



Healthcare-Associated Infections and Antimicrobial Use in U.S. Hospitals: Results from EIP Prevalence Surveys

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Overview

- Background and rationale for hospital prevalence surveys
- EIP hospital survey development and methods
- Summary of results
- Next steps

Healthcare-associated infection surveillance in the United States

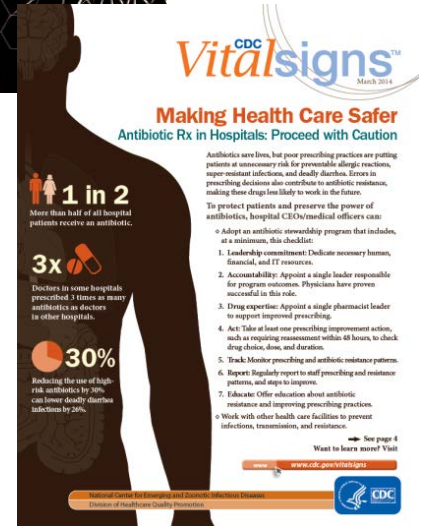
- National Healthcare Safety Network (NHSN) is largest U.S. tracking system for healthcare-associated infections (HAI)
- Hospital reporting to NHSN driven by federal and state requirements
 - Central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI) following colon surgery or hysterectomy, *Clostridium difficile* infections (CDI), MRSA bacteremia
 - Intensive care units, medical and surgical wards
- Data have shown progress in preventing selected HAI types
- Overall impact of prevention success across all HAI types and hospital locations is unclear

Why conduct HAI and antimicrobial use prevalence surveys?

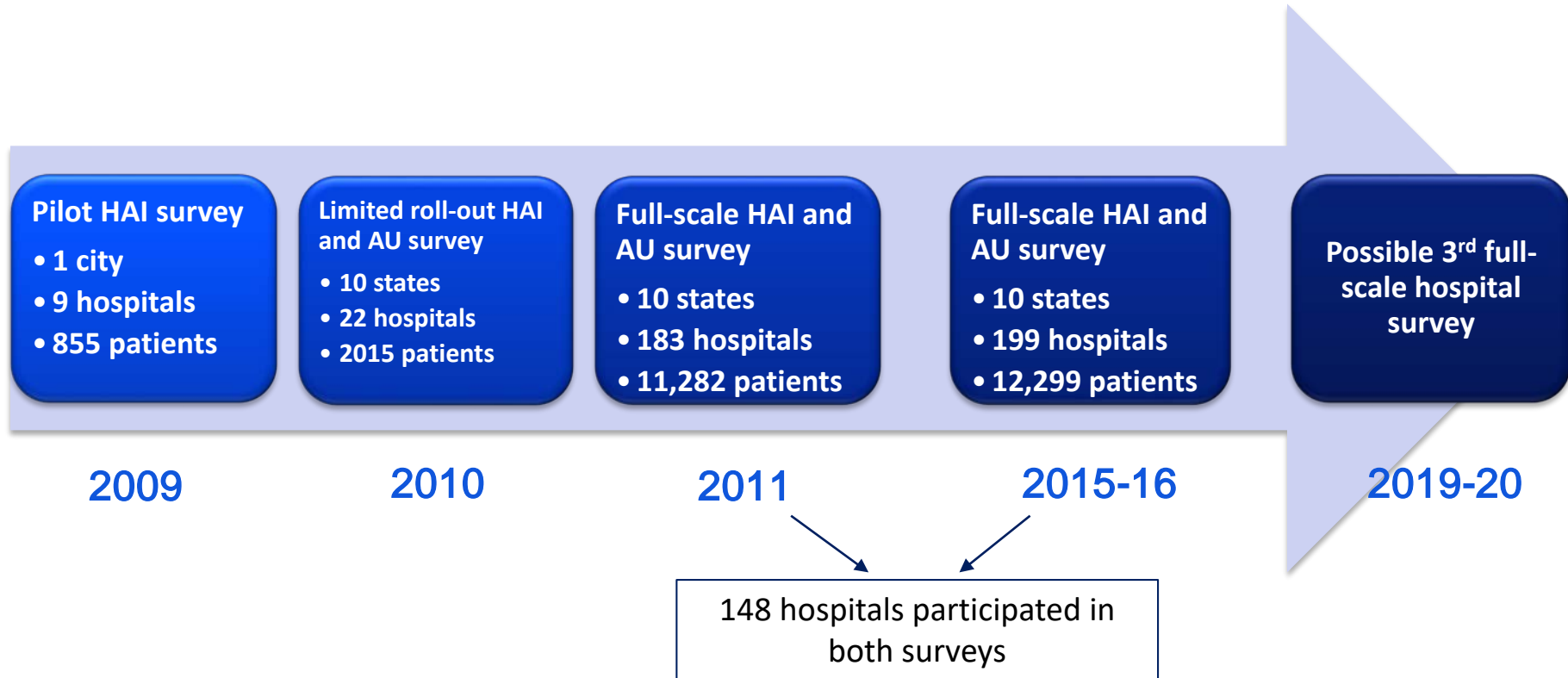
- Maintain awareness of all HAIs affecting hospital patients
 - Still the only system providing “comprehensive” view of acute care HAIs, complementing NHSN
 - New targets, changes over time
- Update national burden estimates
 - Estimates can be used to validate estimates generated using other systems (e.g., NHSN)
- Describe antimicrobial prescribing in hospitals at the patient level
 - Only system right now that can provide patient-level use and prescribing quality data from acute care setting

