An Update on National Stewardship Activities 2019

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Disclosures

- No financial disclosures
- I’m going to focus on developments in hospital stewardship.
- I’ll say a bit about outpatient and nursing home settings.
- There’s also growing work in veterinary stewardship!
“Core Elements of Antibiotic Stewardship”

- Leadership commitment from administration
- Single leader responsible for outcomes
- Single pharmacy leader
- Antibiotic use tracking
- Regular reporting on antibiotic use and resistance
- Educating providers on use and resistance
- Specific improvement interventions
Familiarity Trumps Innovation

- The “Core Elements” approach was new.
- There is nothing new in the core elements.
- That might be why people liked it.

Derek Thompson, *Hitmakers*
Top Grossing Films of the 2010s

- Black Panther (2018)
- Avengers: Infinity War (2018)
- Jurassic World (2015)
- Marvel's The Avengers (2012)
- Star Wars: Episode VIII - The Last Jedi (2017)
- Incredibles 2 (2018)
- Rogue One: A Star Wars Story (2016)
- Beauty and the Beast (2017)
- Finding Dory (2016)

http://www.filmsite.org/boxoffice2.html
CDC Learns From Hollywood . . .
What’s Next For The Hospital Core Elements

- A lot has changed since 2014.
- We need to update the Hospital Core Elements to reflect:
  - Growth in use measurement
  - New data on interventions

Broad interventions

- **Antibiotic “Time outs”**. Antibiotics are often started empirically in hospitalized patients while diagnostic information is being obtained. However, providers often do not revisit the selection of the antibiotic after more clinical and laboratory data (including culture results) become available. (53,56) An antibiotic “time out” prompts a reassessment of the continuing need and choice of antibiotics when the clinical picture is clearer and more diagnostic information is available. All clinicians should perform a review of antibiotics 48 hours after antibiotics are initiated to answer these key questions:
  - Does this patient have an infection that will respond to antibiotics?
  - If so, is the patient on the right antibiotic(s), dose, and route of administration?
  - Can a more targeted antibiotic be used to treat the infection (de-escalate)?
  - How long should the patient receive the antibiotic(s)?

- **Prior authorization**— Some facilities restrict the use of certain antibiotics based on the spectrum of activity, cost, or associated toxicities (57) to ensure that use is reviewed with an antibiotic expert before therapy is initiated. This intervention requires the availability of expertise in antibiotic use and infectious diseases and authorization needs to be completed in a timely manner.

- **Prospective audit and feedback**— External reviews of antibiotic therapy by an expert in antibiotic use have been highly effective in optimizing antibiotics in critically ill patients and in cases where broad spectrum or multiple antibiotics are being used. (25, 58, 59) Prospective audit and feedback is different from an antibiotic “time out” because the audits are conducted by staff other than the treating team. Audit and feedback requires the availability of expertise and some smaller facilities have shown success by engaging external experts to advise on case reviews. (33)
A multicenter quasi-experimental study of a provider-driven antibiotic "time-out" in 3470 antibiotic courses showed no difference in antibiotic use before and after implementation, but did show a decrease in inappropriate therapy (45% vs 31%, \( P < .05 \)). Single time-outs without input from antibiotic stewardship teams are insufficient to optimize prescribing.
NHSN Annual Hospital Surveys 2014-2017: Number and percentage of hospitals meeting all 7 Core Elements

<table>
<thead>
<tr>
<th>Year</th>
<th>Meeting all 7</th>
<th>Not meeting all 7</th>
<th>Number of hospitals</th>
</tr>
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<tbody>
<tr>
<td>2014</td>
<td>40.9%</td>
<td>59.1%</td>
<td>4,184</td>
</tr>
<tr>
<td>2015</td>
<td>51.9%</td>
<td>48.1%</td>
<td>4,569</td>
</tr>
<tr>
<td>2016</td>
<td>64.1%</td>
<td>35.9%</td>
<td>4,781</td>
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<tr>
<td>2017</td>
<td>76.4%</td>
<td>23.6%</td>
<td>4,992</td>
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</table>
Percentage of U.S. acute care hospitals reporting uptake of all 7 CDC Core Elements, 2017 NHSN Annual Hospital Survey, by facility demographic

