Antibiotic Stewardship: Where to Start

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Participant Poll

Did you attend the May 22 webinar "Antimicrobial Stewardship: What, Why, and How?

A. Yes
B. No
C. Don't Know

Participant Poll

What is your main position?

A. Infection Preventionist
B. Nurse
C. Pharmacist
D. Physician
E. Lab/Microbiologist
F. Other

Participant Poll

Do you have a secondary position?

A. **Infection Preventionist**
B. **Nurse**
C. **Pharmacist**
D. **Other**

Objectives

- Learn what is a Driver Diagram
- Identify drivers and change ideas for antibiotic stewardship
- Discuss examples of successful antibiotic stewardship interventions in rural settings

While all changes do not lead to improvement, all improvement requires change.

Success Factors for Change

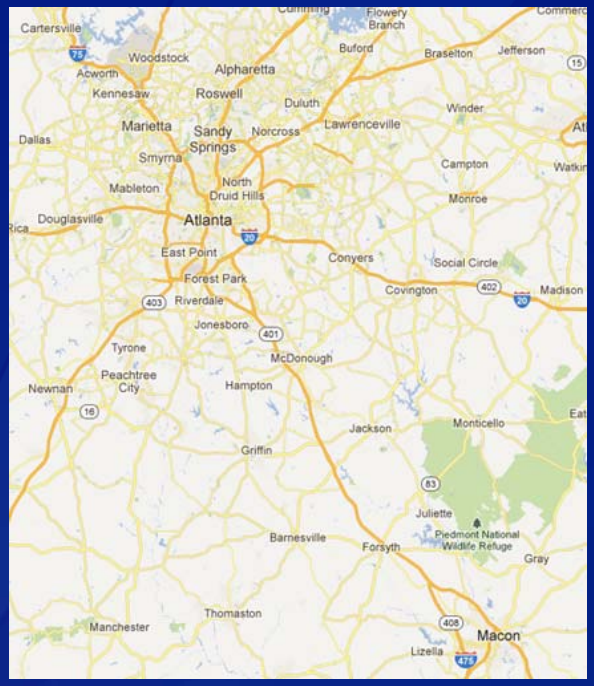
- Clear goal
- Belief in the need for change
- Participation in planning
- Visible progress and results

What is a Driver Diagram?

Antibiotic Stewardship Driver Diagram

A Map…

for improving appropriate use of antibiotics



- Displays destinations
- Shows paths to get there
- Notes landmarks
- Potentially offers guidance
- Multiple ways to reach same destination

Using Driver Diagram as a Map

- A map is only a tool
- Using a map requires
  - Knowledge
  - Decisions
  - Communication
- An map shows an ideal picture, but not road conditions

Ultimately, you are the driver!

Driver Diagram

- A way to visualize an improvement effort
  - Connects specific interventions and activities to a larger goal
  - Outlines specific changes that can result in improvement
- A conceptual model for health care organizations to identify improvement strategies and processes

Driver Diagram

Underlying Factors

- Improvement Activity A
- Improvement Activity B
- Improvement Activity C
- Improvement Activity D