Hospital survey data: raising awareness

- Data were key part of CDC's report on "Antimicrobial Resistance Threats in the United States"
- Prompted efforts to describe clinical events detected by pneumonia and lower respiratory infection definitions
- Highlighted the potential for improving prescribing in U.S. hospitals (CDC "Vital Signs" report)
 - Justified the need for policy changes outlined in the National Strategy to expand antibiotic stewardship programs to all U.S. hospitals
 - Prompted additional work on approaches to describing quality of antimicrobial prescribing



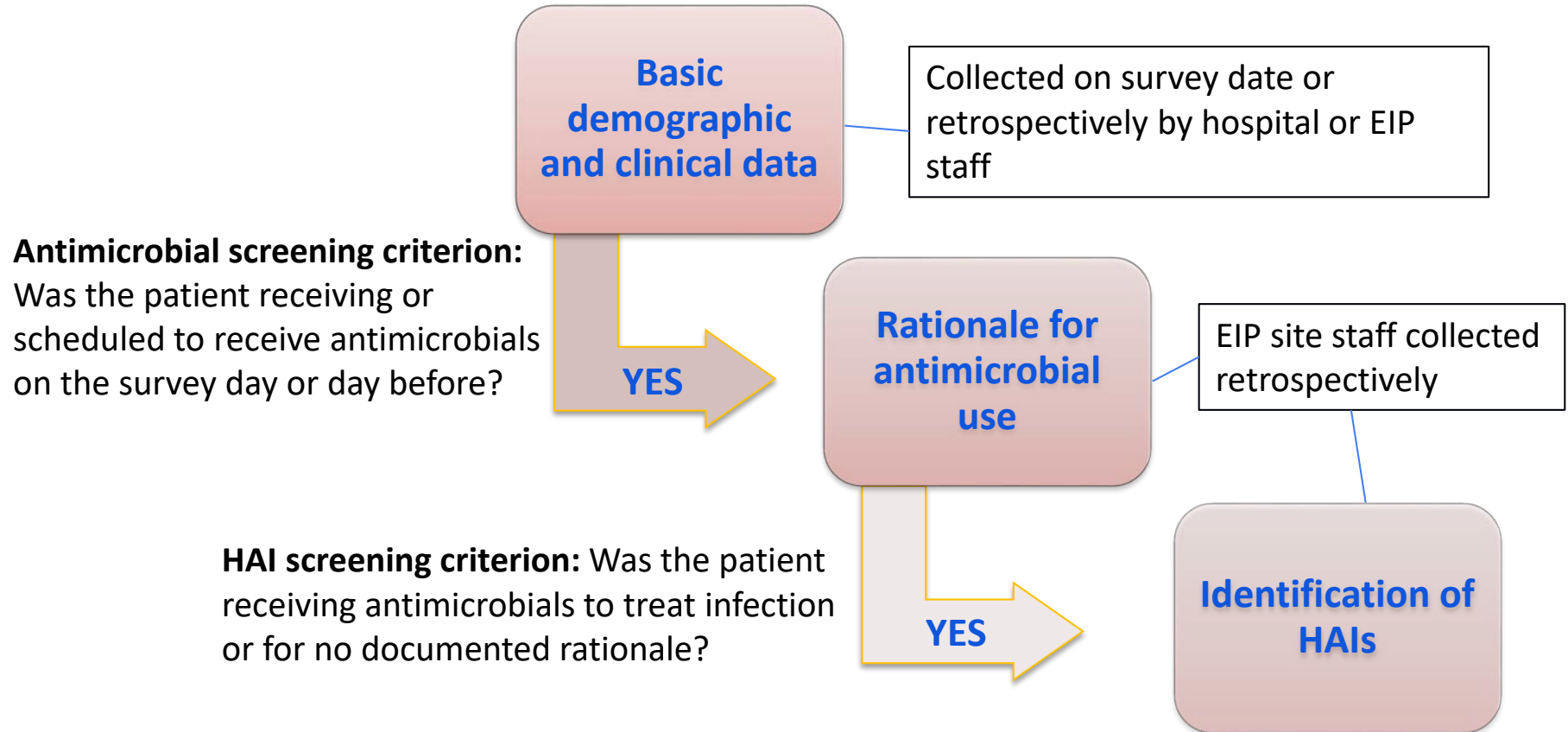
Timeline of U.S. hospital HAI and AU prevalence surveys



