healthcare

- Data
  - Outcomes, practices, risk factors, and pathogens

- Implementation
  - Practices
  - Programs
  - Policies and communications

- Innovation
  - Intramural
  - Extramural

HAI/AR

Prevented

Preventable

Prevention approach unknown
Use Data for Action: Targeted Assessment for Prevention

- Uses the data hospitals are already collecting and reporting to CDC through the National Healthcare Safety Network (NHSN).
- Helps hospitals determine where prevention efforts are needed - locations with large numbers of potentially preventable infections.
- Provides tools to help assess gaps in prevention and then close those gaps.
Find Better Ways to Implement What Works

- We need to help direct people to interventions and implementation ideas that are most effective.
DHQP Networks for Research and Innovation

Prevention Epicenters
Collaborate with leading medical investigators and state health departments to more rapidly identify the best approaches to prevent the spread of infections in health care facilities, including antimicrobial resistance and other important infectious threats.

Emerging Infections Program
Exploration of innovations to improve national surveillance and evaluation of healthcare-associated infection prevention and control strategies.
How We Achieve Progress:
Partners are Critical for Implementation, Evaluation and Education

**Federal Partners**
(CMS, FDA, AHRQ, OASH)
Incentives for action, reporting, and guidance

**State Health Depts.**
Surveillance, prevention and response

**Academic and Innovation Partners**
Modeling, laboratory testing, diagnostics, microbiome

**CDC**

**Healthcare Providers/Professional Orgs.**
Prevention and guidance

**Public and Patients**
Awareness and stewardship

**Healthcare Systems**
Surveillance and prevention
Partnering to Amplify Messages

CDC leverages partners from around the world and across industries and sectors to amplify messages related to patient safety, infection prevention, AMR, antibiotic stewardship, and sepsis.

CDC provides partners with educational materials, messages, and updated information on CDC’s patient safety portfolio.
Partnering to Prevent Infections

- Collaborating with the Health Research and Education Trust of the American Hospital Association on a national prevention collaborative for *C. difficile*.
- Collaborating with Health Departments and hospitals in TN and KY to reduce MRSA infections in high burden locations.
Change in US CLABSI Rates per 1000 catheter days

Why did CLABSI Work at Policy Level?

- Reliable and valid measurement system
- Evidence-based practices from clinical and basic research
- Investment in implementation (improvement) science*
- Local ownership (CUSP team) and peer learning communities
- Investment by hospitals in measuring CLABSI
- Align and synergize efforts of many around a common goal and measure

Source: Pronovost; 5 years after to err is human: a success story to learn from; BMJQS 2015
*Dixon-Woods, what is improvement science the Health foundation 2013
Marshall, Promotion of improvement as a science; Lancet 2013
Framework for Improvement Science

Pronovost 2017 J Health Organization and Management
What did this work at a team and individual level

Dixon-Woods; Explaining Michigan Milbank Quarterly
Reducing Healthcare Associated Infections
Role of Laws and Policies

Marion A. Kainer MD, MPH, FRACP, FSHEA

Former:
Director, Healthcare Associated Infections & Antimicrobial Resistance Program, Tennessee Department of Health (TDH) Nashville, TN

Current:
• Head of Infectious Diseases, Western Health, Melbourne, Australia
• Adjunct Associate Professor Health Policy, Vanderbilt University, Nashville, TN
State Laws
Promote Prevention of HAIs

• Broad authorities for the health department to promote best practices
• Focus on specific, preventable infections
• Identifying responsible facilities, units, and providers
• Reporting of facility-specific infection rates to the health department
• Reporting of facility-specific infection rates to the public
• Immunity for providers and facilities for reporting
• Protection from litigation
• Financial incentives to prevent HAIs or penalties for failure to report or prevent

Tennessee: 2005

TN Hospital Infections Study Group:

“We want to drive the train”
Do the Right Thing; Proactive

Emphasis was placed on collection of actionable, verifiable data. Use of NHSN.

