



# **Antibiotic Stewardship**

Population Health Symposium

Thomas Jefferson University

Presented by:

James M. Keegan, MD

# PYA ASP TEAM



**JAMES M. KEEGAN, MD**  
Principal



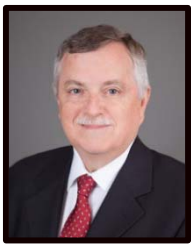
**RANDEE MASON, RN, BSN, CPHQ**  
Senior Manager



**MATTHEW LONG**  
Senior Manager



**STACEY SCHAEFER, MHA, BSOT**  
Senior Manager



# James M. Keegan, MD

## Personal History

Born in Kingsport, Tennessee

Emory University, Atlanta, Georgia

United States Air Force, Ellsworth AFB, South Dakota

Commendation: Meritorious Service

Chief of Medical Staff

Infectious Disease Fellowship, University of Vermont

1986-1990: Clinical Practice of Infectious Disease with Fred Kerns, MD,  
Charleston WV

1990-2005: Clinical Practice Infectious Disease

1990-Present: Medical Director of Infection Control, Rapid City Regional  
Hospital and Regional Health (Western SD)

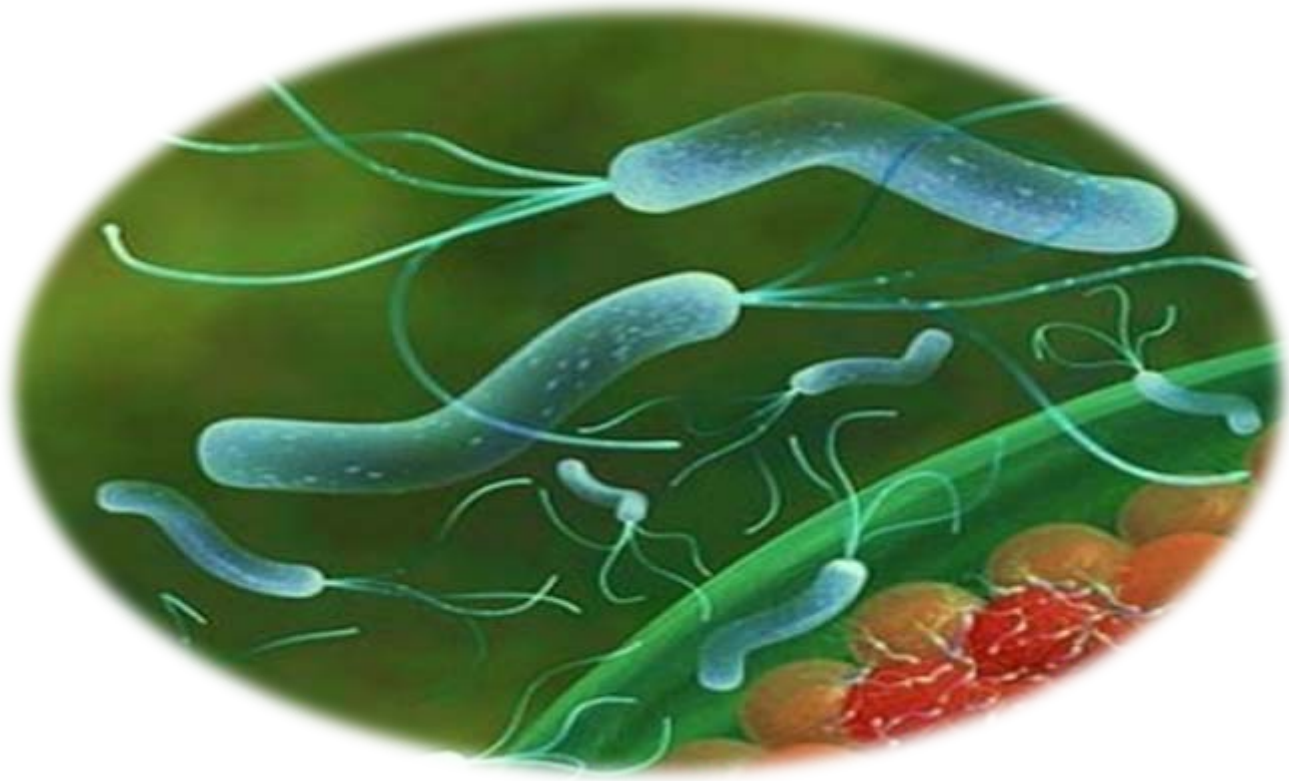
2001-Present: Medical Director Antibiotic Stewardship, Rapid City Regional  
Hospital

