Toward the Elimination of Healthcare-associated Infections

National Center for Preparedness, Detection, and Control of Infectious Diseases
Outline

- **Presentation**: Chesley Richards, MD, MPH
  *Healthcare-associated Infections: A Primer*

- **Focused Discussion**: P. J. Brennan, MD
  *Toward Elimination of Healthcare-associated Infections – the Pennsylvania Experience*

- **Focused Discussion**: Barry Straube, MD
  *Healthcare-associated Infections: Strategies for Elimination*
Healthcare-associated Infections: A Primer

- The Burden and Evidence for Prevention
- National Implementation Activities
- Program Role in HAI Elimination
- Evaluation of Progress
Healthcare-associated Infections (HAIs)

- **Definition**: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting.

- **Settings**: hospitals (Intensive Care Units, Special Care Units, other hospital settings), long-term care facilities (LTCFs), outpatient facilities such as ambulatory surgical clinics, dialysis centers.

- **In hospitals alone (annually)**
  - 1.7 million HAIs
  - 1 out of 20 patients (5%) acquire an HAI
  - 99,000 deaths associated with HAIs
  - $26-33 billion in excess healthcare costs
# Estimates of Healthcare-associated Infections in US Hospitals Annually

<table>
<thead>
<tr>
<th>Infections</th>
<th>Number of Infections</th>
<th>National Cost Billion $</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device-related infections</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>560,000</td>
<td>0.4-0.5</td>
<td>8,000</td>
</tr>
<tr>
<td>Bloodstream infections</td>
<td>250,000</td>
<td>2-8</td>
<td>31,000</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>250,000</td>
<td>5-7</td>
<td>36,000</td>
</tr>
<tr>
<td><strong>Procedure-related infections</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical site infections</td>
<td>290,000</td>
<td>3-8</td>
<td>13,000</td>
</tr>
</tbody>
</table>
Healthcare-associated Infections in Non-hospital Settings

- **Long-term care**
  - 1.7 million beds with 2.5 million residents/year nationally
  - Veterans Healthcare System: 133 LTCFs, 11,475 residents
    - HAI prevalence: 5.2%
    - Indwelling medical device: 25% of all residents

- **Ambulatory surgical centers**: 5,175 facilities
  - Data on HAIs from outbreaks; no national surveillance
  - Example: hepatitis C outbreak associated with syringe reuse resulted in letters to > 40,000 endoscopy center patients

- **Dialysis centers**: 4,950 facilities
  - Catheter-related bloodstream infections: 4.2 per 100 patient months
  - Incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infection: **100 x greater than in nondialysis population**

References:
- Thompson, Ann Intern Med 2009
- MMWR May 16, 2008; 57:19
- Kallen, 19th Annual SHEA Meeting, San Diego, 2009
- NCHS, 2009
- Tsan, AJIC, 2008
- Kleven, Semin Dialysis, 2008
MRSA Infections Are a Patient Safety Challenge not Limited to Acute Care Hospital Setting

- ~ 100,000 invasive MRSA infections per year (normally sterile site)
- 25% was “nosocomial”
- 60% identified before or in first 2 days of hospitalization (but with contacts to healthcare settings)
- 15% community-associated

Healthcare-associated community-onset
Emerging Threats in Healthcare

Estimate of *Clostridium difficile* Cases, by Setting

- **Hospital-acquired, hospital-onset cases**
  - 165,000, $1.3 billion in excess costs, and 9,000 deaths annually

- **Hospital-acquired, post-discharge** (up to 4 weeks)
  - 50,000, $0.3 billion in excess costs, and 3,000 deaths annually

- **Nursing home-onset cases**
  - 263,000, $2.2 billion in excess costs, and 16,500 deaths annually

Campbell, Infect Control Hosp Epidemiol. 2009
Dubberke, Clin Infect Dis. 2008
Dubberke, Emerg Infect Dis. 2008
Elixhauser et al. HCUP Statistical Brief #50. 2008
% Gram Negative Bacteria Resistant to Key Drugs by Healthcare-associated Infection Type  
Source: National Healthcare Safety Network

<table>
<thead>
<tr>
<th>Organism</th>
<th>Bloodstream infection</th>
<th>Pneumonia</th>
<th>Urinary tract infection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acinetobacter baumannii</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbapenem resistant (%)</td>
<td>29</td>
<td>37</td>
<td>26</td>
</tr>
<tr>
<td><strong>Klebsiella pneumoniae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cef/Ctr resistant (%)</td>
<td>27</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Carbapenem resistant (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Guidance for Control of Infections with Carbapenem-Resistant or Carbapenemase-Producing Enterobacteriaceae in Acute Care Facilities

Hidron et al. ICHE 2008
Guidelines are developed for each type of infection and based on systematic reviews of the medical literature.