Primary Drivers
Secondary Drivers

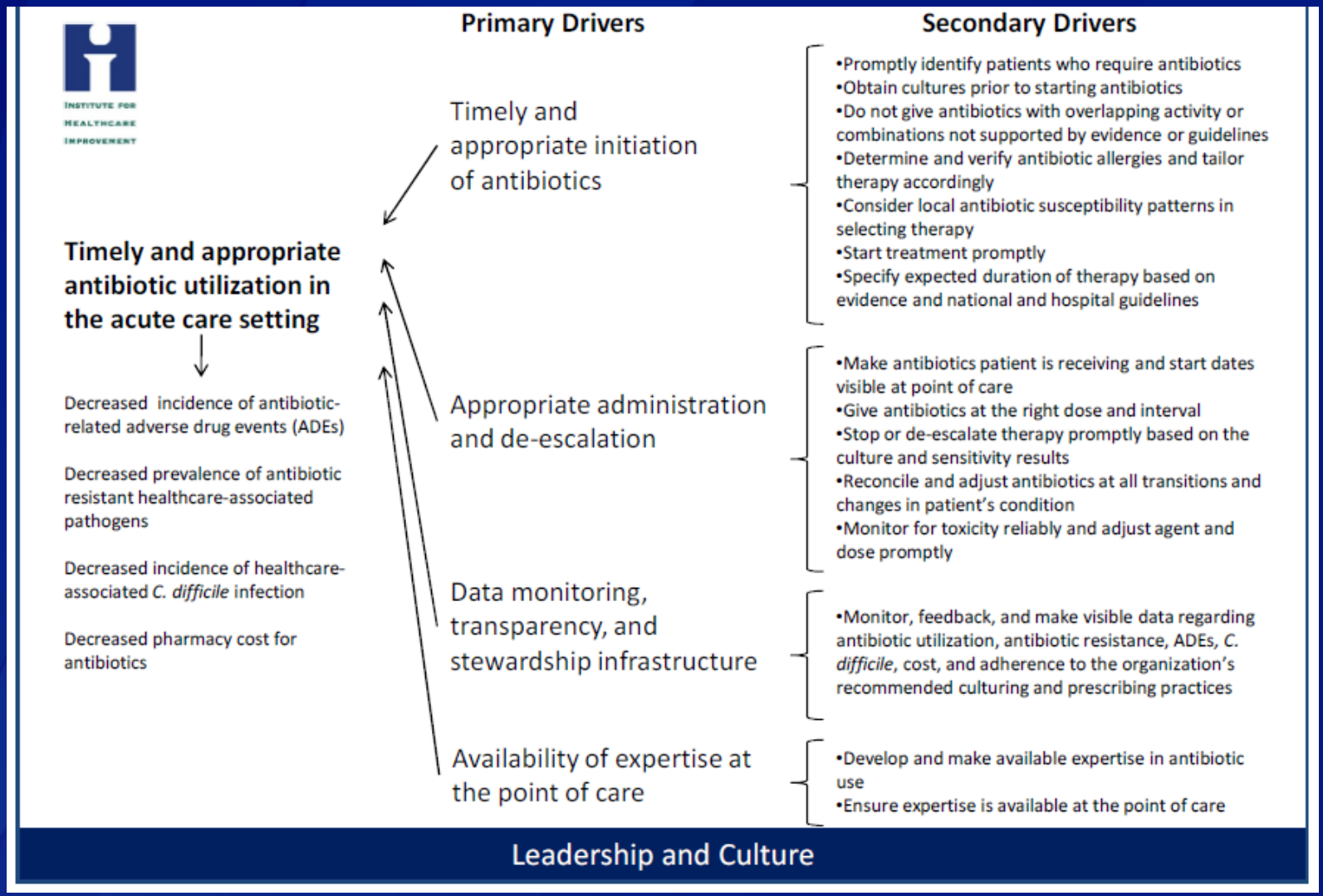
Change Ideas

Antibiotic Stewardship Driver Diagram

- **GOAL: Timely and appropriate antibiotic utilization in the acute care setting**

- **WHY?**
  - **Decreased antibiotic related adverse events**
  - **Decreased antibiotic resistant pathogens**
  - **Decreased incidence of *C. difficile***
  - **Decreased pharmacy cost**

Antibiotic Stewardship Driver Diagram



Development

Creating the CDC/ IHI Driver Diagram

- **Partnership**
  - CDC
  - Institute for Healthcare Improvement (IHI)
  - Clinicians involved in stewardship
- **Broke the process of prescribing and administering antibiotics into discrete steps**
- **Determined what interventions could improve each of those steps**

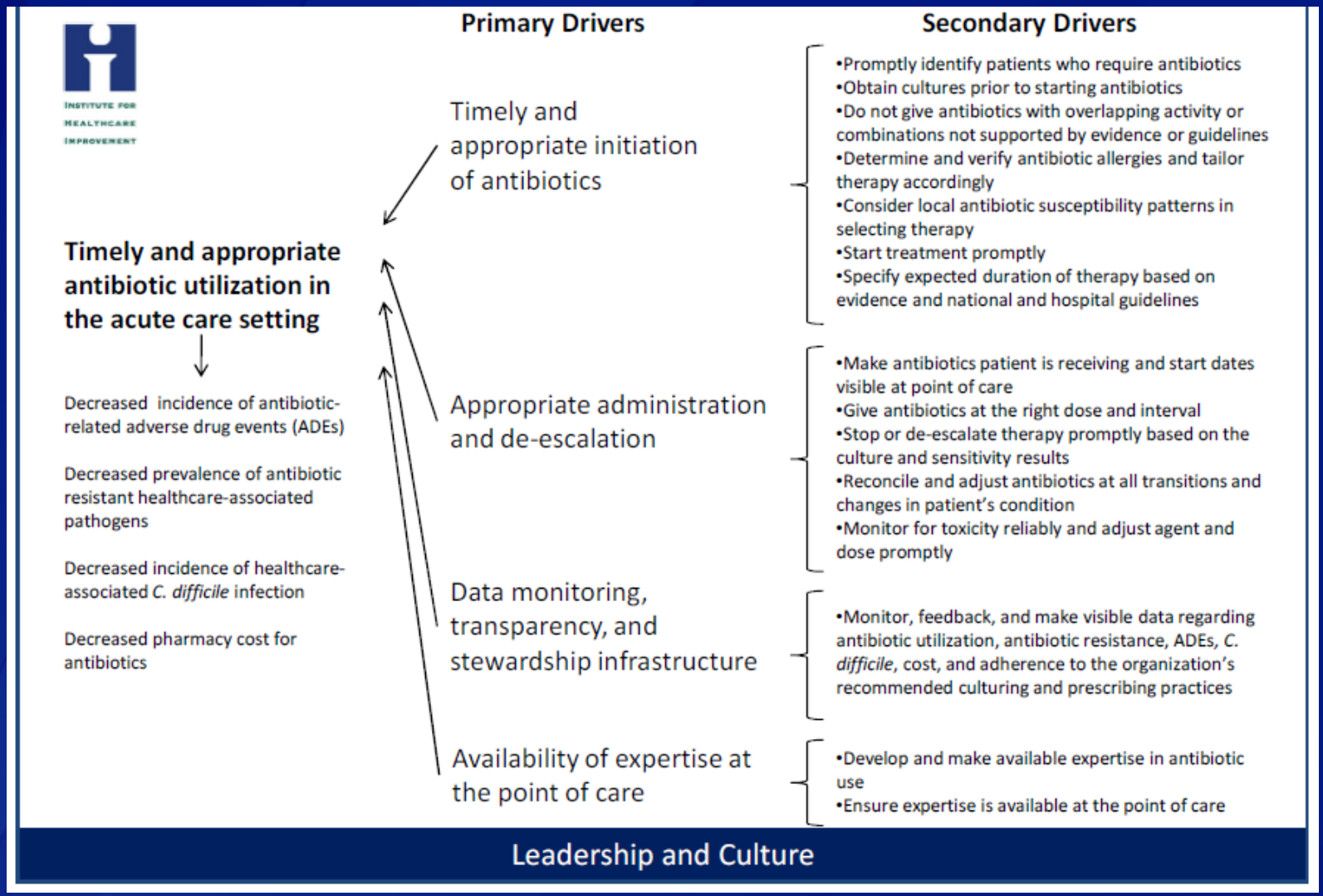
Antibiotic Prescribing is Complex

- Extensive background knowledge needed
- Many people and departments involved
- Data for decisions are available at different times
- Measurement of use is challenging