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Bed Size</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Critical access hospital</td>
<td>≤50 beds</td>
<td>57.8%</td>
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<tr>
<td>Surgical hospital</td>
<td>51 - 200 beds</td>
<td>77.3%</td>
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<tr>
<td>General acute care hospital</td>
<td>&gt;200 beds</td>
<td>81.9%</td>
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<td>Children's hospital</td>
<td></td>
<td>86.0%</td>
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<tr>
<td>≤50 beds</td>
<td>61.4%</td>
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<td>51 - 200 beds</td>
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<tr>
<td>&gt;200 beds</td>
<td>90.7%</td>
<td></td>
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<tr>
<td>Non-teaching</td>
<td></td>
<td>71.4%</td>
</tr>
<tr>
<td>Major teaching</td>
<td></td>
<td>86.4%</td>
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</table>
Assessing the NHSN Annual Facility Survey
Stewardship Questions

- The annual NHSN hospital survey is almost always completed by an infection preventionist.
  - Instructions encourage seeking input from stewardship program.
- How often is that input sought?
- How would the results be different if we directly surveyed stewardship leads?
- Vizient added the NHSN stewardship questions to their annual survey of members of their stewardship network.
- We were able to compare the answers to the NHSN stewardship questions for 189 hospitals that also completed the Vizient survey.
Assessing the NHSN Annual Facility Survey
Stewardship Questions

- 58% of respondents to the Vizient survey indicated they had helped with the NHSN survey.
- Reported implementation of all 7 elements:
  - NHSN: 54.5%
  - Vizient: 58.2%
- Larger variations in some individual elements.
- Some variations by position in Vizient survey, e.g. clinical pharmacist vs. director of pharmacy.
Goal: Improve the Measurement of Implementation of Hospital Stewardship Programs

- The annual facility survey stewardship questions present an important opportunity to advance our understanding of program implementation.
- Now that the majority of hospitals have the basics, we should revise the survey to try and go deeper.
  - More details on program structure and support
  - What specific actions and practices are hospitals implementing?
- CDC sought input from the stewardship community to see what you all wanted to know.
- The revised questions were released as part of the 2019 annual survey.
- Can we pair the survey with data on outcomes (antibiotic use, resistance, *C. difficile*) to find structures and practices that might be associated with good outcomes?
New Questions/Domains

- Details on support provided by leadership (e.g. IT support, communicating with staff, supporting training)
- Details on the composition of the stewardship committee
- Details on program leaders: e.g. is stewardship in the job description?, time allocated and time spent, stewardship training
- Details on prior authorization and post-prescription review- which drugs?
- Details on engagement and support of other groups (e.g. pharmacy, nursing, IT, quality)
- To whom does the stewardship program leader(s) report?
Hospital Stewardship Starts The Measurement Journey

An impact that cannot be measured is not the same as an impact that does not exist.

What gets measured gets done.
Number of acute care hospitals ever-reporting* to NHSN's Antimicrobial Use (AU) Option, 2012-2019

*Reporting at least one month of data
Reporting Metrics

- 1189 facilities submitted at least one month of data
  - From 49 states (+AE & DC)
  - Bed size
    - Average = 217
    - Median = 166
    - Min/Max = 3, 1455
  - Teaching status
    - Teaching: 63%
      - (of all Teaching) Major teaching: 50%

*As of February 1, 2019*
Acute care hospital participation in AU Option

Percentage of facilities reporting at least one month of data to NHSN's AU Option

*As of February 1, 2019*
Goal: Improve the Measurement of Hospital Antibiotic Use

- The larger number of reporting hospitals affords an opportunity to revisit the models used to produce the Standardized Antimicrobial Administration Ratios (SAARs).
- CDC has been working with the stewardship community to make decisions about updating the SAARs.
- And working to validate and improve the data currently being submitted.
2018 AU Data Validation Efforts

- Review of 2017 indicated that 316 facilities might have 1 or more potential validation errors
  - Facilities were emailed in multiple rounds
  - Encouraged to review data and provide confirmation if data were accurate
- Potential errors in numerators, examples:
  - No antibiotic days on many units
- Potential errors in denominators, examples:
  - AU days present < HAI patient days
Standardized Antimicrobial Administration Ratio (SAAR)

- SAAR expresses observed to predicted antibiotic use where use is predicted based on data being submitted to produce models using facility characteristics.