2005-2013: Administrative Leadership in Regional Health  
Vice President Quality ♦ Chief Medical Officer ♦ Chief Executive Officer of  
Regional Health Physicians ♦ 1 of 5 Senior Executive Team Members

- 2013 - James M. Keegan MD LLC
- 2014 - *onewest* Healthcare Consulting LLC
- 2015 - PYA ASP Team
  - James M. Keegan, MD
  - Stacey Schaefer, MHA, BSOT
  - Randee Mason, RN, BSN, CPHQ
  - Matthew Long, BS, CEO Spearfish Surgical Hospital and Multispecialty Clinics

# Antibiotic Stewardship

The  
**Zoo**  
In  
You



# Antibiotic Stewardship

“...resistance to antibiotics has become a major threat to public health”

*World Health Organization<sup>1</sup>*

“Dangerous infections that are resistant to antibiotics are spreading and growing stronger, with dire consequences”

*Consumer Reports<sup>2</sup>*

“We can either work to improve antibiotic use and prevent infections, or watch as the clock turns back to a world where simple infections kill people”

*Tom Frieden, CDC, Wall Street Journal<sup>3</sup>*



*International Division*

<sup>1</sup> Bulletin of the World Health Organization, <http://cx.dol.org/10.2471/BLT.11.088435>.

<sup>2</sup> August 2015 Consumer Reports, Vol. 80 No. 8.

<sup>3</sup> June, 2015 Wall Street Journal.





# Antibiotic Stewardship

Infectious Diseases Society of America (IDSA)

&

Society for Healthcare Epidemiology of America (SHEA) recommend antibiotic stewardship as a

**condition of participation**

by

**December 2017**

to

Centers for Medicare & Medicaid Services (CMS)<sup>4</sup>

<sup>4</sup> IDSA and SHEA letter to CMS, March 4, 2014.



# Antibiotic Stewardship

“Unnecessary [antibiotic] use contributes to emergence of antimicrobial drug-resistant bacteria, an emerging public health crisis that contributes to greater rates of **illness and death** and economic costs **as high as \$4 billion per year**”  
*CDC*<sup>5</sup>

If antibiotic resistance were allowed to go unchecked....the cost incurred to the world would be **\$100 Trillion by 2050**  
*British Government Commission*<sup>6</sup>