Slide courtesy HAI/AR program, TDH
Law passed in 2006: Tennessee

- Department must publish public reports
- May identify individual facilities
- Not release patient level data
- Data from report cannot be utilized for civil litigation
- Use of NHSN
  - CLABSIs
  - SSI (cardiac bypass surgery)

http://tennessee.gov/sos/acts/104/pub(pc0904.pdf

Slide courtesy HAI/AR program, TDH
National Healthcare Safety Network (NHSN)

- NHSN is a surveillance system that serves multiple users and uses
  - Standardized definitions, protocols
  - Infrastructure for reporting, analysis

- NHSN is used by
  - >22,000 healthcare facilities to track HAIs, antimicrobial use and resistance, and adherence to prevention guidelines; guide prevention efforts; submit data for public reporting and quality measurement purposes
  - Health departments for surveillance, prevention, and public reporting
  - CMS for quality measurement and reporting, reimbursement, and prevention
  - HHS to measure national progress

http://www.cdc.gov/nhsn/
Use of the NHSN Patient Safety Component is Mandated in 36 States, Philadelphia, and the District of Columbia – January 1, 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>States</th>
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<tbody>
<tr>
<td>2007</td>
<td>NY, SC, CO, TN, PA, MA, WA, MD, IL, NH, NJ, WV, NV, DC, TX, AR, ME, IN, NM, GA, AK, KY, Phil, MO, NE, WY</td>
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<td>2017</td>
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<tr>
<td>2018</td>
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</table>

- **Central line-associated bloodstream infections (CLABSIs)**: AK, AL, AR, CA, CO, CT, DC, DE, GA, HI, IL, IN, KY, MA, MD, ME, MO, MS, NC, NE, NH, NJ, NM, NV, NY, OK, OR, PA, SC, TN, TX, UT, VA, VT, WA, WV, WY
- **Surgical site infections (SSIs)**: AK, AL, AR, CA, CO, CT, DC, DE, GA, HI, IL, IN, KY, MA, MD, ME, MO, MS, NC, NE, NH, NJ, NV, NY, OK, OR, PA, SC, TN, TX, UT, VA, VT, WA, WV, WY
- **Multidrug-resistant organisms and Clostridium difficile infections**: AK, AR, CA, CT, DC, GA, HI, IL, KY, MD, ME, MO, MS, NC, NE, NJ, NM, NV, NY, OK, OR, PA, SC, TN, UT, WV, WY
- **Ventilator-associated pneumonias (VAP) or Ventilator-associated events (VAE)**: OK, PA, TN, WA
- **Catheter-associated urinary tract infections (CAUTIs)**: AK, AL, AR, CT, DC, DE, GA, HI, IN, KY, MD, ME, MO, MS, NC, NE, NH, NJ, OK, OR, PA, TN, TX, UT, WV, WY
- **Central line insertion practices (CLIP)**: CA, NH
- **Dialysis events**: CO, HI, TN

*Slide courtesy CDC*
Phased-in Reporting of HAI in Tennessee

CLABSI
Catheter-Associated Bloodstream Infections (CLABSI)

CAUTI
Catheter-Associated Urinary Tract Infections (CAUTI)

SSI
Surgical Site Infections (SSI)

MRSA/CDI
LabID Events (MRSA/CDI)

DIALYSIS
Dialysis Events (DE)

HCW FLU VAX
HCP Influenza Vaccination Summary

Slide courtesy HAI/AR program, TDH
Example: Preventing CLABSI - Elements of Success

Five Elements Contributed to Success:

1. Reliable and Valid Measurement System
   - NHSN (CDC) (www.cdc.gov/nhsn)

2. Evidence-Based Care Practices & Recommendations

3. Investment in Implementation Sciences

4. Local Ownership and Peer Learning Communities

5. Align and Synergize Efforts
   - HAI National Action Plan
   - Setting 5-year CLABSI goals
   - ACA - Value-Based Purchasing
   - CMS requires ICU CLABSI data reported to Hospital Compare

Standardized Infection Ratio (SIR): Risk Adjusted Summary Measure

\[ \text{SIR} = \frac{\text{Observed (O) HAIs}}{\text{Predicted (P) HAIs}} \]

To calculate O, sum the # of HAIs among a group

To calculate P, requires the use of the appropriate aggregate data (risk-adjusted rates) (e.g., national NHSN data for 2006-2008, then 2015)