Driver Diagram: Pilot Testing

- Eight hospitals assessed the feasibility of implementation of recommended changes
  - At least one specific change idea
  - From at least two different drivers
- Driver diagram was revised based on experience from the pilot testing.

Antibiotic Stewardship Driver Diagram



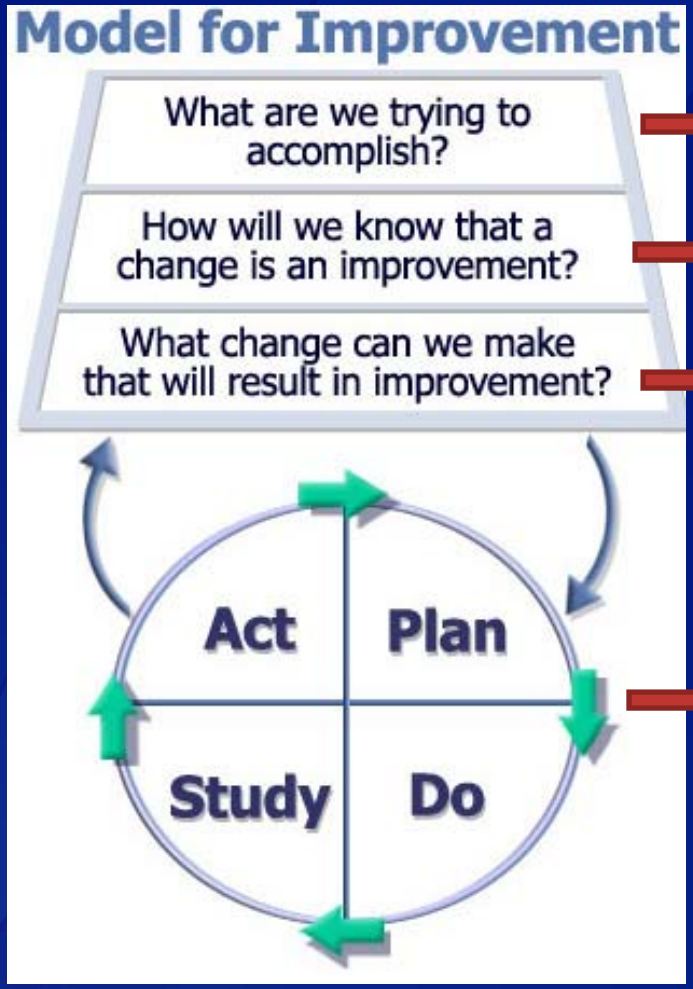
Driver Diagram: Pilot Testing

Pilot Testing Sites	Size	Type
Centerpoint Medical Center, Independence, MO	220 beds	Community
Community Hospital, Tallassee, AL	69 beds	Community
Rogue Valley Medical Center, Medford, OR	378 beds	Community
Seton Medical Center, Austin, TX	425 beds	Community
St. Francis Medical Center, Peoria, IL	616 beds	Teaching
The Reading Hospital & Medical Center, West Reading, PA	711 beds	Teaching
UCLA, Los Angeles, CA	668 beds	Academic
Wellstar Cobb Hospital, Austel, GA	370 beds	Community