Categories of Evidence

- **Category 1A**
  - Strong recommendation/strong or moderate quality of evidence
- **Category 1B**
  - Strong recommendation/weak quality of evidence or accepted practices
- **Category 1C**
  - Strong recommendation required by state or federal regulation
- **Category 2**
  - Weak recommendation supported by limited evidence
- **No recommendation/unresolved issue**
  - Insufficient evidence to support a recommendation
State of Prevention Knowledge/Science
Suboptimal Adherence to HICPAC/CDC Recommendations

- **Hand hygiene adherence**
  - 5% - 81% (overall average: 40%)

- **Surgical antimicrobial prophylaxis**
  - <50% adherence to recommendations

- **Full compliance with major HAI guidelines**
  - Among 1,256 US hospitals—30.7% to 38.5%
  - Central-line bloodstream infections prevention—35.4%

Arch Surg 2005    MMWR 2002:51(RR16);1-44    Leapfrog Group 2007
State of Prevention Knowledge/Science
Successful Prevention of Bloodstream Infections
Michigan & Pennsylvania

- Implementation of CDC/HICPAC Bloodstream Infection Prevention Guideline
  - For insertion and removal of intravascular catheters
- Intensive care units
  - SW Pennsylvania (66), Michigan (103)
- Interventions to increased adherence to recommendations were similar
  - Education of staff
  - Creation of a central-line cart
  - Data/feedback on adherence to practices and outcomes
  - Daily multidisciplinary rounds
  - Strategies to improve safety culture

Successful Implementation of HICPAC/CDC Guidelines Prevents Bloodstream Infections

Pennsylvania

FIGURE. Central line–associated bloodstream infection rate* in 66 intensive care units (ICUs), by ICU type and semiannual period — southwestern Pennsylvania, April 2001–March 2005

- All other unit types
- Medical/surgical units

* Pooled mean rate per 1,000 central line days.
† Includes cardiothoracic, coronary, surgical, neurosurgical, trauma, medical, burn, and pediatric ICUs.
§ p<0.001.

Michigan

103 ICUs at 67 Michigan hospitals, 18 months

BSIs/1,000 catheter days

0
10
8
6
4
2
0


MMWR 2005;54:1013-16
Trends in MRSA Bloodstream Infections by ICU Type

Estimated:
- 7,000 BSIs prevented
- 1,800 lives saved
- $50-180M in costs averted annually

## Preliminary Estimates of Preventable Infections, Deaths, and Costs
Based on Published Literature

<table>
<thead>
<tr>
<th>Type of healthcare-associated infection</th>
<th>Preventable</th>
<th>Cost avoided (billions of 2009 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fraction</td>
<td>Infections (thousands)</td>
</tr>
<tr>
<td>Bloodstream infection</td>
<td>18%–66%</td>
<td>45-164</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>38%–55%</td>
<td>95–138</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>17%–69%</td>
<td>95–388</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>26%–54%</td>
<td>75–157</td>
</tr>
</tbody>
</table>

Umschied, C. University of Pennsylvania. Presentation at HICPAC, March 2009
Healthcare-associated Infections: A Primer

- The Burden and Evidence for Prevention
- National Implementation Activities
- Program Role in HAI Elimination
- Evaluation of Progress
Keys for the Elimination of Healthcare-associated Infections

- Data for action
- Improved implementation of existing best practices
- Recognize excellence in prevention
- Address gaps in knowledge
- Identify and respond to emerging threats
Disclosures of HAI rates required

Data for Action
State Initiatives: Public Reporting of HAIs, 2004

[Map showing states with disclosures of HAI rates required]
Data for Action
State Initiatives: Public Reporting of HAIs, 2009

[Map of the United States showing states with and without disclosures of HAIs rates required. The map highlights states with green areas indicating states where disclosures of HAIs rates are required.]
Data for Action
Healthcare-associated Infections in New York State, 2008
A State Report Utilizing CDC’s National Healthcare Safety Network

Report includes
- Bloodstream infections in intensive care unit (ICU) patients
- Surgical site infections

From 2007 to 2008
- Bloodstream infection rates increasing
- Surgical site infection rates decreasing
- Targeted prevention efforts

http://www.health.state.ny.us/statistics/facilities/hospital/hospital_acquired_infections/
News Release

FOR IMMEDIATE RELEASE
Tuesday, January 6, 2009

HHS Issues Action Plan to Prevent Health Care-Associated Infections

The U.S. Department of Health and Human Services (HHS) unveiled a plan that establishes a set of five-year national prevention targets to reduce and possibly eliminate health care-associated infections (HAIs).

Health care-associated infections are infections that patients acquire while undergoing medical treatment or surgical procedures. These infections are largely preventable.

The Action Plan to Prevent Health Care-Associated Infections lists a number of areas in which HAIs can be prevented, such as surgical site infections. The plan also outlines cross-agency efforts to save lives and reduce health care costs through expanded HAI prevention efforts.

"This plan will serve as our roadmap on how the department addresses this important public health and patient safety issue," HHS Secretary Mike Leavitt said. "This collaborative interagency plan will help the nation build a safer, more affordable health care system."