SIR > 1.0: # infections are HIGHER than predicted

SIR= 1.5: # infections = 50% HIGHER than predicted

SIR < 1.0: # infections are LOWER than predicted

SIR= 0.4: # infections = 60% LOWER than predicted

SIR is used to measure progress towards HHS action plan goal (2020) and HP2020

Slide courtesy HAI/AR program, TDH
CLABSI* (Adult/Ped ICU), TN 2008-14

* Central Line Associated Blood Stream Infections [CLABSI]

Start CLABSI Collaborative

First report sent to hospitals with hospital specific data

* Central Line Associated Blood Stream Infections [CLABSI]

Slide adapted from: Kainer, SHEA Plenary, 2016
Report: Consumer & Technical

Tennessee’s Report on Healthcare-Associated Infections for Healthcare Consumers
January 1, 2017 – December 31, 2018

Tennessee’s Report on Healthcare-Associated Infections
January 1, 2017 – December 31, 2018

https://www.tn.gov/health/cedep/hai.html
# Sample Table (Consumer Report)

## Tennessee Acute Care Hospitals, Infections Compared to the National Experience, 2017

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Bloodstream Infections (CLABSI) in Adult/Pediatric ICUs</th>
<th>Bloodstream Infections (CLABSI) in Neonatal ICUs</th>
<th>Urinary Tract Infections (CAUTI) in Adult/Pediatric ICUs</th>
<th>Surgical Site Infections from Colon Surgeries</th>
<th>Surgical Site Infections from Abdominal Hysterectomies</th>
<th>C. difficile Events†</th>
<th>Methicillin-Resistant Staphylococcus aureus (MRSA) Events†</th>
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</thead>
<tbody>
<tr>
<td>Hospital A</td>
<td>=</td>
<td>No Conclusion</td>
<td>=</td>
<td>No Conclusion</td>
<td>C. difficile Events†</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Hospital B</td>
<td>No Conclusion</td>
<td>N/A**</td>
<td>=</td>
<td>No Conclusion</td>
<td>No Conclusion</td>
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<td>=</td>
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<tr>
<td>Hospital C</td>
<td>=</td>
<td>=</td>
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<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Hospital D</td>
<td>=</td>
<td>N/A**</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**N/A - Facility was not subject to this reporting requirement during 2017.**

† These refer to hospital-onset laboratory-identified events. MRSA events include only those identified in the bloodstream.

### Legend

- **Star (★)**: Fewer infections **(better)** than predicted based on the national experience.*
- **Equal Sign (=)**: About the **same** number of infections as predicted based on the national experience.*
- **X**: More infections **(worse)** than predicted based on the national experience.*
- **No Conclusion**: When the number of predicted infections is less than 1, no conclusion can be made.

*National experience contains data from 2015 baseline for CLABSI, CAUTI, SSI, MRSA and C. difficile Laboratory-Identified Events.

https://www.tn.gov/health/cedep/hai.html
### Standardized Infection Ratio (SIR) by Infection Type, 01/01/2018-12/31/2018

<table>
<thead>
<tr>
<th>HAI</th>
<th>Type/Unit</th>
<th>Observed</th>
<th>Predicted</th>
<th>Device Days/Procedures Performed/Patient Days</th>
<th>SIR*</th>
<th>95% CI</th>
<th>TN SIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>Adult/Pediatric ICU</td>
<td>13</td>
<td>20.3</td>
<td>17993</td>
<td>0.64</td>
<td>(0.36, 1.07)</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>Adult/Pediatric Ward</td>
<td>8</td>
<td>15.5</td>
<td>15994</td>
<td>0.51</td>
<td>(0.24, 0.97)</td>
<td>0.62</td>
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<tr>
<td>CAUTI</td>
<td>Adult/Pediatric ICU</td>
<td>43</td>
<td>50.2</td>
<td>25961</td>
<td>0.86</td>
<td>(0.63, 1.14)</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>Adult/Pediatric Ward</td>
<td>9</td>
<td>12.6</td>
<td>10199</td>
<td>0.71</td>
<td>(0.35, 1.31)</td>
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<tr>
<td>SSI</td>
<td>Colon surgery</td>
<td>21</td>
<td>32.3</td>
<td>790</td>
<td>0.65</td>
<td>(0.41, 0.98)</td>
<td>0.80</td>
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<tr>
<td></td>
<td>Abdominal hysterectomy</td>
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<tr>
<td>LabID</td>
<td>MRSA bacteremia</td>
<td>27</td>
<td>21.4</td>
<td>236148</td>
<td>1.26</td>
<td>(0.85, 1.81)</td>
<td>1.29</td>
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<tr>
<td></td>
<td>C. difficile infection</td>
<td>128</td>
<td>182.7</td>
<td>236148</td>
<td>0.70</td>
<td>(0.59, 0.83)</td>
<td>0.68</td>
</tr>
</tbody>
</table>