Pilot testing was conducted from October 2011- June 2012

Using the Driver Diagram To Improve Antibiotic Use

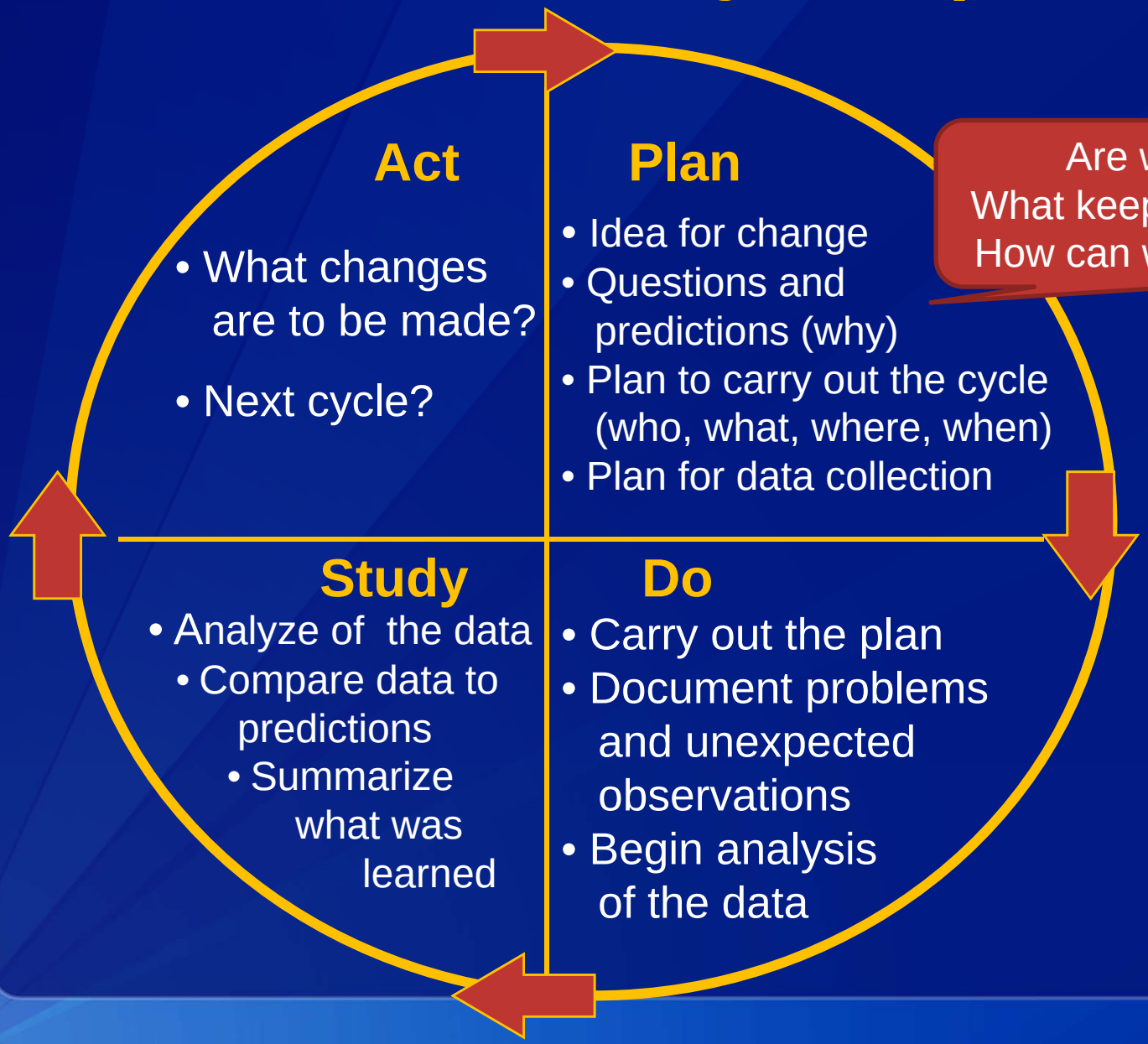
Model for Improvement



- Set an aim
- Establish a measure
- Plan to improve
- Specific ‘Tests of Change’

Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance (2nd edition). San Francisco: Jossey-Bass Publishers; 2009.