- SAARs for different groups of antibiotics.
- SAARs for adult and pediatric locations.
- SAARs for ICU and non-ICU locations.
- SAARs can be calculated at the individual unit level or hospital wide.
Standardized Antimicrobial Administration Ratio (SAAR) Evolution

- **2014** baseline SAAR models were developed using AU Option data from:
  - 77 acute care hospitals (350 adult and 33 pediatric locations)

- **2017** baseline SAAR models were developed using AU Option data from:
  - Adult models: 449 acute care hospitals, 2156 locations
  - Pediatric models: 109 acute care hospitals, 170 locations

- The larger sample size in 2017 enabled:
  - Inclusion of new location types in SAAR models
  - Adult and pediatric patient populations to be modeled separately
  - Increased precision of SAAR model estimates
Changes for the SAAR and AU Option

- SAARs for 2 new adult location types: stepdown and oncology.
- Adding a SAAR for anti-fungals.
- Adding a SAAR for agents posing the highest risk for *C. difficile*.
- Adding an azithromycin SAAR for pediatrics
- Adding a rate distribution for agents used to treat highly resistant pathogens (e.g. colistin).
2017 baseline SAAR Antimicrobial Categories

- Broad spectrum antibacterial agents predominantly used for hospital-onset infections
- Broad spectrum antibacterial agents predominantly used for community-acquired infections
- Antibacterial agents predominantly used for resistant gram-positive infections (e.g., MRSA)
- Narrow spectrum beta-lactam agents*
- Azithromycin (peds only)*
- Antifungal agents predominantly used for invasive candidiasis*
- Antibacterial agents posing the highest risk for CDI (Clostridium difficile infection)*^ 
- All antibacterial agents

*New categories

^Not mutually exclusive (includes antimicrobials found in other SAAR categories)
2017 baseline SAAR Location Types

- Adult
  - Medical ICU
  - Surgical ICU
  - Medical-Surgical ICU
  - Medical Ward
  - Surgical Ward
  - Medical-Surgical Ward
  - Step-down unit
  - General Hematology-Oncology

- Pediatric
  - Medical ICU
  - Medical-Surgical ICU
  - Medical Ward
  - Surgical Ward
  - Medical-Surgical Ward
### SAAR Reports in NHSN

#### National Healthcare Safety Network

**SAARs Table - All SAARs by Location (2017 Baseline)**

As of: February 22, 2019 at 2:53 PM  
Data Range: All AU_SAAR_2017

**Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR wards**

<table>
<thead>
<tr>
<th>Facility Org ID</th>
<th>SAAR Type 2017 Baseline</th>
<th>Location</th>
<th>Summary Year/Month</th>
<th>CDC Location</th>
<th>Antimicrobial Days</th>
<th>Predicted Antimicrobial Days</th>
<th>Days Present</th>
<th>SAAR</th>
<th>SAAR p-value</th>
<th>95% Confidence Interval</th>
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<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>5GNORTH</td>
<td>2017M07</td>
<td>IN:ACUTE:WARD:MS</td>
<td>144</td>
<td>131.744</td>
<td>1145</td>
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<td>0.925, 1.283</td>
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<td>374</td>
<td>4.090</td>
<td>0.0000</td>
<td>3.492, 4.762</td>
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</table>

Includes data for January 2017 and forward.  
The SAAR is only calculated if the number of predicted antimicrobial days (numAUDaysPredicted) is >=1.  
If antimicrobial days exceed days present for a specific SAAR category, a SAAR will not be calculated and data should be validated for accuracy.  
Data restricted to medical, medical-surgical, surgical, step down and oncology locations.  
Source of aggregate data: 2017 NHSN AU Data  
Data contained in this report were last generated on February 11, 2019 at 3:34 PM.
How Can We Drive Change In Stewardship?