*Green highlighting indicates an SIR significantly LOWER than the 2015 national baseline

*Red highlighting indicates an SIR significantly HIGHER than the 2015 national baseline

*N/A: Data not shown for <50 device days or <20 procedures / SIR not calculated when <1 infection predicted

*Complex Admission/Readmission SIRs are presented for surgical site infections (SSI)

### Healthcare Personnel Influenza Vaccination - '2018/2019' Influenza Season

- **Employees (21,274)**: 95%
- **Licensed Independent Practitioners (102)**: 96%
- **Students/Trainees/Volunteers (1,593)**: 98%
- **Overall (22,209)**: 99%

<table>
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<tr>
<th>Healthcare Personnel Vaccinated (%)</th>
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<td>Below 90%</td>
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### Healthcare Facility-Onset Laboratory Identified (LabID) Events

- **LabID - Methicillin-resistant S. aureus (MRSA) Bacteremia**
- **LabID - C. difficile Infection (CDI)**
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<td>0.65</td>
<td>(0.41, 0.98)</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Abdominal hysterectomy</td>
<td>0</td>
<td>2.9</td>
<td>282</td>
<td>0.00</td>
<td>(0.00, 1.03)</td>
<td>0.78</td>
</tr>
<tr>
<td>LabID</td>
<td>MRSA bacteremia</td>
<td>27</td>
<td>21.4</td>
<td>236148</td>
<td>1.26</td>
<td>(0.85, 1.81)</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>C. difficile infection</td>
<td>128</td>
<td>182.7</td>
<td>236148</td>
<td>0.70</td>
<td>(0.59, 0.83)</td>
<td>0.68</td>
</tr>
</tbody>
</table>

- **Green highlighting** indicates an SIR significantly **LOWER** than the 2015 national baseline.
- **Red highlighting** indicates an SIR significantly **HIGHER** than the 2015 national baseline.
- **N/A**: Data not shown for <50 device days or <20 procedures / SIR not calculated when <1 infection predicted.
- *Complex Admission/Readmission SIRs are presented for surgical site infections (SSI).*
# Progress over Time

## (Technical Report)

### CLABSI - Adult/Pediatric ICUs

<table>
<thead>
<tr>
<th>YR</th>
<th>N</th>
<th>OBS</th>
<th>PRE</th>
<th>CLD</th>
<th>SIR</th>
<th>SIR &amp; 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>2</td>
<td>2</td>
<td>1.7</td>
<td>2052</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
<td>6</td>
<td>3.0</td>
<td>3501</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>2</td>
<td>7</td>
<td>3.1</td>
<td>3632</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>2</td>
<td>9</td>
<td>3.5</td>
<td>4060</td>
<td>2.6</td>
<td></td>
</tr>
</tbody>
</table>

**Reporting Period:**
- 2015-2018

---

*Data reported as of June 20, 2019*

- **YR** = reporting year;  **N** = number of units reporting (CLABSI/CAUTI);  **OBS** = observed number of infections
- **PRE** = statistically 'predicted' number of infections, based on NHSN national baseline data
- **SIR** = standardized infection ratio (observed/predicted number of infections)
- **CLD** = central line days;  **UCD** = urinary catheter days;  **PROC** = procedures performed;  **PATD** = patient days;
- **N/A** = data not shown for <50 device days or <20 procedures / SIR not calculated when <1 infection predicted

---

*Colors and symbols used in the chart:*
- Green: Significantly lower than NHSN SIR of 1
- Grey: Not significantly different from NHSN SIR of 1
- Red: Significantly higher than NHSN SIR of 1
- Blue dashed line: 2018 TN SIR
- Red dashed line: NHSN SIR=1
Targeted Assessment for Prevention (TAP) Strategy

• Prioritize facilities with highest burden of preventable disease ➔ get biggest return on investment

• In TN ~ 5-7 facilities account for ~ 50% of excess (preventable) infections

• Number Needed to Prevent to Reach Goal (Observed- Predicted)