The plan establishes national goals and outlines key actions for enhancing and coordinating HHS-supported efforts. These include development of national benchmarks, prioritized recommended clinical practices, a coordinated research agenda, an integrated information systems strategy and a national messaging plan.

The plan also identifies opportunities for collaboration with national, state, tribal and local organizations.

HHS intends to update the plan in response to public input and new recommendations for infection prevention. The plan, and instructions for submitting comments on the plan, can be found online at [http://www.hhs.gov/ophs](http://www.hhs.gov/ophs).
## HHS Action Plan for HAI Prevention
### National 5 Year Goals

<table>
<thead>
<tr>
<th>Metric</th>
<th>Source</th>
<th>National 5-Year Prevention Target</th>
<th>Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloodstream infections</td>
<td>NHSN</td>
<td>50% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>Adherence to central-line insertion practices</td>
<td>NHSN</td>
<td>100% adherence</td>
<td>CDC</td>
</tr>
<tr>
<td><em>Clostridium difficile</em> (hospitalizations)</td>
<td>NHDS HCUP</td>
<td>30% reduction</td>
<td>CDC/AHRQ</td>
</tr>
<tr>
<td>Clostridium difficile infections</td>
<td>NHSN</td>
<td>30% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>NHSN</td>
<td>25% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>MRSA invasive infections (population)</td>
<td>EIP</td>
<td>50% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>MRSA bacteremia (hospital)</td>
<td>NHSN</td>
<td>25% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>Surgical site infections</td>
<td>NHSN</td>
<td>25% reduction</td>
<td>CDC</td>
</tr>
<tr>
<td>Surgical Care Improvement Project Measures</td>
<td>SCIP</td>
<td>95% adherence</td>
<td>CMS</td>
</tr>
</tbody>
</table>

NHSN=National Healthcare Safety Network   NHDS=National Hospital Discharge Survey
HCUP=Healthcare Cost and Utilization Project EIPs=Emerging Infections Program
SCIP=Surgical Care Improvement Project
Recognize Excellence in Prevention

- Congress: Health Reform
  - Health reform bills propose mandatory national public reporting
  - HAI prevention would be tied to Medicare/Medicaid payment

- Centers for Medicare and Medicaid Services (CMS)
  - Reduced payment for hospital-acquired conditions (HACs) including healthcare-associated infections
    - Effective October 2008
    - Includes hospital-associated bloodstream infections, urinary tract infections, and selected surgical site infections
  - Pay for reporting/performance
Healthcare-associated Infections: A Primer

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- Evaluation of Progress
CDC’s Role in HAI Elimination
Data for Action

- National Healthcare Safety Network (NHSN)
  - Internet based reporting system through CDC’s Secure Data Network
  - 2400+ US healthcare facilities currently participate from all 50 states
  - Standard definitions, methods, and protocols
    - used in more than 20 countries
  - Manual data entry with transition toward electronic data capture

- Emerging Infections Program
  - Population based surveillance in 10 states
  - Especially important for understanding the dynamic epidemiology of healthcare-associated infections due to MRSA and C. difficile, and other emerging multidrug resistant bacteria causing HAIs
CDC’s Role in HAI Elimination
Data for Action: States Mandating NHSN for Reporting (in green)
CDCs Role in HAI Elimination
CDC Support for State Activities

- Congressionally mandated State HAI Plans
  - States will be required to have a formal HAI prevention plan
  - Linked to CDCs Prevention Block Grant
  - Submission to HHS by January 1, 2010

- Recovery Act
  - $40M to CDC to fund State HAI activities
    - All grantees will be developing and executing State HAI Plans based on the HHS Action Plan - 49 states, DC, and Puerto Rico funded
    - Enhancing HAI surveillance
    - Establishing HAI prevention initiatives
  - $10M to CMS to improve surveys in ambulatory surgical clinics
    - CDC assisting by developing tools for enhanced surveys, training surveyors, and assisting with onsite survey activities
CDC’s Role in HAI Elimination
Address Emerging Threats and Gaps in Knowledge

- **Prevention**
  - Better understanding of HAI epidemiology: New risk factors, populations, impact on patient outcomes and healthcare costs to prioritize prevention practice development
  - New evidence-based prevention practices, or combinations of existing practices
  - Comparative effectiveness studies where multiple, competing prevention measures co-exist
  - Improve process and outcomes data for HAI reporting and prevention

- **Microbiology**
  - Antimicrobial resistance: Methods and molecular epidemiology of emerging pathogens
  - Environmental microbiology: Role of the healthcare environment in infection transmission
Healthcare-associated Infections: A Primer

- The Burden and Evidence for Prevention
- National Implementation Activities
- Program Role in HAI Elimination
- Evaluation of Progress
Primary outcome - Have HAIs been reduced or eliminated?
- Ultimate goal is to have sustained action to prevent infections