The Plan-Do-Study-Act (PDSA) Cycle



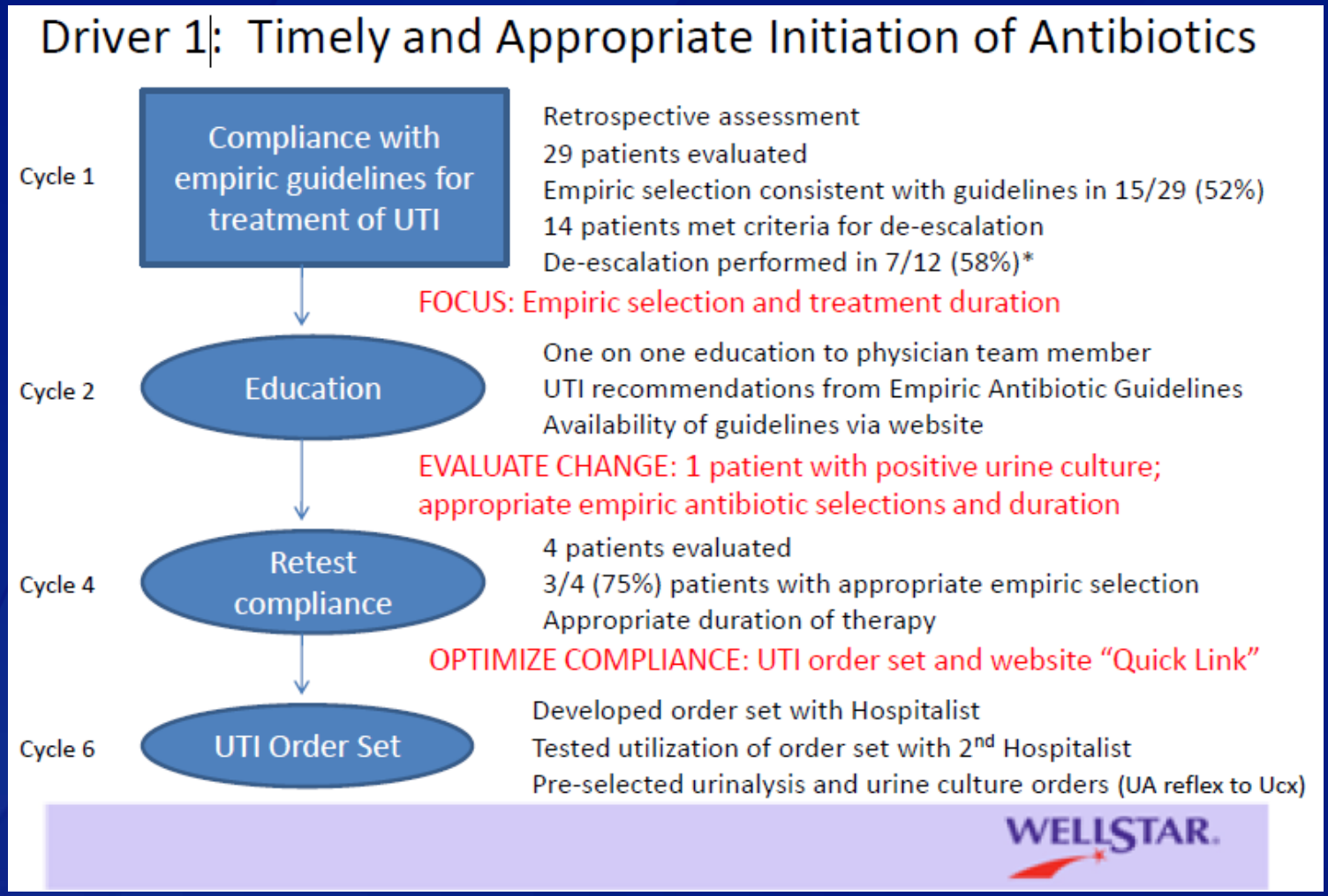
Repeated Use of the PDSA Cycle

Multiple cycles

- *Evaluate an outcome*
- *Improve upon it*
- *Test it again*

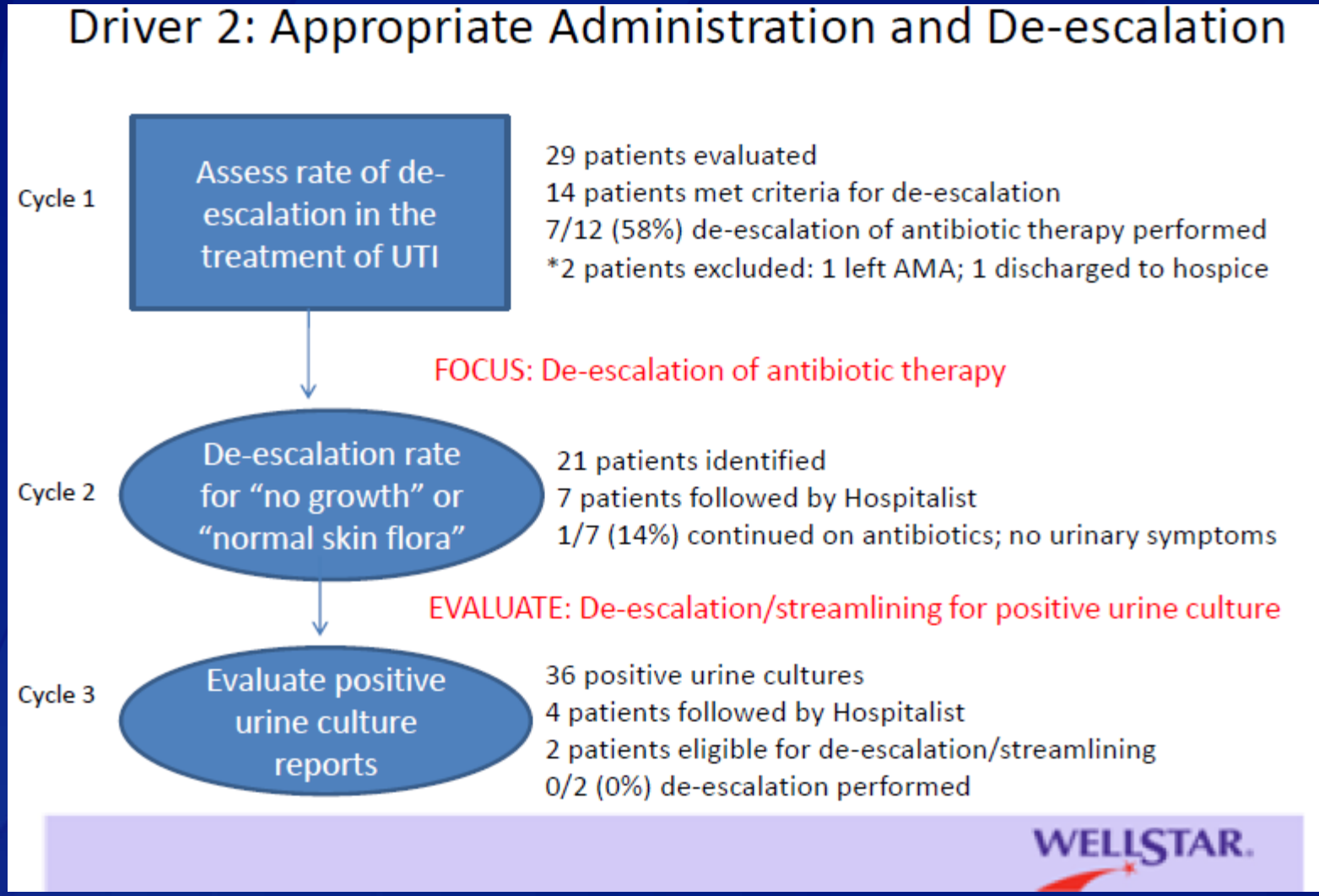
- **Specific**
- **Rapid**

Model for Improvement: Example



WellStar Hospital (Austell, GA) participated in piloting Antibiotic Stewardship Driver Diagram