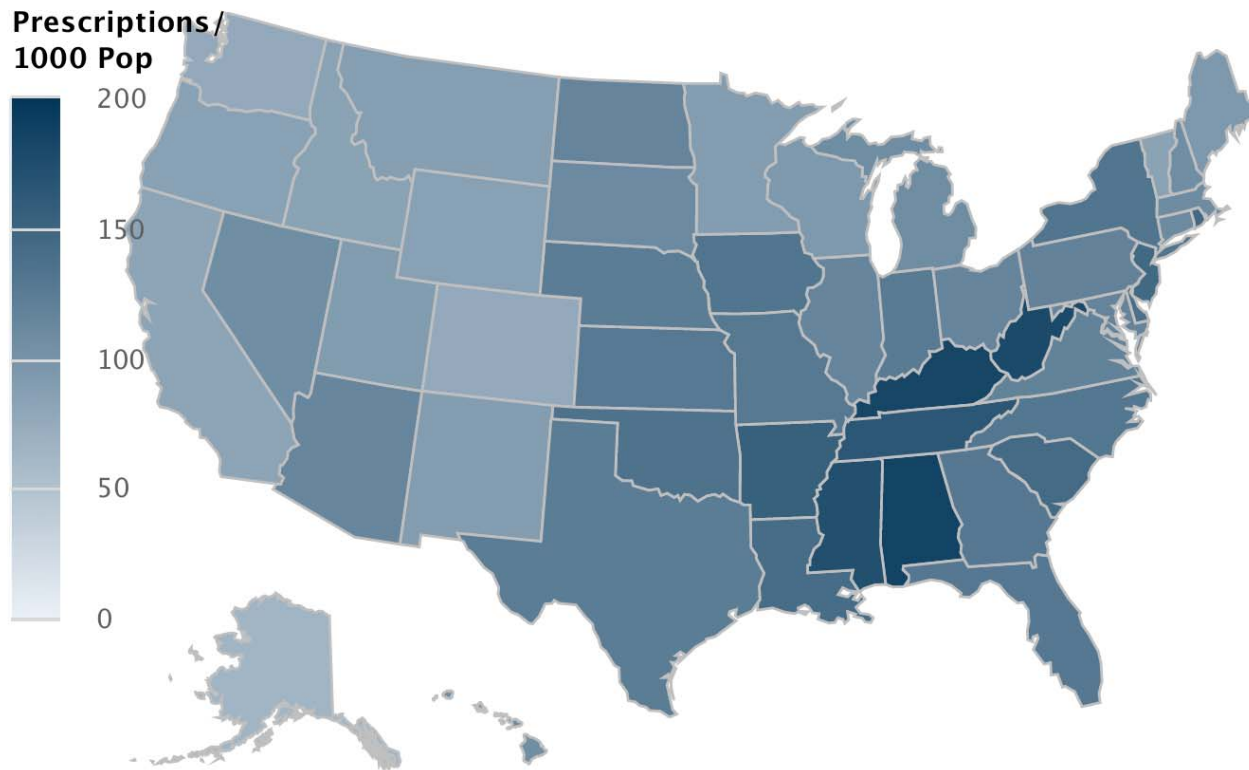
<sup>5</sup> CDC, *Journal Emerging Infectious Disease*.

<sup>6</sup> McKenna, Maryn, “The Coming Costs of Superbugs: 10 Million Deaths per Year,” 12.15.14.

# Quinolones

## Use of Quinolones in 2012

Source: IMS Xponent



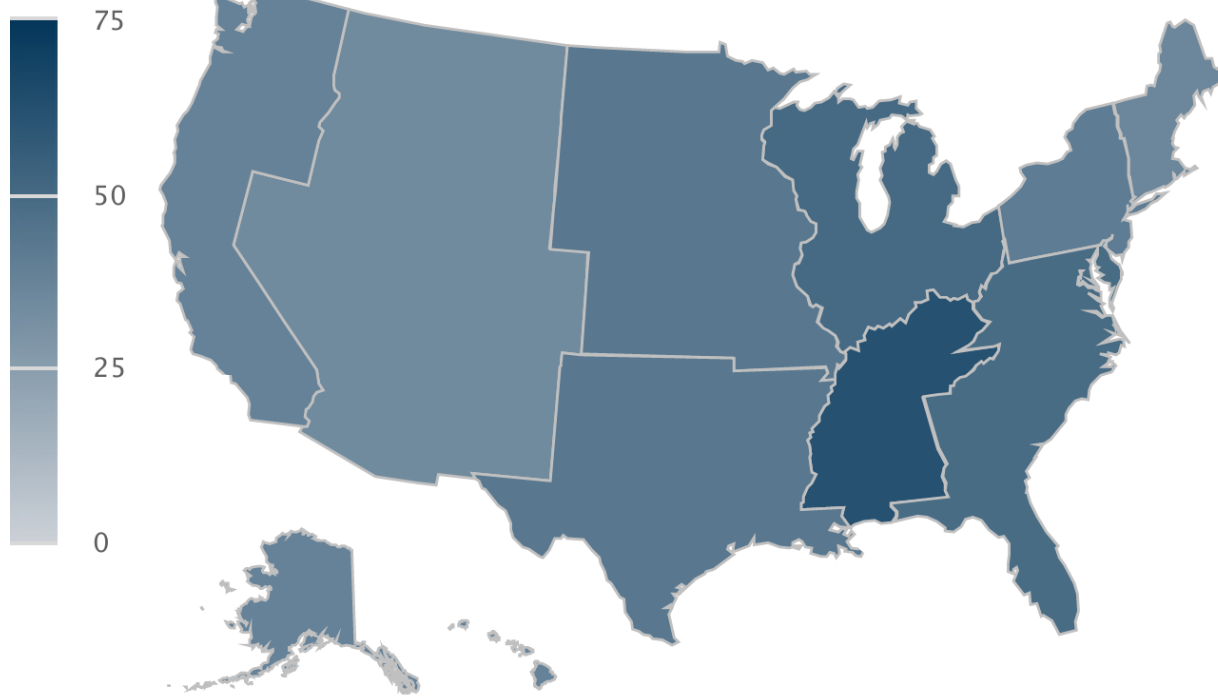
Center for Disease Dynamics, Economics & Policy (cddep.org)