- Direct the rider
  - Follow the bright spots
- Motivate the elephant
  - Find the feeling
- Shape the path
  - Tweak the environment
Follow The Bright Spots

- What can we learn from the top performers?
- All of them do prior authorization and/or post prescription review.

Core Element Implementation - 2016

- Lowest Use Hospitals
- National Average
Using NHSN AU Data to Focus Stewardship Efforts

Courtesy of Eddie Stenehjem
Antibiotic Resistance Won’t Motivate The Elephant.

- We need to emphasize the fact that avoiding unnecessary antibiotics can help protect against serious and near-term potential harms:
  - *C. difficile*
  - Adverse drug reactions- which land people in the ED 200,000 times per year.
  - Disruption of the microbiome- which can cause diarrhea and yeast infections and which can increase the risk of sepsis
Shape The Path. How To Put New Ideas Into Practice?

- Max Planck:
  A scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it.

- Thaler and Sunstein:
  You find ways to nudge them forward.
The Core Elements Got Some Important Nudges . . .

NATIONAL STRATEGY
FOR COMBATING ANTIBIOTIC-
RESISTANT
BACTERIA

Vision: The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic-resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.

September 2014

NATIONAL ACTION
PLAN FOR COMBATING
ANTIBIOTIC-RESISTANT
BACTERIA

MARCH 2015

Call to Action for Human Health Stewardship

FORUM ON ANTIBIOTIC STEWARDSHIP
JUNE 2, 2015
And Then Some Shoves . . .

- CMS 2016 Proposed Hospital Conditions of Participation
- Requirements for antibiotic stewardship programs

Joint Commission Accreditation Standard

New Antimicrobial Stewardship Standard

APPLICABLE TO HOSPITALS AND CRITICAL ACCESS HOSPITALS
Effective January 1, 2017

Medication Management (MM)

Critical Access Hospital Requirement

MBQIP New Required Measure
FY2018 – 2021
Antibiotic Stewardship Summary
Are Stewardship Requirements Good or Bad?
Of course!

- **Pro**
  - Spurs interest from the C-suite.
  - Drives investment—“need to have” beats “nice to have”.
  - Create an environment where interventions are more likely to succeed

- **Con**
  - Creates resentment in said C-suite
  - Lead to “gaming” and “box checking” rather than real improvements
  - Stifle innovation

Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS)
In the 1970s, the Environmental Protection Agency issued regulations to sharply reduce car emissions.

Chrysler engineer tells the US Senate the standards will mean the end of station wagons and large sedans.

Instead, car companies developed innovative solutions: catalytic converters, electronic fuel injection.

“...because of these innovations, “about five hundred current-model-year vehicles emit what a single 1970 model did.””

The New Yorker, April 2, 2018
It’s Happening in Stewardship

Intermountain Healthcare

Duke Antimicrobial Stewardship Outreach Network

About
A Standard Is Only As Good As Its Enforcement

- Box checking enforcement will drive box checking behavior.
- But, enforcement that is aware of advances, informed by experts and adapts to input has the power to educate and drive implementation of best practices.
A Standard That Is Informed and Informative

- Requirement for hospitals is being eliminated
  - Focus in hospitals will instead be on proper education around discharge medications

Leading Practices in Antimicrobial Stewardship

David W. Baker, MD, MPH, FACP
Executive Vice President, Healthcare Quality Evaluation
Goal: Use The Joint Commission Stewardship Standard and Survey Process to Support Improvements