Hospital and patient selection

- Hospitals
 - Stratified random sample based on hospital acute care staffed bed size (voluntary participation)
 - In 2015 sites preferentially recruited hospitals that participated in the 2011 survey; additional hospitals recruited through stratified random sampling scheme, up to 25 per site
- Patients
 - Random sample of acute care inpatients on morning of survey
 - 100 patients in large hospitals, 75 in small and medium hospitals (or all acute care inpatients if <75)

Patient-level data collection from medical records



Hospital HAI prevalence and burden, 2011

- 1 in 25 hospital inpatients (4%) had at least one HAI
- Estimated national burden of 722,000 HAIs in 648,000 patients in 2011
- ~75,000 patients with HAIs died during their hospitalizations

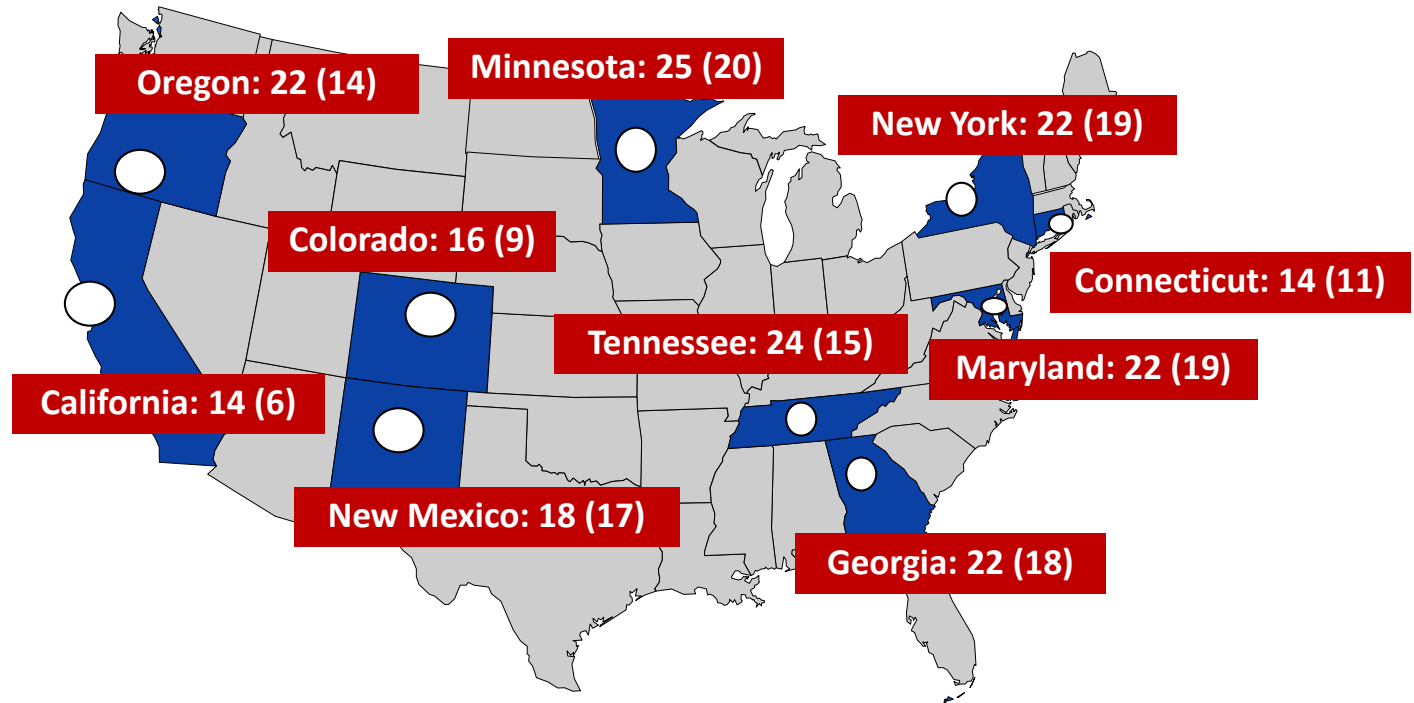


The screenshot shows the top portion of a web page from The New England Journal of Medicine. On the left is the circular logo of the journal, featuring a caduceus and the text 'The NEW ENGLAND JOURNAL OF MEDICINE' and the years '1812' and '1827'. To the right of the logo, the journal's name is displayed in a serif font: 'The NEW ENGLAND JOURNAL of MEDICINE'. Below