Model for Improvement: Example



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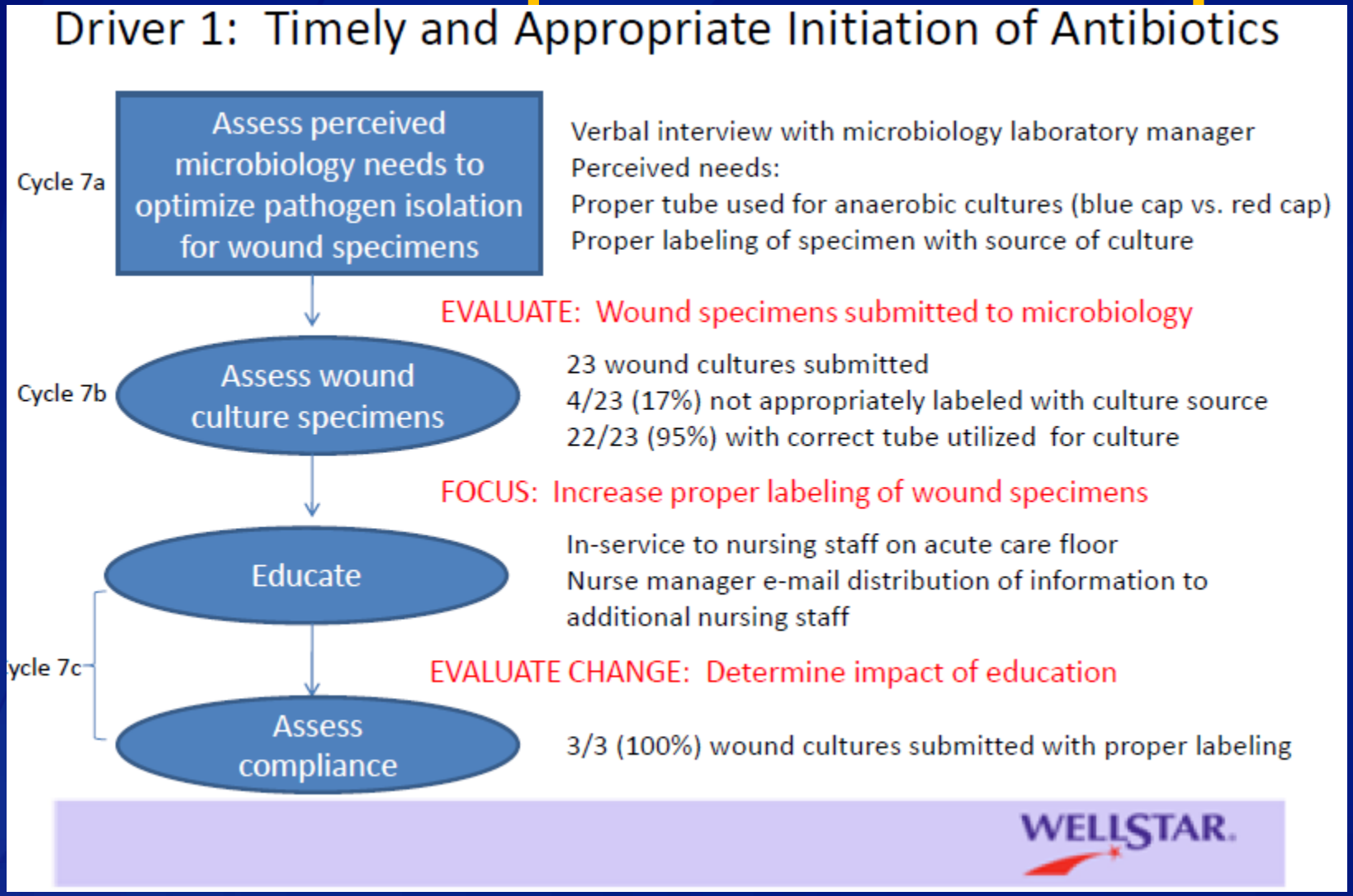
Model for Improvement: Example



WellStar Hospital (Austell, GA) participated in piloting Antibiotic Stewardship Driver Diagram

Driver Diagram & the PDSA Cycle : Always a Work in Progress

- The point is NOT to implement everything, but to pick a specific intervention that's important to your facility
  - Select a change
  - Test a change
  - Implement a change

Small steps towards a big goal

Antibiotic Stewardship: Where to Start?

Primary Driver 1.
Timely and Appropriate Initiation of Antibiotics

Timely and Appropriate Initiation

- Promptly identify patients who require antibiotics
  - Specify situations when antibiotics are not needed
- Obtain cultures prior to starting antibiotics
- Do not give antibiotics with overlapping activity or combinations

http://www.cdc.gov/getsmart/healthcare/learn-from-others/driver-diagram/primary-driver1.html

Timely and Appropriate Initiation (cont.)

- Determine and verify antibiotic allergies and tailor therapy accordingly
- Consider local susceptibility patterns in selecting therapy
- Start treatment promptly
- Specify expected duration of therapy based on evidence and national and hospital guidelines

http://www.cdc.gov/getsmart/healthcare/learn-from-others/driver-diagram/primary-driver1.html

Participant Poll

What statement describes your pharmacy support?

A. **On-site, full time**
B. **On-site, part time**
C. **Off-site**
D. **Other**

Participant Poll

Which statement describes your microbiology laboratory (e.g. cultures)?

A. **Available at the facility**
B. **All microbiology cultures are sent out**
C. **Not known**

Participant Poll

Does your facility have available a summary of resistance patterns (antibiogram)?