# MRSA

## Resistance of *Staphylococcus aureus* to Oxacillin (MRSA) in 2012

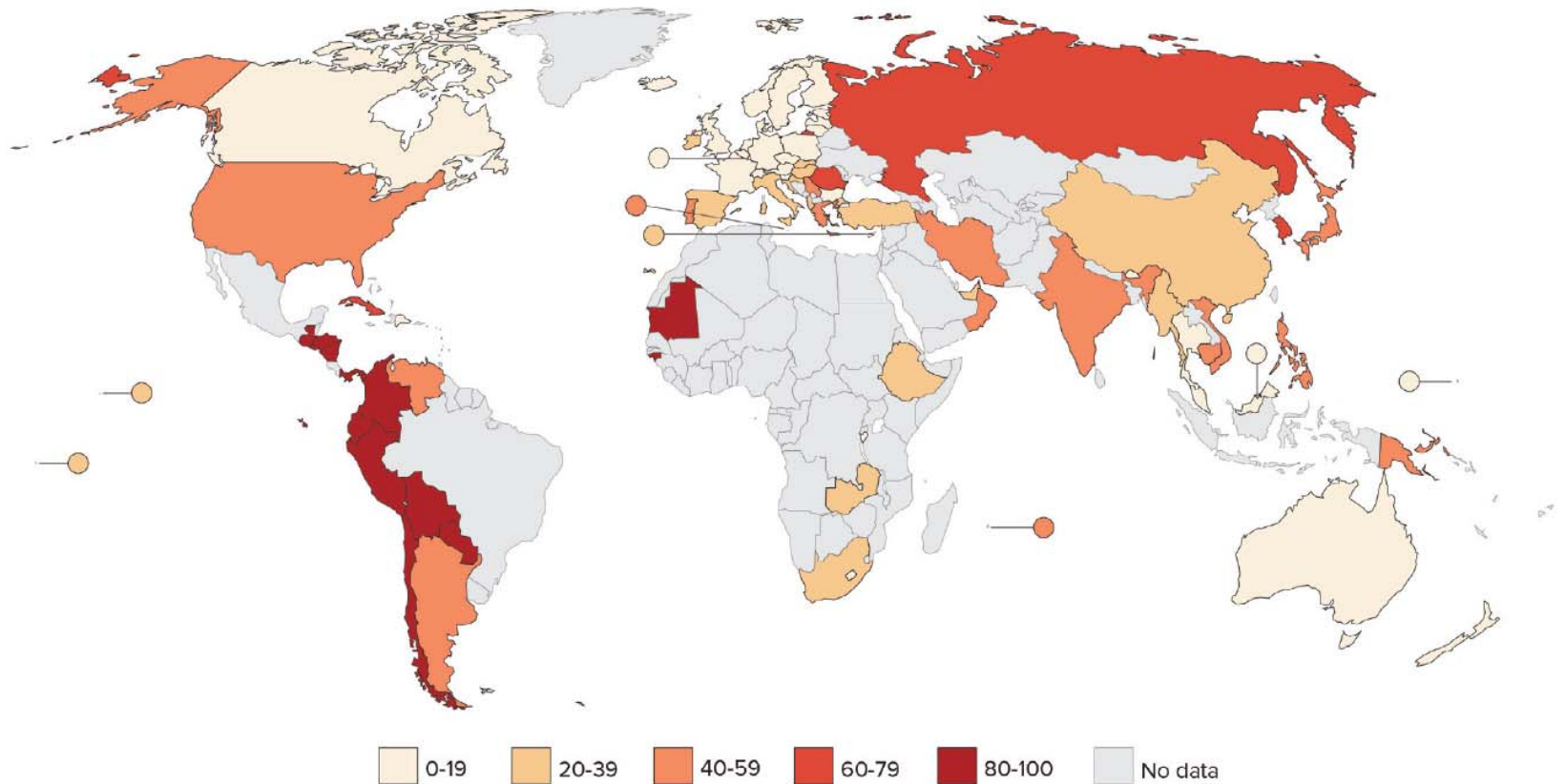
Source: The Surveillance Network

% Resistant  
(invasive isolates)



Center for Disease Dynamics, Economics & Policy (cddep.org)

# MRSA by Country



**FIGURE 1-1<sup>1</sup>:** Percentage of *Staphylococcus aureus* isolates that are methicillin resistant (MRSA), by country (most recent year, 2011–14)

# Antibiotic Stewardship

Antibiotic prescribing in hospitals are often:

***Inconsistent***

***Inappropriate***

***Contributes to Antibiotic Resistance***

*CDC<sup>7</sup>*

<sup>7</sup> Centers for Disease Control and Prevention, CDC, “Core Elements of Hospital Antibiotic Stewardship Programs.”

# Antibiotic Stewardship

“At community hospitals, **one of three** patients with bloodstream infections receives inappropriate, empiric antimicrobial therapy...”

*Duke University<sup>8</sup>*



<sup>8</sup> Duke TODAY, Health and Medicine, March 18, 2014.

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***PRIMUM NON NOCERE:***

Aggressive Diagnostics  
&  
Conservative Therapeutics



# Antibiotic Stewardship

“Patients getting powerful antibiotics to treat a broad range of infections are **up to three times more likely** to get another infection from an even more resistant microbe.”

*Thomas Frieden, Director of CDC<sup>9</sup>*

Federal data cite at least **2 million Americans are infected with drug-resistant bacteria each year - 23,000 Die as a Result**<sup>10</sup>

<sup>9</sup> CDC

<sup>10</sup> Ibid.