Challenge for primary outcome measure
- Infection rates vary by healthcare setting, intervention, risk group
- Great desire to have simple metrics, that can be used at the unit, hospital, state, national level

Standardized Infection Ratio (SIR)
- Analogous to a Standardized Mortality Ratio
- Compares each unit, hospital, state to a baseline rate (2006-2008)
- Allows combining of data from a variety of healthcare settings

Publicly reported SIRs by State, January 2010
## Evaluation of Progress Toward Eliminating HAIs

**Standardized Infection Ratios (SIR), by State**

<table>
<thead>
<tr>
<th>State</th>
<th>SIR</th>
<th>Central Line-Days</th>
<th>% Hospitals Participating</th>
<th>% Data from Intensive Care Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.85</td>
<td>174,082</td>
<td>24.7</td>
<td>73.2</td>
</tr>
<tr>
<td>B</td>
<td>0.92</td>
<td>163,314</td>
<td>61.4</td>
<td>93.7</td>
</tr>
<tr>
<td>C</td>
<td>1.16</td>
<td>94,455</td>
<td>70.8</td>
<td>59.5</td>
</tr>
<tr>
<td>D</td>
<td>1.30</td>
<td>95,288</td>
<td>65.8</td>
<td>93.6</td>
</tr>
</tbody>
</table>

- **Significantly below**
- **Below**
- **Above**
- **Significantly above**

2009 data, National Healthcare Safety Network
Focused Discussion

P. J. Brennan, MD
Chair, HICPAC
Chief Medical Officer, University of Pennsylvania

*Toward Elimination of Healthcare Associated Infections – the Pennsylvania Experience*
Public Disclosure of Healthcare Acquired Infection (HAI) Rates
Hospitals Underreport Infection Rates

New data suggests Pennsylvania hospitals are failing to report thousands of hospital-acquired infections, as required by law. Starting in January, hospitals were required to begin reporting four types of hospital-acquired infections to the Pennsylvania Health Care Cost Containment Council: bloodstream infections, urinary tract infections, surgery site infections and ventilator-associated pneumonia. First-quarter data became available last month and showed approximately 2,300 such infections mandated.

The bottom line The Pittsburgh Regional Healthcare Initiative, a nonprofit organization founded five years ago in an effort to improve patient care, has been collecting infection data voluntarily from about two dozen Western Pennsylvania hospitals since 2001.
In January 2004, Pennsylvania hospitals began submitting data on hospital-acquired infections to the Pennsylvania Health Care Cost Containment Council (PHC4). While concerns remain about whether all hospitals are fully complying with this new initiative, the first year of data collected provides some eye-opening information for all parties involved in the delivery and payment of hospital care. In 2004, hospitals reported 11,668 hospital-acquired infections, that is, 7.5 hospital-acquired infections per 1,000 patients admitted to Pennsylvania’s general acute care hospitals. 15.4 percent or 1,793 of these patients died. $2 billion in additional hospital charges and 205,000 additional hospital days were associated with the hospital admissions in which these devastating infections occurred. However, until all Pennsylvania hospitals have met the current PHC4 reporting requirements for hospital-acquired infection data, the full impact of these infections remains unknown.
### Distribution of HAIs by Sites as Reported by Pennsylvania Hospitals

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Number of Hospital-acquired Infections Reported by Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical Site</td>
<td>1,317</td>
</tr>
<tr>
<td>Urinary Tract</td>
<td>6,139</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1,335</td>
</tr>
<tr>
<td>Bloodstream</td>
<td>1,932</td>
</tr>
<tr>
<td>Multiple Infections</td>
<td>945</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,668</strong></td>
</tr>
</tbody>
</table>
Hospital-infections analysis a first

A Pennsylvania report found patients spent 205,000 extra days in the hospital at a cost of $350 million due to clinic-acquired diseases.
By Josh Goldstein
Inquirer Staff Writer

In 2004, 11,668 Pennsylvania hospital patients got an infection during their treatment causing them to spend an estimated 205,000 extra days in hospitals, according to a new report by a state agency.

The Pennsylvania Health Care Cost Containment Council's first report on hospital-acquired infections estimated that the sometimes preventable complications added nearly $350 million to the cost of care last year.

The report examined more than 1.5 million admissions to hospitals. It found that 1,793 patients who contracted hospital-acquired infections died. According to the cost containment council, that was 1,510 more deaths than expected.
# Healthcare-related Infection

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
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<tbody>
<tr>
<td>Number</td>
<td>30,237</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Fatal</td>
<td>12.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>LOS (days)</td>
<td>19.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Charge*</td>
<td>$176,000</td>
<td>$33,000</td>
</tr>
</tbody>
</table>

*Charges are not costs

**Difference:** 3,084 deaths and $4.3 billion

[Source: PHC4 2006 Report](www.phc4.org)
Hospital infections’ cost tallied

In a first, a report broke down 19,154 cases in Pa. last year.

