Healthcare-associated Infections and Antimicrobial Use Prevalence Survey

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Agenda

- Recognize healthcare-associated infections (HAIs) as a public health problem
- Brief review of survey objectives, time line, and methodology
- Discuss preliminary results from healthcare facility assessment (HFA) survey
- Discuss preliminary results from Emerging Infections Program (EIP) HAI and Antimicrobial Use Prevalence Survey
- Discuss next steps for survey and how data has been used

Public Health and Healthcare-associated Infections

- HAI recognized as major public health problem
  - 1 in 20 hospitalized patients affected
  - Excess morbidity, mortality, healthcare costs; case-fatality rate ranges from 2.3% to 14.4% depending on the type of infection
  - Occur across spectrum of care

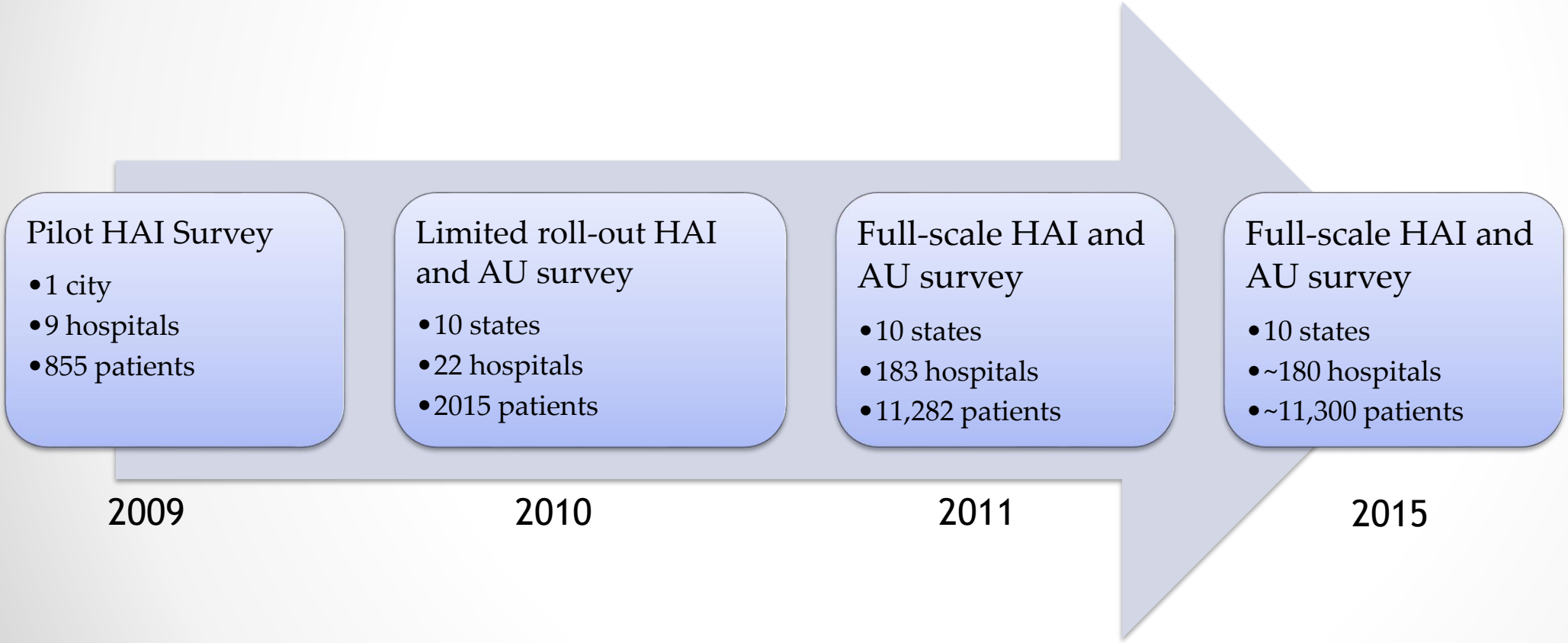
- Preventing HAIs is priority of CDC and state and federal agencies
  - Among CDC's winnable battles
  - State mandates to report HAIs
  - 2009 Omnibus Law required states receiving Preventive Health and Health Services (PHHS) Block Grant funds to submit a HAI prevention plan to Health and Human Services by January 2010