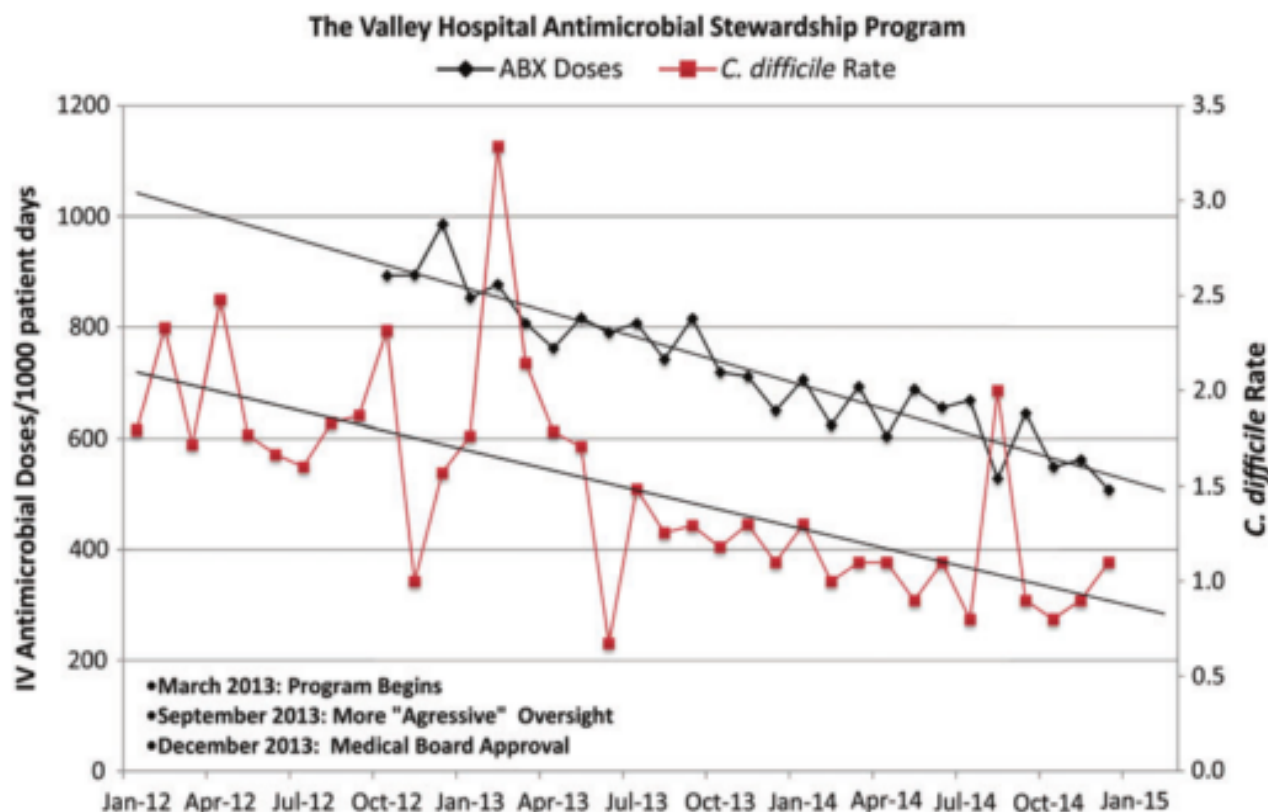
# Antibiotic Stewardship

- If you are hospitalized and declare a penicillin allergy, your **mortality risk doubles** if you are prescribed an alternative medication
- Avoiding penicillin means using alternatives that are **less effective, more expensive or have greater side effects**
- An allergist can confirm your suspected “allergy” to penicillin with a simple skin test

# Western South Dakota



# Valley Hospital ASP Results



**Figure 1.** Relationship between total administered intravenous (IV) antimicrobial (ABX) doses and the rate of *Clostridium difficile* infection.

# Methicillin Resistant Staphylococcus Aureus

## RAPID CITY REGIONAL HOSPITAL RESULTS

MRSA (STAPHYLOCOCCUS AUREUS BACTERIA)  
SEPSIS TWICE THE MORTALITY RATE  
OF SENSITIVE STAPH SEPSIS

	Baseline	Peak	Current	National Average
MRSA	15%	50%	35%	60-70%

# RAPID CITY REGIONAL HOSPITAL RESULTS

THE CAUSE OF 75% OF BACTERIAL PNEUMONIAS

	Baseline	Peak	Current	National Average
Streptococcus Pneumoniae	0%	25%	0%	5-10%

# Carbapenem Resistant Enterobacteriaceae

## RAPID CITY REGIONAL HOSPITAL RESULTS

CURRENTLY NO EFFECTIVE DEPENDABLE TREATMENT

	Baseline	Peak	Current	National Average
CRE	None	None	None	Rising



# Clostridium Difficile

## RAPID CITY REGIONAL HOSPITAL

HOSPITAL ACQUIRED INFECTION

1/10 DIE WITH THIS DIAGNOSIS

	Baseline	Peak	Current	National Average
C- diff	1/10-1/2 Nat. Ave	Same	Same	Nat. Ave.