By Josh Goldstein
ENQUIRER STAFF WRITER

Jeanne Staglaff expected that the surgery to repair a tear in her right knee would have her back on the ski slopes in no time.

But soon after her operation in February, the 56-year-old tax accountant developed an infection. As a result, Staglaff needed two additional operations, eight days in a Montgomery County hospital, and more than six months of rehabilitation.

Each year, thousands of patients contract infections in hospitals, a problem detailed for the first time yesterday in a report surveying 168 Pennsylvania hospitals.

Last year, 19,154 patients in Pennsylvania were infected in a hospital — driving up health-care costs, lengths of hospital stays, and death rates, the report said. The study examined 1.6 million hospitalizations.

The report, from the Pennsylvania Health Care Cost Containment Council, is the first in the country that allows people to examine infection rates hospital by hospital.

“The simple fact is that every patient that enters a hospital is at risk for a hospital-acquired infection,” said Marc P. Volavka, executive director of the

See INFECTIONS on A12

Infection Rates by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Urinary tract</th>
<th>Surgical site</th>
<th>Pneumonia</th>
<th>Bloodstream</th>
<th>Multiple</th>
<th>Total per 1,000 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburban Philadelphia</td>
<td>6.0</td>
<td>2.9</td>
<td>1.1</td>
<td>1.9</td>
<td>1.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>6.4</td>
<td>5.8</td>
<td>1.1</td>
<td>3.2</td>
<td>1.4</td>
<td>13.2</td>
</tr>
<tr>
<td>Statewide</td>
<td>7.2</td>
<td>5.2</td>
<td>1.2</td>
<td>1.7</td>
<td>1.2</td>
<td>12.2</td>
</tr>
</tbody>
</table>
Administrative coding data, compared with CDC/NHSN criteria, are poor indicators of health care–associated infections

Kurt B. Stevenson, MD, MPH, a,b Yosef Khan, MBBS, MPH, a,b Jeanne Dickman, MT, CIC, a Terri Gillenwater, RN, BSN, c Pat Kulich, RN, CIC, a Carol Myers, RN, BSN, CIC, a David Taylor, PhD, a Jennifer Santangelo, BA, d Jennifer Lundy, BS, MHA, d David Jarjoura, PhD, e Xiaobai Li, PhD, e Janice Shook, BS, b and Julie E. Mangino, MD a,b

Columbus, Ohio

Retrospective review of 3882 surgical procedures, 1599 patients at risk for BSI, and 193 patients at risk for VAP during 2005 for which infection surveillance using CDC NHSN definitions were completed. Using ICD-9-CM procedure codes, a data set of the identical patients at risk were recreated and secondary ICD-9-CM codes were applied for determination of HAIs by coding.
Hospital-Acquired Infections in Pennsylvania

2007 Number of Infections

Source: Pennsylvania Health Care Cost Containment Council
Hospital-Acquired Infections in Pennsylvania
Change in Infection Rate and Mortality Rate
2006 - 2007

Source: Pennsylvania Health Care Cost Containment Council
Governor’s program to insure all Pennsylvanians
Cost ~ $10 billion; Anticipated budget gap - $3.2 billion
Plan to fill budget gap by preventing HAIs
Bills introduced into the State General Assembly
Act 52 of 2007 signed into law on July 20, 2007
Act 52 of 2007 Quality Component

Goal: To eliminate virtually all HAIs
- Initial focus: MRSA, SSI, VAP, CLABSI
- Disclosure rules
- NHSN participation
- Require electronic surveillance system
- Fund regional best practice training
- Eliminate perverse incentives
- Nursing facilities to report HAIs
- Requires screening of MRSA-exposed
- Penalties and rewards
Pennsylvania Infection Distribution by Type
NHSN Reporting Period Q3 08 - Q1 09

4819, 23%
4489, 22%
4048, 20%
2863, 14%
2814, 14%
1341, 7%

Urinary Tract
Bloodstream
LRI/Pneu
GI
All others

All others
1341, 7%

Bloodstream
2814, 14%

LRI/Pneu
2863, 14%

GI
4048, 20%

Surgical Site
4489, 22%
Quality Imperatives Key Driver of Strategy
The Blueprint for Quality is a Critical Component for UPHS Clinical and Financial Strategy

UPHS Blueprint for Quality and Patient Safety

UPHS’ **overarching quality goal** is to prevent the preventable — **reduce mortality** and **reduce 30-day re-admissions**.