EIP HAI and Antimicrobial Use Prevalence Survey Objectives

- Estimate HAI Prevalence in a large sample of U.S. acute care inpatients
- Determine distribution of HAIs by pathogen (including antimicrobial resistant pathogens) and major infection site
- Estimate the prevalence and describe the indications for antimicrobial use in a large sample of U.S. acute care inpatients

Complements data reported to CDC's National Healthcare Safety Network (NHSN); big picture of all HAI and antimicrobial use

EIP HAI and Antimicrobial Use Prevalence Survey



2015 (Phase 4) HAI and Antimicrobial Use Prevalence Survey

- Same hospitals from 2011 asked to participate in 2015
- Capture changes in HAIs and antimicrobial use since 2011 survey
- Includes large-scale assessment of antimicrobial drug prescribing quality
- Provides data to address question of what the next targets should be to continue to improve patient safety
  - HAI surveillance and prevention
  - Antimicrobial stewardship

EIP Phase 4 HAI and Antimicrobial Use Prevalence Survey: Methods

- Cross-sectional, point prevalence survey
- Stratified random selection of acute healthcare facilities
- Eligible patients: acute care inpatients of any age, randomly selected
- HFA survey was administered to the facilities
- Data collection on survey day by primary teams, detailed chart review by EIP teams
- Data analysis

  Preliminary aggregate data analysis by EIP sites for state level; generated prevalence estimates for device use, antimicrobial use, and rationale
- IRB approved

HFA Survey

- Basic hospital characteristics
- Infection control policies and practices
- Antimicrobial stewardship policies and practices

HFA Survey: NM Results

- Characteristics of participating hospitals

Characteristic	No. (%)
Hospital location	
Urban	17 (89.4%)
Rural	1 (5.3%)
Academic affiliation	
AMA-approved residency program	Yes=3 (15.8%); No= 15 (84.2%)
Council of Teaching Hospital members	Yes= 1 (5.3%); No =18 (94.7%)

HFA Survey: NM Results

- Characteristics of participating hospitals

Characteristic	Median
Total annual discharges	3,323
Total patient rooms	95
Single patient rooms	71
Acute care licensed beds	100
Acute care staffed beds	99
Average daily census	40
ICU beds	10
Infection Preventionist FTEs	1
Hospital Epidemiologist FTEs	0.00

HFA Survey: Infection Control Characteristics

- "Does your facility have an infection control team or program with one or more staff members responsible for developing and implementing infection control policies and practices and related activities?"
  - Yes = 89.5 %
- Among those that have a program
  - 64.7% been in place for more than 10 years
  - 64.7% of teams/programs meet every other month or quarterly
- All facilities have a committee that reviews activities of the infection control-related program (100%)
  - 84.2 % of committees include Nursing leaders or administrators; 63.2% of committees include facility executive leaders or board members

HFA Survey: Compliance and Accountability

- "My hospital measures adherence to isolation precautions among staff (e.g., the percentage of those who comply with wearing of gloves or donning of gowns)"
  - Yes = 63.2%
- "All hospital units, services and/or staff members are held accountable for complying with infection control policies (e.g., there are positive consequences for good compliance, and/or negative consequences for poor compliance)"
  - Yes = 73%

HFA Survey: Antimicrobial Stewardship Teams

- Does your hospital have a multidisciplinary team focused on promoting appropriate antimicrobial use?
  - Yes = 68.4%
  - **No = 31.6%**
- Among hospitals with a stewardship team, 46.2 % have had a team in place between 1 and 3 years
- Most teams meet every other month or quarterly (61.5%)
- Small proportion of teams have full (38.5%) or partial (38.5%) salary support for one or more team members