A. Yes
B. No
C. Not known

Primary Driver 2.
Appropriate Administration And De-escalation

Administration and De-escalation

- Make antibiotics patient is receiving and start dates visible at point of care and in health records
- Give antibiotics at the right dose and interval
- Stop or de-escalate therapy promptly based on the culture and sensitivity results
- Reconcile and adjust antibiotics at all transitions and changes in patient's condition
- Monitor for toxicity reliably and adjust agent and dose promptly

Primary Driver 3.
Monitoring, Transparency, Infrastructure

Monitoring, Transparency, Infrastructure

- **Monitor, feedback, and make visible data**
  - **Antibiotic utilization**
  - **Antibiotic resistance**
  - ***C. difficile***
  - **Cost**
  - **Adherence recommended culturing and prescribing practices**

http://www.cdc.gov/getsmart/healthcare/learn-from-others/driver-diagram/measurement-framework.html

Recommended Measures

- Percent of patients where cultures were obtained prior to first dose of antibiotics
- Percent of patients sampled where antibiotic start date was documented/visible at the point of care
- Percent of patients sampled where antibiotic stop date/duration was documented/visible at the point of care
- Percent of patients sampled where antibiotic indication was documented/visible at the point of care

Recommended based on pilot testing
http://www.cdc.gov/getsmart/healthcare/learn-from-others/driver-diagram/measurement-framework.html

Antibiotic Stewardship Measurement Framework

Primary Driver	Measure
Timely antibiotic management	COMPOSITE MEASURE: Percent of patients sampled where antibiotic • start date, • stop date/duration and • indication were documented/visible at the point of care
Appropriate administration and de-escalation	

http://www.cdc.gov/getsmart/healthcare/learn-from-others/driver-diagram/measurement-framework.html

Participant Poll

How available is an infectious disease (ID) physician to your facility?

A. **Available at the facility or by consult**
B. **Available at a referral hospital**
C. **Available by tele-medicine**
D. **Difficult to access**

Driver 4. Expertise at Point of Care

- Develop and make available expertise in antibiotic use
  - Cultivate local expertise among staff
  - Develop a process for antibiotic formulary management
- Ensure expertise is available to clinicians at the point of care
  - Create processes to ensure availability of expertise

Overarching Driver: Leadership and Culture

- Promote a culture of optimal antibiotic use
- Engage administrative and clinical leadership to champion stewardship effort

Engaging Clinicians

- Improve patient outcomes
- Involve physicians from the beginning
- Identify and activate champions
- Use the 20/80 rule

http://www.ihi.org/knowledge/Pages/IHIWhitePapers/EngagingPhysiciansWhitePaper.aspx

Engaging Clinicians

- Standardize what is standardizable
- Generate light, not heat, with data
- Make the right thing easy to try, and
  - Easy to do
- Communicate candidly, often

http://www.ihi.org/knowledge/Pages/IHIWhitePapers/EngagingPhysiciansWhitePaper.aspx

Antimicrobial Stewardship in Rural Settings

Antimicrobial Stewardship on the Frontier

- **Setting:** Four rural and frontier hospitals in NM
- **Support:** Extension for Community Health Outreach
- **Intervention:**
  - **Seven biweekly lectures**
    - Q&A with University of NM Faculty (ID physicians, Antimicrobial pharmacists, Clinical Microbiologists)
    - Participants sharing their own interventions
  - **Electronic Access to:**
    - Guidelines
    - Literature
    - Order sets

Kellie, Inf Control Hosp Epi. 2012;30(11):1181-1183.

Antimicrobial Stewardship on the Frontier

- Lecture topics:
  - Making the case for stewardship
  - Key formulary interventions
  - Developing clinical guidelines
  - Reviewing individual orders
  - Working with the microbiology laboratory and infection control staff
  - Measuring the impact of the program

Kellie, Inf Control Hosp Epi. 2012;30(11):1181-1183.

Antimicrobial Stewardship on the Frontier

TABLE 1. Number of Participating Hospitals with Element of Antimicrobial Stewardship in Place prior to the Curriculum, Implemented or Expanded during or after the Curriculum, and Planned for Implementation at the Time of the Assessment Survey and Percentage of Total Elements Implemented or Planned

Antimicrobial stewardship element	In place prior to curriculum	Implemented during or after the curriculum	Expanded during or after the curriculum	Planning to add this element at time of survey
Antimicrobial stewardship team	1	1	0	2
Regular review of selected antimicrobial drug orders	2	0	1	2
Review of antimicrobial therapy for patients with selected organisms in blood culture	2	1	1	1
Dissemination of antibiograms to medical staff	3	1	1	0
Indication required for all antibiotic orders	0	0	0	0
% of elements implemented	40	15		25[a]

[a] Planned implementation.

Kellie, Inf Control Hosp Epi. 2012;30(11):1181-1183.

Antimicrobial Stewardship on the Frontier

- Take-aways
  - You don’t need to be a big hospital to have an antimicrobial stewardship team
  - You don’t need to do everything
  - Even the hospitals with a team found ways to expand
  - Solutions and support for stewardship may exist outside your walls
  - Peer-sharing was important
    - “Hearing questions from other participants”
    - “Learning how other facilities solved problems”

Kellie, Inf Control Hosp Epi. 2012;30(11):1181-1183.

Case study: Small, rural hospital

- Private-practice physicians admit patients
  - No hospitalist
  - Infectious disease specialist available by consult
- Pharmacy operates 7am-10pm
- Pharmacy and therapeutic committee staffed by chief medical office
- Microbiology is outsourced

Ohl and Dodds-Ashley, CID. 2011;53(S1)S23-S28.

Proposed approach: Small, rural hospital

Institutional Support?