the journal name is a navigation bar with several menu items: 'HOME', 'ARTICLE S & MULTIMEDIA', 'ISSUE S', 'SPECIALTIE S & TOPIC S', 'FOR AUTHOR S', and 'CME'. The main content area is titled 'ORIGINAL ARTICLE' and features the article title 'Multistate Point-Prevalence Survey of Health Care–Associated Infections'. Below the title, the authors are listed: Shelley S. Magill, M.D., Ph.D., Jonathan R. Edwards, M.Stat., Wendy Barberg, M.D., Zintars G. Beldavs, M.S., Ghinwa Dumyati, M.D., Marlon A. Kalner, M.B., B.S., M.P.H., Ruth Lynfield, M.D., Meghan Maloney, M.P.H., Laura McAllister-Hollod, M.P.H., Joelle Nadle, M.P.H., Susan M. Ray, M.D., Deborah L. Thompson, M.D., M.S.P.H., Lucy E. Wilson, M.D., and Scott K. Fridkin, M.D. for the Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Survey Team. The publication information is: N Engl J Med 2014; 370:1198-1208 | March 27, 2014 | DOI: 10.1056/NEJMoa1306801. At the bottom right of the article text, there are social media sharing icons for Facebook, Twitter, LinkedIn, and a plus sign for more options. Below the article text is a navigation bar with buttons for 'Abstract', 'Article', 'References', 'Citing Articles (54)', and 'Letters'.