• Provide context (top 5 in TN)
# HAI Progress Report: Tennessee, 2013

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>95</td>
<td>↓ 14%</td>
<td>↓ 10%</td>
<td>↓ 52%</td>
<td>0.49</td>
<td>0.54</td>
</tr>
<tr>
<td>Nat’l Baseline: 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAUTI</td>
<td>94</td>
<td>↓ 10%</td>
<td>↑ 17%</td>
<td>↑ 24%</td>
<td>1.24</td>
<td>1.06</td>
</tr>
<tr>
<td>Nat’l Baseline: 2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSI, Abdominal Hysterectomy</td>
<td>87</td>
<td>↑ 2%</td>
<td>↑ 3%</td>
<td>↓ 11%</td>
<td>0.89</td>
<td>0.86</td>
</tr>
<tr>
<td>Nat’l Baseline: 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSI, Colon Surgery</td>
<td>95</td>
<td>↑ 2%</td>
<td>↓ 1%</td>
<td>↓ 9%</td>
<td>0.91</td>
<td>0.92</td>
</tr>
<tr>
<td>Nat’l Baseline: 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRSA Bacteremia</td>
<td>115</td>
<td>2012 SIR not available</td>
<td>↑ 24%</td>
<td>↑ 13%</td>
<td>1.13</td>
<td>0.92</td>
</tr>
<tr>
<td>Nat’l Baseline: 2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. difficile Infections</td>
<td>115</td>
<td>2012 SIR not available</td>
<td>↓ 16%</td>
<td>↓ 23%</td>
<td>0.77</td>
<td>0.90</td>
</tr>
<tr>
<td>Nat’l Baseline: 2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For additional data points, refer to the technical data tables. The number of hospitals that reported to NHSN and are included in the SIR calculation. This number may vary across HAH types; for example, some hospitals do not use central lines or urinary catheters, or do not perform colon or abdominal hysterectomy surgeries. Nat’l baseline time period varies by HAI type. See first column of this table for specifics.

### HAI Progress Report: Tennessee, 2014

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>105 (Nat’l Baseline: 2008)</td>
<td>0%</td>
<td>↓ 4%</td>
<td>↓ 52%</td>
<td>0.48</td>
<td>0.50</td>
</tr>
<tr>
<td>CAUTI</td>
<td>106 (Nat’l Baseline: 2009)</td>
<td>↓ 17%</td>
<td>↑ 1%</td>
<td>↑ 1%</td>
<td>1.01</td>
<td>1.00</td>
</tr>
<tr>
<td>SSI, Abdominal Hysterectomy (Nat’l Baseline: 2008)</td>
<td>84</td>
<td>↓ 9%</td>
<td>↓ 3%</td>
<td>↓ 20%</td>
<td>0.80</td>
<td>0.83</td>
</tr>
<tr>
<td>SSI, Colon Surgery (Nat’l Baseline: 2008)</td>
<td>92</td>
<td>↓ 2%</td>
<td>↓ 7%</td>
<td>↓ 9%</td>
<td>0.91</td>
<td>0.98</td>
</tr>
<tr>
<td>MRSA Bacteremia (Nat’l Baseline: 2011)</td>
<td>114</td>
<td>↓ 8%</td>
<td>↑ 17%</td>
<td>↑ 1%</td>
<td>1.01</td>
<td>0.87</td>
</tr>
<tr>
<td>C. difficile Infections (Nat’l Baseline: 2011)</td>
<td>114</td>
<td>↑ 3%</td>
<td>↓ 16%</td>
<td>↓ 22%</td>
<td>0.78</td>
<td>0.92</td>
</tr>
</tbody>
</table>

† The number of hospitals that reported to NHSN and are included in the SIR calculation. This number may vary across HAI types; for example, some hospitals do not use central lines or urinary catheters, or do not perform colon or abdominal hysterectomy surgeries.

‡ Nat’l baseline time period varies by HAI type. See first column of this table for specifics.