- The Joint Commission wants its standards to inform improvements in practice.
- CDC and TJC are working together to find ways to do this for the stewardship standard.
  - In partnership with Pew Trusts, American Hospital Association and The National Quality Forum.
- Expert consultation in May 2018 to discuss options:
  - What policies and practices have been most important for your success?
  - What measures do you use to assess the success of your program?
  - Have you done anything novel that was successful?
Using Accreditation To Drive Improvement

- Important for success:
  - Prior authorization and post-prescription audit with feedback-implemented by all programs we talked to but in different ways
  - Engagement of front line providers
  - Availability of treatment guidelines
  - Efforts to improve diagnostic testing

- Recommended measures:
  - Antibiotic use- days of therapy per 1000 patient days
  - *C. difficile*
  - Compliance with guidelines

- What’s novel:
  - Moving to physician level measures and reports on use
What’s Next For This Work?

▪ What are key things surveyors can look for and questions they can ask that would:
  – Help get the best sense of how good the stewardship program is- how do we make sure people aren’t just “checking the boxes”?
  – Direct stewardship programs to policies and practices that are most effective?
▪ How can we embed this work into the existing survey process?
▪ More to come on this . . .
Assessing Appropriate Antibiotic Use

- Very challenging in hospitals.
- CDC’s Emerging Infections Program collected antibiotic use data from ~199 hospitals during the 2015 prevalence survey for an attempt at the 1st ever national assessment of “appropriate” antibiotic use.
  - Vancomycin, quinolones
  - Community acquired pneumonia, urinary tract infections
- Currently working with experts to develop algorithms that can be applied to the data to assess potential opportunities to improve use (e.g. deviations from guidelines).
- CDC supporting work at University of Pennsylvania and the VA to try and do this directly from electronic health records.
  - VA comparing electronic measures of appropriate use to SAARs.
What Other Hospital Stewardship Work is CDC Supporting?

▪ Exploring facility level vs. patient level risk adjustment of hospital antibiotic use.
▪ Assessing the impact of stewardship efforts on SAAR values.
▪ Stewardship interventions specifically targeting *C. difficile*, including post-discharge.
▪ Implementing a “smart prompt” using electronic health record data to identify patients at low risk for resistant organisms (INSPIRE).
▪ An “opt out” protocol to guide antibiotic discontinuation in patients started on antibiotics for suspected sepsis (DETOURS).
▪ Seeking ways to expand engagement of pharmacists.
▪ Engaging and training nurses to support stewardship.
The Critical Role of the Staff Nurse in Antimicrobial Stewardship—Unrecognized, but Already There

Richard N. Olans,1 Rita D. Olans,2 and Alfred DeMaria Jr2
1 Hallmark Health System, Inc., Melrose-Wakefield Hospital, 2 MGH Institute of Health Professions - School of Nursing, Boston, and 3 Bureau of Infectious Disease, Massachusetts Department of Health, William A. Hinton State Laboratory Institute, Jamaica Plain, Massachusetts

Redefining the Antibiotic Stewardship Team:
Recommendations from the American Nurses Association/Centers for Disease Control and Prevention Workgroup on the Role of Registered Nurses in Hospital Antibiotic Stewardship Practices
Effective Date: 2017
Critical Role of Bedside Nurses- Lessons Learned From CLABSI Prevention

- Nurses can play a critical role when they know the process and can watch for omissions.
- Nurses are key in prompting the provider/team to perform key actions that might get overlooked.
- Nurses are critical in patient and family education.
- CDC partnering with Johns Hopkins on a project to engage nurses in stewardship.
- The project is focused on:
  - Collection of urine cultures- why and how
  - Collection of respiratory cultures- why and how
  - Assessment of penicillin allergy
5 Ways Pharmacists Can Be Antibiotics Aware

- Verify Penicillin Allergy
- Avoid Duplicative Anaerobic Coverage
- De-escalate Anti-MRSA Coverage
- Avoid Treatment of ASB
- Limit Antibiotic Duration

Stewardship Pharmacy Posters to be launched soon:

- Engage all pharmacists in stewardship
- Suggestions for hospital stewardship implementation and/or quality improvement projects
More Lessons From Behavioral Psychologists- “Opt-Out” Policies