HFA Survey: Antimicrobial Stewardship Practices

- Formulary: 94.7%,
- **Pre-authorization: 63.2%**
- Audit: 84.2%
- Audit plus feedback: 78.9%
- **Automatic stop orders: 21.1%**
- Guidelines:
  - Switching form parenteral to oral: 73.7%
  - Surgical prophylaxis: 78.9%
  - **Treatment for common infections: 68.4%**
- Hospital information technology support: 89.5%

Phase 4 Prevalence Survey: NM Results – Hospitals and Patients

- 19 general acute care facilities participated
- 878 patient records were surveyed; 453 were on antimicrobials initially, finalized 437
- 54.6% female, 45.4% male
- 65.3% White, 11.8% American Indian, 11.3% unknown, 7.1% other race

Phase 4 Prevalence Survey: NM Results – Device Use on Survey Date

- 165 patients (19%) had urinary catheter
- 45 patients (5.2%) received mechanical ventilation
- 136 patients (15.6%) had central line
  - -121 had one central line
  - - 13 had more than one central line

Phase 4 Prevalence Survey: NM Results – Antimicrobial Use

- 453 patients (51.2%) reported to be on or scheduled for antimicrobials on survey day or day prior to survey day
- 437 patients (50.1%) confirmed to have received antimicrobials
- 729 antimicrobials given (includes same antimicrobial given by different routes)

Phase 4 Prevalence Survey: NM Results – Antimicrobial Rationale

Rationale	Frequency (n=729)	Percent (%)
Treatment of active infection	596	81.8
Surgical prophylaxis	79	10.8
Medical prophylaxis	35	4.8
Non-infectious	2	0.3
None documented	21	2.9

Phase 4 Prevalence Survey: NM Results – Therapeutic Site for Active Infections

Top 5 Therapeutic Sites	Frequency (n=703)	Percent (%)
Pneumonia	182	25.8
Undetermined	121	17.2
Urinary tract infection	106	15.1
Skin/soft tissue infection	85	12.1
Gastrointestinal tract infection	55	7.8

Comparison of Top 5 Therapeutic Sites between 2011 and 2015

2011 Top 5 Therapeutic Sites	2015 Top 5 Therapeutic Sites
Lower respiratory tract infection	Pneumonia
Urinary tract infection	Undetermined
Skin/soft tissue infection	Urinary tract infection
Gastrointestinal tract infection	Skin/soft tissue infection
Bloodstream infection	Gastrointestinal tract infection

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Gastrointestinal tract infection	Skin/soft tissue infection
Bloodstream infection	Gastrointestinal tract infection

Phase 4 Prevalence Survey: NM Results – Antimicrobials Being Used

Top 10 Antimicrobials	Frequency (n=727)	Percent (%)
Vancomycin	98	11.8
Ceftriaxone	77	11.6
Cefazolin	75	10.2
Piperacillin/tazobactam	73	9.6
Levofloxacin	57	7.6
Metronidazole	56	7.2
Ciprofloxacin	38	4.5
Azithromycin	31	4.2
Ampicillin	21	3.6
Clindamycin	20	3.3

Comparison of Antimicrobials Use Between 2011 and 2015

2011 Top 10 Antimicrobials	2015 Top 10 Antimicrobials
Vancomycin	Vancomycin
Cefazolin	Ceftriaxone
Ceftriaxone	Cefazolin
Piperacillin/tazobactam	Piperacillin/tazobactam
Ciprofloxacin	Levofloxacin
Metronidazole	Metronidazole
Clindamycin	Ciprofloxacin
Azithromycin	Azithromycin
Levofloxacin	Ampicillin
Moxifloxacin	Clindamycin

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Levofloxacin	Ampicillin
Moxifloxacin	Clindamycin