Results: hospitals in the 2015 survey

- Of 199 hospitals contributing patients to the survey, 148 (74.4%) had previously participated in the 2011 survey

Map shows total no. hospitals (no. hospitals that also participated in 2011 survey) for each EIP site

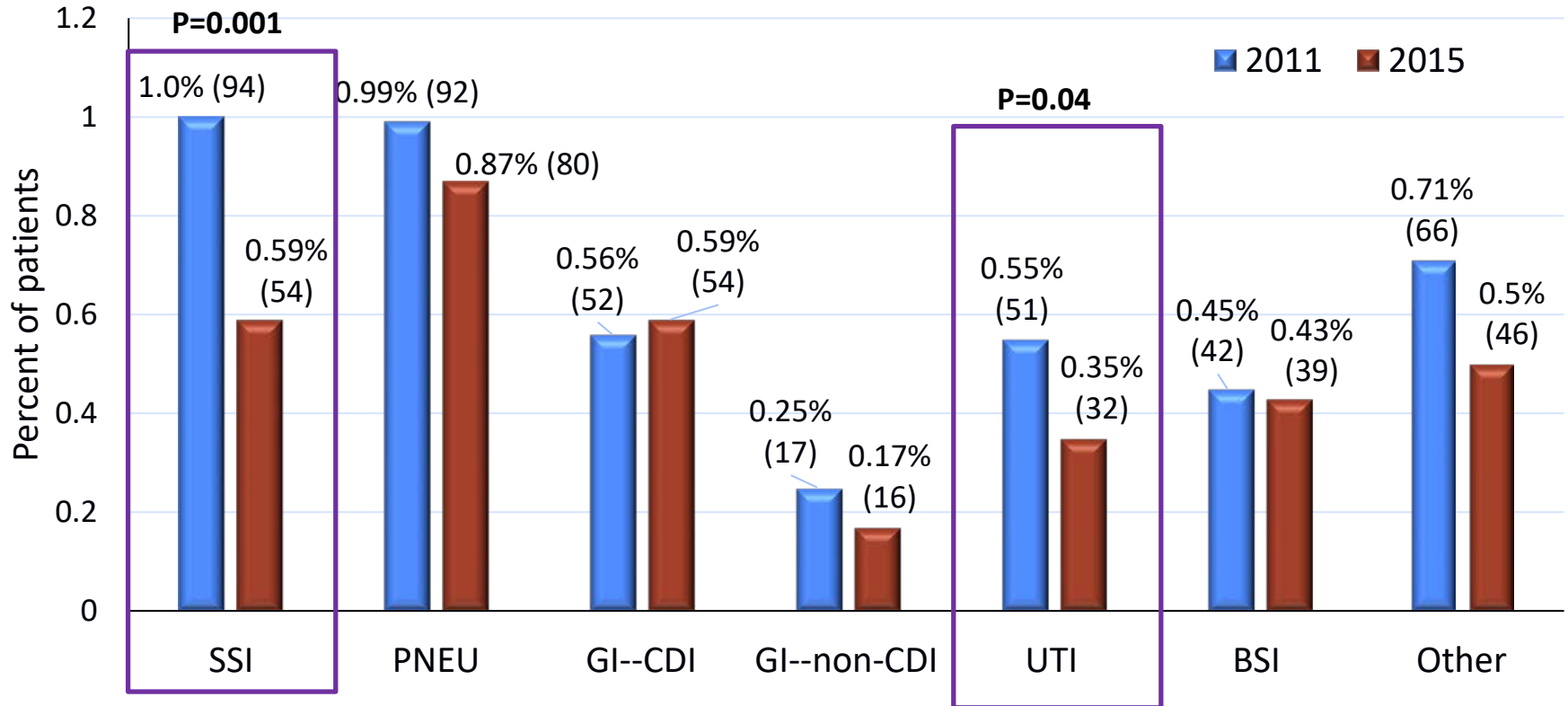


HAI prevalence, 2011 vs. 2015, in hospitals participating in both surveys

	2011 Survey N=9283		2015 Survey N=9169		P-value
	No. (%)	95% CI	No. (%)	95% CI	
Patients with HAIs	383 (4.1)	3.7-4.6	297 (3.2)	2.9-3.6	0.001

Patients surveyed in 2015 had a 22% lower risk of HAI than patients surveyed in 2011, after adjusting for age, time from admission to survey, presence of devices, and hospital size