## Progress to HP 2020 Goals: 2018

<table>
<thead>
<tr>
<th>HAI</th>
<th>TN</th>
<th>US</th>
<th>HP 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>0.69</td>
<td>0.74</td>
<td>0.50</td>
</tr>
<tr>
<td>CAUTI</td>
<td>0.71</td>
<td>0.81</td>
<td>0.75</td>
</tr>
<tr>
<td>SSI COLO</td>
<td>0.79</td>
<td>0.90</td>
<td>0.75</td>
</tr>
<tr>
<td>SSI HYST</td>
<td>0.78</td>
<td>0.90</td>
<td>0.75</td>
</tr>
<tr>
<td>CDI</td>
<td>0.68</td>
<td>0.71</td>
<td>0.70</td>
</tr>
<tr>
<td>MRSA</td>
<td>1.29</td>
<td>0.84</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Data courtesy HAI/AR program, TDH and CDC
Strategies to Prevent Hospital-onset *Staphylococcus aureus* Bloodstream Infections in Acute Care Facilities


Published March 2019

"Reporting antibiotic use in acute care hospitals through the National Healthcare Safety Network’s Antibiotic Use and Resistance Module will be required beginning in January 1, 2021. This will be a phased-in approach based on hospital bed size. The Tennessee Department of Health is advising of this future requirement several years in advance to allow adequate preparation."

Providing Support for NHSN AU Reporting Mandate:

National Healthcare Safety Network Antibiotic Use Reporting Symposium

Hosted by the Tennessee Department of Health and The Pew Charitable Trusts

Wednesday, October 30, 2019 | 7:30 a.m. - 4:00 p.m. CT
CLABSI* (Adult/Ped ICU), TN 2008-14

* Central Line Associated Blood Stream Infections [CLABSI]

Data Reported as of September 9, 2015

Slide adapted from: Kainer, SHEA Plenary, 2016
CLABSI* (Adult/Ped ICU), TN 2008-14

* Central Line Associated Blood Stream Infections [CLABSI]

Start CLABSI Collaborative

TN SIR

HHS action goal baseline: SIR = 1.0

HHS action goal (2013: SIR = 0.5)

Data Reported as of September 9, 2015

Slide adapted from: Kainer, SHEA Plenary, 2016
CLABSI* (Adult/Ped ICU), TN 2008-14

* Central Line Associated Blood Stream Infections [CLABSI]

CLABSI collaborative:

- Evidence Based Practices
- Peer learning
- Implementation Science

http://www.cdc.gov/hicpac/

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Slide adapted from: Kainer, SHEA Plenary, 2016
Ongoing Reductions: CLABSI (Adult/Ped ICU), TN 2008-19 Q1

Data Reported as of June 20, 2019

Slide courtesy HAI/AR program, TDH
### Sample Table (Consumer Report)

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Number of Procedures</th>
<th>Observed Infections</th>
<th>Predicted Infections</th>
<th>How Does This Facility Compare to the National Experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A</td>
<td>45</td>
<td>2</td>
<td>1.2</td>
<td>= Same</td>
</tr>
<tr>
<td>Hospital B</td>
<td>34</td>
<td>0</td>
<td>Less than 1.0</td>
<td>No Conclusion</td>
</tr>
<tr>
<td>Hospital C</td>
<td>421</td>
<td>0</td>
<td>3.2</td>
<td>★ Better</td>
</tr>
<tr>
<td>Hospital D</td>
<td>311</td>
<td>15</td>
<td>10.0</td>
<td>= Same</td>
</tr>
<tr>
<td>Hospital E</td>
<td>464</td>
<td>28</td>
<td>16.3</td>
<td>✗ Worse</td>
</tr>
<tr>
<td>Hospital F</td>
<td>317</td>
<td>3</td>
<td>9.1</td>
<td>★ Better</td>
</tr>
<tr>
<td>Hospital G</td>
<td>38</td>
<td>0</td>
<td>1.1</td>
<td>= Same</td>
</tr>
<tr>
<td>Hospital H</td>
<td>62</td>
<td>1</td>
<td>1.7</td>
<td>= Same</td>
</tr>
</tbody>
</table>

**Legend**

- ★ Better: Fewer infections (better) than predicted based on the 2015 national experience.
- ✗ Worse: More infections (worse) than predicted based on the 2015 national experience.
- = Same: About the same number of infections as predicted based on the 2015 national experience.
- No Conclusion: When the number of predicted infections is less than 1, no conclusion can be made.