Phase 4 Prevalence Survey: NM Results – Healthcare-associated Infections

- 2011 definitions:
  - 23 HAIs detected among 22 patients
  - At patient level, 2.6% HAI prevalence

- 2015 definitions:
  - 22 HAIs detected among 21 patients
  - At patient level, 2.5% HAI prevalence

Phase 4 Prevalence Survey: NM Results – Healthcare-associated Infections by 2011 definitions

HAI Major Type	Frequency (n=23)	Percent (%)
Gastrointestinal tract infection	7	30.4
Pneumonia	6	26.1
Surgical site infection	5	21.7
Bloodstream infection	2	8.7
Urinary tract infection	1	4.3
Skin/soft tissue infection	1	4.3
Lower respiratory tract infection	1	4.3

Phase 4 Prevalence Survey: NM Results – Healthcare-associated Infections by 2015 definitions

HAI Major Type	Frequency (n=22)	Percent (%)
Gastrointestinal tract infection	6	27.3
Pneumonia	6	27.3
Surgical site infection	6	27.3
Bloodstream infection	2	9.1
Urinary tract infection	1	4.5
Ventilator-associated events	1	4.5

Challenges

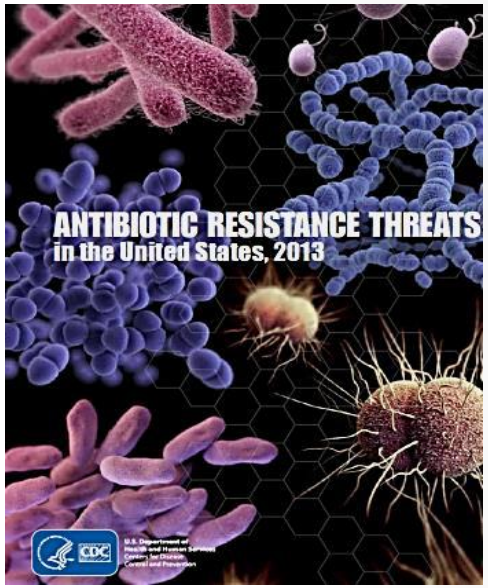
- Lack of reviewer's access to complete medical records
- Difficulty in finding ICD-9 codes
- Incomplete medical records in paper form
- Unable to access medical records remotely

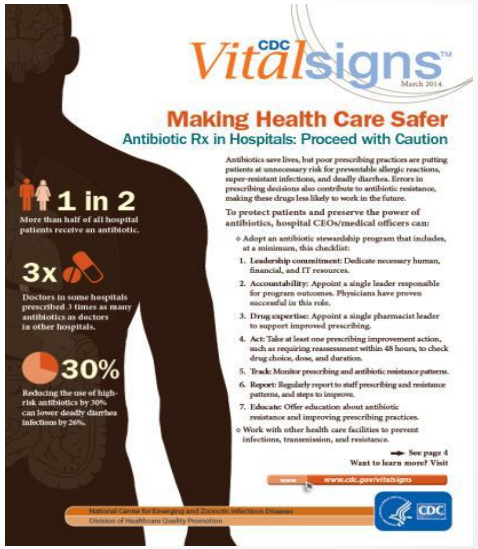
Next Steps

- Data validation
- Complete data entry
- Manuscripts:
  - HAI prevalence and burden paper, comparison to 2011-target 2017
  - AU prevalence and burden paper, comparison to 2011- target 2017
  - AQUA results- target 2018?

How Have the Prevalence Survey Results Been Used?

- Used for national burden estimates in CDC's report on "Antimicrobial Resistance Threats in the United States"
  - Puts antimicrobial resistance in context for public and policy makers
- Highlighted potential for improving prescribing in U.S. hospitals (CDC "Vital Signs" report)
  - Provides support for CDC's call to expand antibiotic stewardship programs to all U.S. hospitals
  - Prompted additional work on approaches to describing quality of antimicrobial use prescribing





Thank you!

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