- Organ donation rates in “opt-out” countries ~90% vs <15% in opt-in
- Retirement savings “opt-out” policies increase participation by 35%
- Why not for antibiotics?
- Duke conducting an opt-out on a study for patients started on a sepsis pathway.
- For patients who don’t meet sepsis criteria after a pre-specified time, antibiotics will automatically be de-escalated unless the provider opts out.

https://sparq.stanford.edu/solutions/opt-out-policies-increase-organ-donation
https://www.nber.org/aginghealth/summer06/w12009.html
Antibiotic prescribing for antibiotic-inappropriate acute respiratory illnesses (ARIs)* by outpatient setting — MarketScan, 2014

*Antibiotic-inappropriate ARIs include: Viral URI, bronchitis, bronchiolitis; influenza; nonsuppurative otitis media; viral pneumonia; asthma/allergy. Visits with additional diagnoses of concomitant bacterial infections (e.g. pneumonia, urinary tract infections, acute otitis media, sinusitis) were excluded.

Outpatient Policy Changes for Stewardship

- Outpatient stewardship is part of the new payment program for outpatient providers, the Merit Based Incentive Payment System (MIPS).
- Providers have to earn “points” in 4 domains to maximize reimbursement.
- Stewardship is in 2 of the 4.
- Quality- providers can report on one or more of several antibiotic prescribing quality measures (e.g. avoiding antibiotics in adults with sinusitis, using amox or amox/clav to treat adult sinusitis).
- Improvement- providers can show they are implementing outpatient stewardship programs and can take the CDC on-line stewardship course.
New CDC Training on Antibiotic Stewardship

- Focused on outpatient antibiotic prescribing and aimed at frontline providers with the objective to:
  - Optimize antibiotic prescribing
  - Inform healthcare professionals about proper antibiotic use
  - Encourage open discussion among clinicians and patients (includes communication training for clinicians in module 6)
- 8 hours of free CE, released in 4 sections through 2018
- Fulfils Improvement Activities Patient Safety and Practice Assessment (PSPA_23 and PSPA_24) under CMS’s Merit-Based Incentive Payment Program (MIPS)

https://www.train.org/cdctrain/training_plan/3697
Next Steps in Outpatient Stewardship

- Working with CMS Quality Improvement Networks who have enrolled more than 7,000 outpatient settings in a national project to improve use.
- Focusing efforts on adult providers.
- Working to drive and support stewardship in urgent care.
- Collaborating with CDC opioid to explore opportunities for synergy between efforts to improve opioid and antibiotic prescribing.
  - Bottle of amoxicillin directions: “Take as needed for pain”
Getting Data for Action in Nursing Homes
Collaboration with Nursing Home Vendors

▪ Collaboration with long term care pharmacies
  – Data use agreement to share de-identified antibiotic dispensing data with PharMerica to describe antibiotic use at a facility level and explore data elements that can be used for antibiotic use reporting

▪ Collaboration with nursing home electronic health record companies
  – Analysis with PointClickCare to describe antibiotic use at a facility level, specifically by indication and resident characteristics in 2,600 nursing homes
  – Data use agreement to share de-identified antibiotic use data with Matrixcare to explore data elements for analysis of antibiotic use data
Collaboration and funded work in nursing home stewardship implementation

▪ CDC is implementing and evaluating the *Core Elements of Antibiotic Stewardship for Nursing Homes*
  – Tracking both antibiotic use and important clinical outcomes

▪ Centers for Medicare and Medicaid Services (CMS) tasked the QIN-QIOs to promote *C. difficile* infection reporting, prevention and antibiotic stewardship in nursing homes
  – >3,000 NHs (~20%) of CMS certified NHs enrolled across the country
    • >2,500 nursing home contributing to CDI data into NHSN
  – Ongoing engagement in CDI prevention and stewardship implementation activities over the coming year
Conclusions

- We know that real progress in improving use comes from the work that you do every day.
- Our goal is to support you.
- Please tell us what we can do to help!