# Antibiotic Stewardship

## Rapid City Regional Hospital (RCRH)

417 Licensed beds

Ernst & Young ~\$1 million antibiotic per year cost savings



# Antibiotic Stewardship

Location/Type of Facility	Number of Beds	Cost Savings/Reductions	AS Team Composition
Monroe, Louisiana Community Hospital	120	\$177,000/ 1 Year	ID Specialist, Clinical Pharmacist
Dallas, Texas LTAC Hospital	60	\$159,580/ 15 Months	ID Specialist, Director of Pharmacy
Dorchester, Massachusetts Community Teaching Hospital	159	\$200,000-250,000/ 1 Year	ID Specialist, ID-trained Pharmacist
Baltimore, MD Large tertiary care, teaching medical center	800	\$2,949,705/ 3 Years	ID Specialist, Clinical Pharmacist
Winston-Salem, NC Academic Medical Center	880	\$920,070 to \$2,064,441 per year over 11 years	2 ID Specialists, 3 Clinical Pharmacists

# Antibiotic Stewardship

## Kenmore Mercy Hospital (Buffalo, NY<sup>11</sup>)

Began ASP program in 2012

- During the first year, they **saved more than \$145,000** on drug purchasing alone
- Pharmacist-initiated IV to oral conversions **increased 688%**
- Physicians accepted ID physicians recommendations  $\frac{3}{4}$  of the time

CDC reports a comprehensive ASP program can reduce antibiotic use by 22-36% with annual savings of