[https://www.tn.gov/health/cedep/hai.html](https://www.tn.gov/health/cedep/hai.html)
Law passed in 2006: Tennessee

- Central line associated blood stream infections (CLABSI) with facility identifiers
- Surgical Site Infections (SSI) following coronary artery bypass graft surgery (aggregate only, no facility identifiers)
- Required use of National Healthcare Safety Network (NHSN)

Progress on HAIs: But More is Possible
Some Cautionary Notes

Bernie Black
Nicholas Chabraja Professor, Northwestern University
Pritzker Law School and Kellogg School of Management
What Is Possible for CLABSI: (Almost) Zero

• Pronovost et al. (NEJM, 2006): Michigan consortium study
  ◦ Designed: 2001-2003?
  ◦ Implemented 2004
  ◦ Published 2006

• Median post-intervention CLABSI rate (per 1,000 catheter days): 0
  ◦ Mean = 0.92
  ◦ Versus 2.7 pre-intervention

• But infections pop up, sources need to be traced
  ◦ Training and discipline wears off; needs to be reinforced
  ◦ Easy for senior management to say, “we’re good”, when they could be better
15 years later, how are we doing?

- National: 21,173 reported infections: mean rate = 0.80
- Michigan: 522 reported infections: mean rate = 0.74

- Better, but hardly zero
- How can we do better?
Concern 1: Measurement

• We have a reasonable CLBSI definition, from CDC/NHSN
• But we don’t know true incidence
• Why? Incomplete, inconsistent auditing. In 2017, of 51 states:
  ◦ 5 conducted audits of some individual sites (maybe not very many)
    ● NC among them
  ◦ 26 conducted "any validation"
  ◦ 20 didn’t even do that
  ◦ Also some CMS auditing of Hospital Compare reports, but how much?
• We require audited financials for public companies?
  ◦ Why not audited quality reports for hospitals?
• (Marc Volavka, Head of Pennsylvania Health Care Cost Containment Council, called PHC4)
  ◦ When is a UTI **NOT** a UTI??
  ◦ When is a blood clot (DVT) **NOT** a blood clot??
  ◦ When is a central line blood stream infection **NOT** a CLAB??
Mr. Volavka’s Answer

When PHC4 is doing a public report!!
Concern 2: Slow feedback

• NHSN report is through 2017
  ◦ But it’s now October 2019

• Hospital Compare: Most recent data through Sept. 2018

• For hospitals to manage CLABSI: want real-time feedback
  ● Public reporting demands clean data
  ● But internal feedback demands speed
  ● Challenge: How can we achieve both?
Concern 3: Everyone is average

• Pressure to improve comes:
  ◦ In a few states, from state regulator
  ◦ Adverse publicity if worse than average
    ● Less likely: good publicity if better than average
  ◦ Top down from senior management (if worse than average)
  ◦ Rarely from individual patients choosing hospitals

• So let’s look at Hospital Compare
  ◦ I searched the first 300 entries for HAIs
    ● 199: Relative rank “Not available”
    ● 88: No different than national average
    ● 10: better than national average
    ● 3: worse than national average
How Can We Do Better?

• Audit first (base for everything else)
• Then serious reward for good performance/punish poor performance  
  ◦ For a few core quality metrics
• Suppose we said: social cost of a CLABSI is $100k  
  ◦ On the low side, given substantial mortality
• CMS could tell hospitals: Your expected number of CLABSIIs is x.x  
  ◦ If you beat the target  
    ● we will pay you $100k times the difference  
  ◦ Can also penalize the laggards.
How About Tradeable Permits?

• An idea used for pollution

• Set national CLABSI goal (today, say 20,000)
  ◦ Adjust biannually based on cost and benefit of prevention

• CMS will offer 20,000 CLABSI permits for sale (and no more)
  ◦ Have a CLABSI = must buy a permit (or big fine, say 5x permit price)

• Virtue 1: Learn market price of prevention
  ◦ Hospitals will invest in prevention if cheaper than cost of permit

• Virtue 2: We can ratchet down infection level over time
  ◦ CDC/CMS can set annual targets
  ◦ Informed by cost of prevention (market price of permits)
Thought Experiment

• If we really want to get from 20,000 CLABSI to 10,000, or 5,000
  ◦ We know how, technically (and have known for a long time)

• We can get there through regulation
  ◦ All we need is the will to do so.