<table>
<thead>
<tr>
<th>Four Imperatives</th>
<th>Priority Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Transitions in care</td>
<td>• Transition planning</td>
</tr>
<tr>
<td></td>
<td>• Medication management</td>
</tr>
<tr>
<td>2. Reduce unnecessary variations in practice</td>
<td>• Reduce hospital-acquired infections</td>
</tr>
<tr>
<td></td>
<td>• Reduce medication errors</td>
</tr>
<tr>
<td>3. Coordination of care</td>
<td>• Interdisciplinary rounding</td>
</tr>
<tr>
<td>4. Accountability</td>
<td>• Unit clinical leadership</td>
</tr>
</tbody>
</table>
Imperatives Behind UPHS’ Quality Goals

Quality Goal #1: Mortality Reduction

External Imperatives
- Public metrics
- P4P
- Patient safety
- Anticoagulation
- Boards on board
- BSIs
- VAP
- SCIP

Organizational Strategies

Quality Goal #2: Better Transitions
The CMOs and CNOs have identified FY’09 quality targets for UPHS. The targets are directly aligned to the UPHS Blueprint for Quality and Patient Safety, which is UPHS’ framework for clinical strategy.

### UPHS Blueprint for Quality and Patient Safety

**UPHS’ overarching quality goal** is to prevent the preventable — reduce QIII/QIV mortality and reduce 30-day re-admissions.

<table>
<thead>
<tr>
<th>Four Imperatives</th>
<th>Priority Actions</th>
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<tbody>
<tr>
<td>1. Transitions in care</td>
<td>Transition planning, Medication management</td>
</tr>
<tr>
<td>2. Reduce unnecessary variations in practice</td>
<td>Reduce hospital-acquired infections, Reduce medication errors</td>
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<tr>
<td>3. Coordination of care</td>
<td>Interdisciplinary rounding</td>
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<tr>
<td>4. Accountability</td>
<td>Unit clinical leadership</td>
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### Transitions in Care — FY’09 Targets

**All Units**
- Increase use of homecare
- Med reconciliation on admission

**Selected Units**
- HUP only: 25% reduction in preventable readmits for CHF, Diabetes & Anticoagulation for patients from HCHS
- Increase appropriate use of hospice
- Core measures — heart failure discharge instructions
- Unplanned readmission to ICU

### Reduce Variations in Practice — FY’09 Targets

**All Units**
- Reduce CR bloodstream infections
- Reduce urinary tract infections
- Time to admin of STAT antibiotics
- Decrease rate of DVTs & PEs
- Decrease falls with injury
- Decrease pressure ulcers
- Adherence to hand hygiene

**Selected Units**
- Ventilator-associated pneumonia
- SCIP (Surgical Care Improvement Program)
- Process improvements for high risk patient populations
- HUP only: Med errors (applies to HUP pharmacy, but goals are unit specific)

### Coordination of Care — FY’09 Targets

**All Units**
- “Staff worked together” (Press Ganey)
- Likelihood of recommendation (HCAHPS)
- Anticipated discharge by patient (Patient Progression)

**Selected Units**
- Timely launch of Unit Clinical Leadership team
**Blue Cross Pay for Performance FY09**

UPHS achieved a final effective score of 94 out of 100 for the FY09 contract year. This equates to $5.3M in total revenue, an increment of approximately $1M from FY08.

<table>
<thead>
<tr>
<th>Patient Safety Program</th>
<th>Full Weight Potential</th>
<th>Final Weighted Score</th>
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<tbody>
<tr>
<td>Anticoagulation</td>
<td>15%</td>
<td>8.5</td>
</tr>
<tr>
<td>Boards on Board</td>
<td>15%</td>
<td>15.0</td>
</tr>
<tr>
<td>Vent Assoc Pneumonia</td>
<td>25%</td>
<td>24.2</td>
</tr>
<tr>
<td>Urinary Tract Infections</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Central Line Infections</td>
<td>30%</td>
<td>30.0</td>
</tr>
<tr>
<td>Surg Care Improvement</td>
<td>15%</td>
<td>13.8</td>
</tr>
</tbody>
</table>
Penn Medicine: Reducing Bloodstream Infections
Numbers of Bloodstream Infections: FY06-Present

- First BSI Campaign
- 2nd BSI Campaign
- BioPatch Pilot
- BSI Task Force
- New Dressing
- BioPatch Use Expanded
- TheraDoc
- BSI Definition Changes
- CLC 2000 Removed
- Value Capture

Chart showing the numbers of bloodstream infections from FY06 to Present, with various interventions marked along the timeline.
Public Reporting Challenges in Pennsylvania

- **Use of NHSN**
  - System not designed for this purpose
  - Complex/high maintenance
  - Learning curve
  - System outside our control
  - Limited ability to diagnose problems
  - System updates

- **Multiple organizations/conveying of rights**
Public Reporting Challenges in Pennsylvania

- **Substantial time and effort by users**
  - Costs
  - Personnel

- **Long term care facility capacity**
  - Separate system
  - Infrastructure

- **Need to demonstrate reductions**
  - Data quality
  - Ability to investigate findings
  - MRSA screening
Focused Discussion

Barry M. Straube, MD
Chief Medical Officer, &
Director, Office of Clinical Standards & Quality
Centers for Medicare & Medicaid Services

*Healthcare-associated Infections: Strategies for Elimination*
Income to the HI Trust Fund will soon become inadequate to fund the HI portion of Medicare benefits