Results: HAI prevalence by infection type



Antimicrobial use prevalence, 2011

- 50% of patients were on antimicrobials at the time of the survey
- Of patients getting antimicrobials, half were getting ≥ 2
- Few differences in treatment given to patients in/outside of ICUs, for community and healthcare infections

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Original Investigation | October 8, 2014

Prevalence of Antimicrobial Use in US Acute Care Hospitals, May-September 2011

Shelley S. Magill, MD, PhD¹; Jonathan R. Edwards, MStat¹; Zintars G. Beldavs, MS²; Ghinwa Dumyati, MD³; Sarah J. Janelle, MPH⁴; Marion A. Kainer, MBBS, MPH⁵; Ruth Lynfield, MD⁶; Joelle Nadle, MPH⁷; Melinda M. Neuhauser, PharmD, MPH⁸; Susan M. Ray, MD⁹; Katherine Richards, MPH¹⁰; Richard Rodriguez, MPH¹¹; Deborah L. Thompson, MD, MSPH¹²; Scott K. Fridkin, MD¹; for the Emerging Infections Program Healthcare-Associated Infections and Antimicrobial Use Prevalence Survey Team

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JAMA. 2014;312(14):1438-1446. doi:10.1001/jama.2014.12923.

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Preliminary comparison of antimicrobial use, 2011 vs. 2015

	2011 Survey, N=9283	2015 Survey, N=9169	P-value
Receiving or scheduled to receive antimicrobial drugs at time of survey – no. (%)	4792 (51.6)	4684 (51.1)	0.47
Received antimicrobials for infection treatment or no indication at the time of the survey – no. (%)	3675 (39.6)	3468 (37.8)	0.01

Rationale for antimicrobial drug use

Rationale	2011	2015
	No. drugs=9865	No. drugs=10,612
Treatment of infection	7641 (77.5)	8138 (76.7)
Surgical prophylaxis	1199 (12.2)	1334 (12.6)
Medical prophylaxis	583 (5.9)	860 (8.1)
Non-infection-related reason	41 (0.4)	78 (0.7)
None documented	455 (4.6)	265 (2.5)

Among drugs given just for surgical prophylaxis, with known duration, 21% were given for >24 hours

Summary

- In this group of hospitals, the point prevalence of patients with HAIs was lower in 2015 compared to 2011
 - Difference in prevalence between survey years persisted after adjustment for patient and hospital factors
 - Reduction in HAI prevalence was primarily due to fewer SSIs and UTIs
 - Prevalence of CDI and pneumonia remained unchanged
- Lower proportions of patients had urinary catheters or central lines in 2015 as compared to 2011
- Proportion of patients receiving antimicrobial drugs remained high

Limitations

- Small number of hospitals, patients, and HAIs in 10 states
- Use of antimicrobial screening criterion to identify patients for HAI review
 - Proportion meeting criteria for review was lower than in 2011
 - Among patients who had HAI review, proportion with HAIs was still significantly lower in 2015 (8.6% vs. 10.4%, $p=0.008$)
- Cannot account for changes in CDI testing methods from 2011 to 2015 that might have led to over-diagnosis in 2015
- Unable to relate reductions in prevalence to specific prevention practices

Conclusions

- Results suggest national efforts to prevent HAIs are succeeding
 - Focus on reducing urinary catheter use and improving urinary tract infection diagnosis
 - Compliance with surgical prophylaxis guidelines, uptake of SSI prevention strategies
- More work needed to determine hospital pneumonia risk factors and preventability, develop effective prevention approaches
- Ongoing attention to antimicrobial stewardship, isolation precautions, environmental infection control to reduce CDI

Next steps

- Planning for another hospital survey in 2019-2020
 - Late 2018-early 2019: recruiting hospitals participating in previous surveys as well as possibility of including additional facilities

***Many thanks for your interest and participation!
These surveys wouldn't be possible without your help.***

Acknowledgments

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- Phase 1 prevalence survey participants
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- U.S. CDC colleagues
- Many others ...

Thank you!

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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