Yes

- Financial support ID specialist
- Establish a stewardship committee run by ID specialist
- Review antimicrobial formulary
- Institute daily pharmacist review of antibiotic prescriptions
- Create a antibiogram

No

- Identify an AS champion to advocate for a stewardship committee
- Advocate for initiatives and improvements through P&T committee
- Review antimicrobial use
- Implement changes based on studies of use
  - Develop empiric treatment guidelines
  - IV to oral conversion
  - Limited duration
  - De-escalation

Ohl and Dodds-Ashley, CID. 2011;53(S1)S23-S28

Antimicrobial Stewardship in a Rural Hospital

- **Setting:** 141-bed community hospital in rural Northwest
- **Team:** Pharmacist-led (non-ID), Remotely located ID physician
- **Intervention:**
  - Targeted review of six antimicrobials
    - Pip/Tazo, imipenam, cilastatin, ertapenam, vancomycin, linezolid, daptomycin
  - Weekly teleconference “rounding” with ID physician
  - Streamlined Therapy
    - Eliminated unnecessary combinations
    - Recommended more narrow spectrum
  - Dose optimization

Yam et al. Am J of Healht-System Pharm. 2012 ;(69):1142-8

Antimicrobial Stewardship in a Rural Hospital

Outcomes

- Number of interventions increased from 2 to 7 per week
- Streamlining was most common intervention
  - 44% before program, 96% after program began
- C. diff infections decreased from 5.5 to 1.6 (cases/10,000 pt days)
- Antimicrobial purchase costs decreased
  - $13,521 per 1,000 pt days (baseline) to
  - $ 9,756 (2010) to
  - $ 6,583 (2011 Quarter 1-2)

Yam et al. Am J of Health-System Pharm. 2012 ;(69):1142-8

What can <u>you</u> do?

Nurses

- **Ensure cultures are properly collected**
- **Ensure an appropriate duration of treatment**
- **Know and communicate culture results**
  - Ensure treatment is in line with microbiology results
  - Limit use of broad spectrum antimicrobials
- **Monitor IV antimicrobial prescriptions and engage physicians and pharmacists regarding oral therapy**
- **Test for symptoms consistent with *C. difficile***
- **Recognize that antibiotics are not always indicated**

Edwards. *Journal of Infection Prevention* 2011 12: 6.

Infection Preventionists

- **Identify drug resistance patterns of organisms among the population served by your health care facility**
  - Education of clinicians on prudent and appropriate use
  - Development of clinical algorithms for treating infections
  - Oversight of standard and transmission-based precautions
  - Compliance with hand hygiene
- **Audit, analysis and reporting of data on antibiotic-related HAIs (e.g. *C. Difficile*)**

Moody et al. Am J Infect Control. 2012 Mar;40(2):94-5

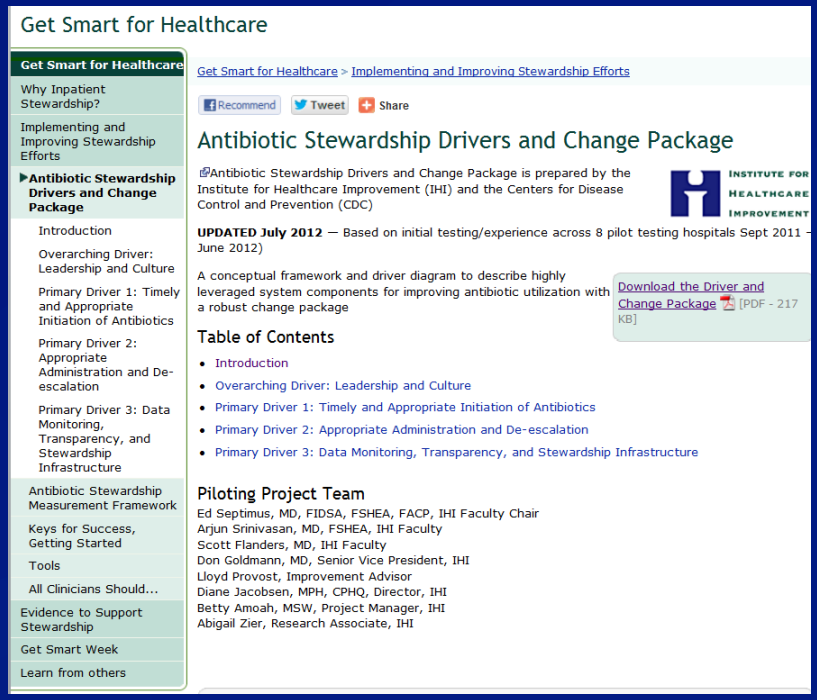
Pharmacists

- **Become involve in a multidisciplinary team**
- **Make recommendations for appropriate use**
  - Agent selection
  - Dosing and therapeutic monitoring
  - De-escalation
- **Contribute to antimicrobial use policies/procedures**
- **Generate quantitative data on use**
- **Enroll in formal training for pharmacists**
  - American Society of Health System Pharmacists
  - MAD-ID antimicrobial stewardship training programs

http://www.leadstewardship.org/ and http://ashpadvantage.com/docs/ASP_DiscGuide_Final.pdf

http://mad-id.org/antimicrobial-stewardship-programs/

Resources on *Get Smart for Healthcare* Website – *For your use!*



- **Fact sheets and fast facts**
- **Slide sets**
- **Tools to start a program**
- **Press kit to raise awareness**

http://www.cdc.gov/getsmart/healthcare/

Review of Objectives

- Learn what is a Driver Diagram
- Identify drivers and change ideas for antibiotic stewardship
- Discuss examples of successful antibiotic stewardship interventions in rural settings

Essential Elements for Strategic Improvement

Thank you!

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