- HI Trust Funds to be depleted by 2016
- Expenditures currently exceed income/revenue
- Recipients of benefits growing, workers to beneficiaries decreasing
- Overall economy affects Trust Fund, currently negatively
- HI deficit over the next 75 years is $13.4 trillion. Eliminating the deficit would require:
  - Immediate 134% increase in payroll tax, or
  - Immediate 53% reduction in benefits, or
  - Combination of both

This dismal situation is in addition to the increased funding needs of Medicare Parts B & D that are funded out of the general fund and premium payments that are adjusted annually.
CMS as a Public Health Agency

- Population health as well as person-centeredness
- Using CMS influence and financial leverage, in partnership with other HHS components, to transform American healthcare system
- Focusing on not just Medicare & Medicaid, but also Commercial, uninsured, etc
- Quality, Value, Efficiency
- Assisting patients and providers in receiving evidence-based, technologically-advanced care while reducing avoidable complications & unnecessary costs
Ensuring Quality & Value: CMS Strategies

- “Traditional Quality Improvement”
- Transparency: Public reporting & data sharing
- Incentives:
  - Financial: Value-Based Purchasing
  - Non-financial
- Regulatory vehicles
- Demonstrations, pilots, research
- Coverage decision-making and comparative effectiveness
- Leveraging efforts with other HHS components, state/federal agencies & private sector
Traditional Quality Improvement

- Multiple collaboratives
  - Regional
  - National
  - Local

- Examples of national collaboratives
  - Surgical Care Improvement Program (SCIP)
    - NSQIP, others
  - 100K Lives Campaign
  - HRSA Organ Donation Collaborative
  - NQF National Priorities Partnership
  - Obesity, diabetes, smoking cessation, immunizations
QIO Program 9th SOW

- HAIs under patient safety theme
- Reduction of MRSA infections in 440 hospitals nationwide
  - CDC National Healthcare Safety Network (NHSN)
  - AHRQ TeamSTEPPS methodology
- Pilot programs: ? 10th SOW inclusion
  - C. difficile infection reduction
  - Urinary tract catheter infection reduction
ESRD Network Program QI activities

- Individual ESRD Networks have included activities to address infections in vascular access as well as other infection control issues, including facility-acquired infections (dialysis facilities and some hospitals)

- Collaboration with other HHS agencies, other state/federal agencies, private sector organizations
Traditional Quality Improvement (& Incentives): CMS Hospital Quality Initiative

- National Voluntary Hospital Reporting Initiative (NVHRI) public-private initiative
  - Federation of American Hospitals
  - AHA
  - AAMC
  - CMS, JCAHO, others

- Hospital Quality Alliance

- Medicare Modernization Act of 2003: Section 501b – Financial incentive of 0.4%
“Voluntary” participation went from 10% of hospitals reporting some of 10 measures to over 95%

Incentive increased from 0.4% to 2% of APU under DRA

Current year 96% of hospitals qualified
- 44 measures (includes Hospital CAHPS)
- Recent inclusion of mortality and readmission rates for AMI, CHF, Pneumonia
- Plan to test EHR submission soon

Pay-for-Reporting works, better than voluntarism

Quality reporting roadmap: Voluntary to P4R to P4P
Transparency: CMS Compare Websites

- Hospital Compare
- Nursing Home Compare
- Home Health Compare
- Dialysis Facility Compare
- Health Plan and Medi-Gap Compare
- Prescription Drug Plan Compare
- Physician Compare in future
- Continuum of Care in future
  - Overall efficiency across settings
  - Care transitions and coordination
- MyMedicare.gov
Transparency

- Additional reporting of HAI measures
  - Considering for future Hospital Compare updates
  - Discussing inclusion of CDC NHSN measures
  - Requires NQF endorsement and Hospital Quality Alliance and other stakeholder input
  - Expand to other provider sites, starting with:
    ✓ Ambulatory surgery centers
    ✓ Dialysis facilities
  - Link to transitions of care and episodes of care
The White House, the Secretary and HHS have prioritized the concept of HHS making its data available to all healthcare stakeholders.

- [www.data.gov](http://www.data.gov) development and expansion

- CMS has now added the concept that as part of its public health agency role, collecting, reporting and making healthcare data available is a core competency/mission.
Incentives

- **Current**
  - P4R: RHQDAPU, HOPQDRP, PQRI
  - ARRA /HITECH: EHRs in hospitals, MD offices

- **Value-based Purchasing (VBP)**
  - Hospital VBP Report to Congress (Nov 2007)
  - Physician VBP RTC due May 2010
  - ESRD Quality Incentive Program to be implemented by January 1, 2012
  - All other settings with plans

- **Healthcare Reform debate may define better**
Support for Incentives via VBP

- President’s Budget
  - Includes line items for HAIs and HACs

- Congressional Interest in P4P and Other Value-Based Purchasing Tools
  - BIPA, MMA, DRA, TRCHA, MMSEA, MIPPA, ARRA

- MedPAC Reports to Congress
  - P4P recommendations related to quality, efficiency, health information technology, and payment reform

- IOM Reports
  - P4P recommendations in *To Err Is Human* and *Crossing the Quality Chasm*
  - Report, *Rewarding Provider Performance: Aligning Incentives in Medicare*

- States & Private Sector
  - Private health plans: Commercial, Medicare, Medicaid, SNPs
  - Employer coalitions
260 participating hospitals
  - Wide variation in demographics, funding

34 Quality Metrics
  - Acute myocardial infarction (9)
  - Coronary artery bypass graft (8)
  - Heart failure (4)
  - Community acquired pneumonia (7)
  - Hip and knee replacement (6)
Premier Demonstration

- **Hospital scores**
  - “Rolling up” individual measures into one score for each disease category
  - Each disease category will be categorized by hospital scores by decimal

- **Public reporting of all data will be available**

- **Financial awards**
  - Hospitals in top 20% will be given bonuses: 2% for top decimal, 1% for second decimal
  - Top 50% recognized on CMS website
Public Reporting and Pay for Performance in Hospital Quality Improvement

Peter K. Lindenauer, M.D., M.Sc., Denise Remus, Ph.D., R.N., Sheila Roman, M.D., M.P.H., Michael B. Rothberg, M.D., M.P.H., Evan M. Benjamin, M.D., Allen Ma, Ph.D., and Dale W. Bratzler, D.O., M.P.H.
Composite of 10 Measures
Incentives: Hospital Acquired Conditions

- DRA Section 5001(c) authorized this approach
- Beginning October 1, 2007, IPPS hospitals were required to submit data on their claims for payment indicating whether diagnoses were present on admission (POA)
- Beginning October 1, 2008, CMS stopped assigning a case to a higher DRG based on the occurrence of one of the selected conditions, if that condition was acquired during the hospitalization
Incentives: HACs

- Almost all HACs might have indirect relationship to potential HAIs

- HACs clearly linked to HAIs
  - Catheter-associated UTI
  - Vascular catheter associated infection
  - Surgical site infections
    - Mediastinitis after CABG
    - Certain orthopedic surgeries
    - Bariatric surgery for obesity

- Inclusion of HAIs and HACs in VBP programs
Conditions of Participation

- COPs are minimum health and safety standards set by CMS for facilities that may receive Medicare payments
  - 17 separate provider settings plus supplier settings

- Current Infection Control COPs generally address reduction of HAIs

- Expansion possibilities for COPs
  - Require facilities to incorporate specific standards of practice or guidelines set by the Secretary
  - Require that infection control be part of the QAPI program
Conditions of Participation

- Infection control regulations already strengthened
  - Conditions for Coverage for ESRD facilities (April 15, 2008)
  - CfC for Ambulatory Surgery Centers (ASCs) (November 18, 2008)

- Other current considerations
  - Omnibus COP/CfC Rule for HAIs
  - Individual setting strengthening of current regulations
All U.S. healthcare facilities certified by Medicare are expected to be in compliance with all current regulations, as well as applicable state laws

S&C process uses interpretive guidelines to assess compliance with regulations
- Focus on HAIs can be prioritized
- Surveyor training has included HAI emphasis
- Web-based training & surveyor tools being developed
- Interpretive guidelines for 2010 to include QAPI opportunities for hospitals
- Focused facility approach feasible merging QI & S&C
Other

- Demonstrations, pilots, research
  - ARRA funding and other funding sources should also focus on HAIs as they fall under:
    - √ Comparative Effectiveness Research
    - √ Prevention, Wellness, Patient Safety
  - CMS will incorporate HAI topics into its demos, when appropriate

- Cross Agency HHS collaboration (a priority for all issues from the Secretary), as well as with other federal/state agencies, private sector
Future: CMS-CDC HAI Collaboration

- **Traditional QI**
  - Measures identification, prioritization, development, testing & implementation
  - Data collection facilitation: Claims, administrative sources, registries, EHRs, etc.
  - QI collaboratives, leveraging existing efforts

- **Transparency**
  - Compare Websites collaboration: NHSN to start?
  - [www.data.gov](http://www.data.gov) data submission

- **Incentives**
  - Prioritization and alignment of VBP topics/foci
Future: CMS-CDC HAI Collaboration

- **Conditions of Participation**
  - Increased joint review of infection control sections of COPs
  - Joint regular maintenance of COPs
  - Emergency & urgent focus on infectious topics
    - HAVBED monitoring system of ASPR as example
    - NHSN as monitoring system

- **Survey & Certification**
  - Surveyor guideline development
  - Focused facility strategy
Future: CMS-CDC HAI Collaboration

- Demonstrations & Research
  - Evidence-based guidelines development
  - Evidence-based interventions development and piloting

- Coverage Decision-Making

- Cross-Agency collaboration within HHS and federal government
  - A priority for the Secretary and HHS
  - Diabetes self-management as example