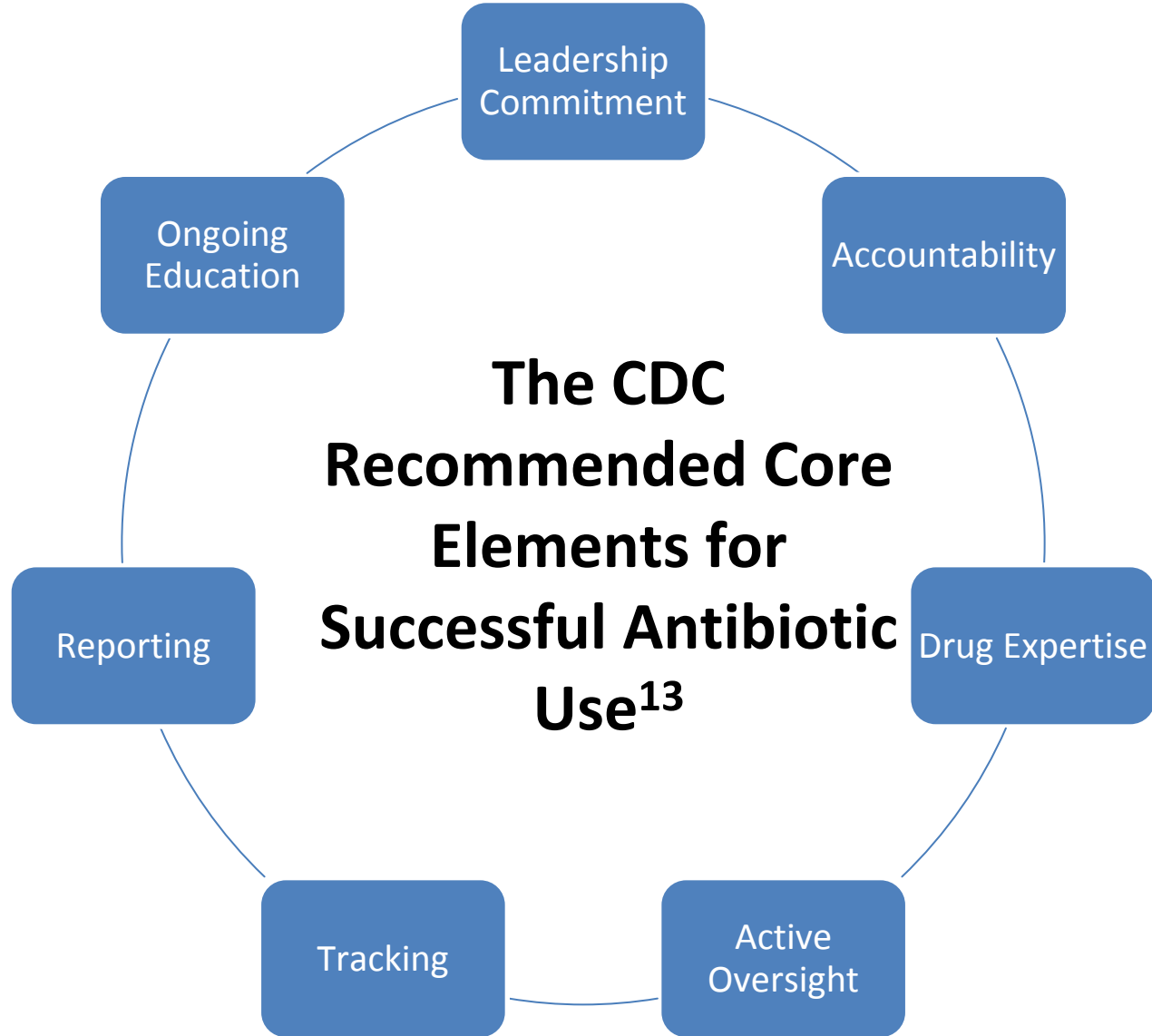
**\$200,000 to \$900,000<sup>12</sup>**

<sup>11</sup> McKinney, Maureen, December 20, 2014: "Hospitals Focus on Antibiotic Overuse as CMS Prepares New Mandate."

<sup>12</sup> Ibid.

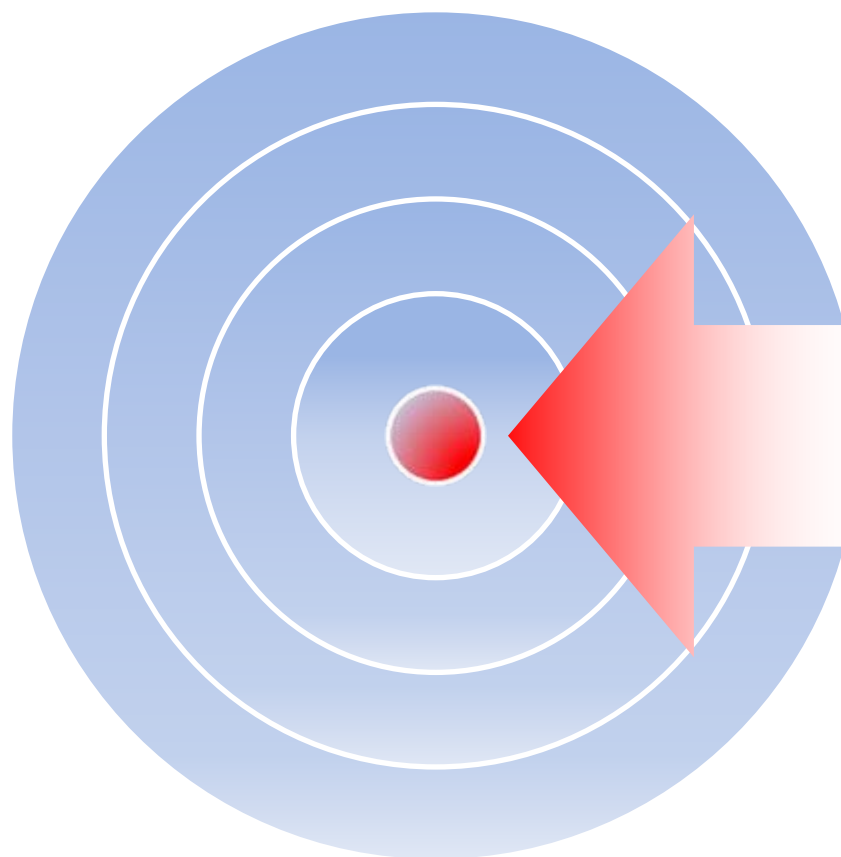
# Antibiotic Stewardship

- **Cost Savings: soft savings or unrealized savings**
  - Avoid Unnecessary Admissions
  - Decreased LOS (Length of Stay)
  - Decreased Readmissions
  - Decreased risk for HAI (Hospital Acquired Infections)
  - Decreased “Never” Events
  - Improved DRG Sufficiency



<sup>13</sup> Centers for Disease Control and Prevention, CDC, “Core Elements of Hospital Antibiotic Stewardship Programs.”

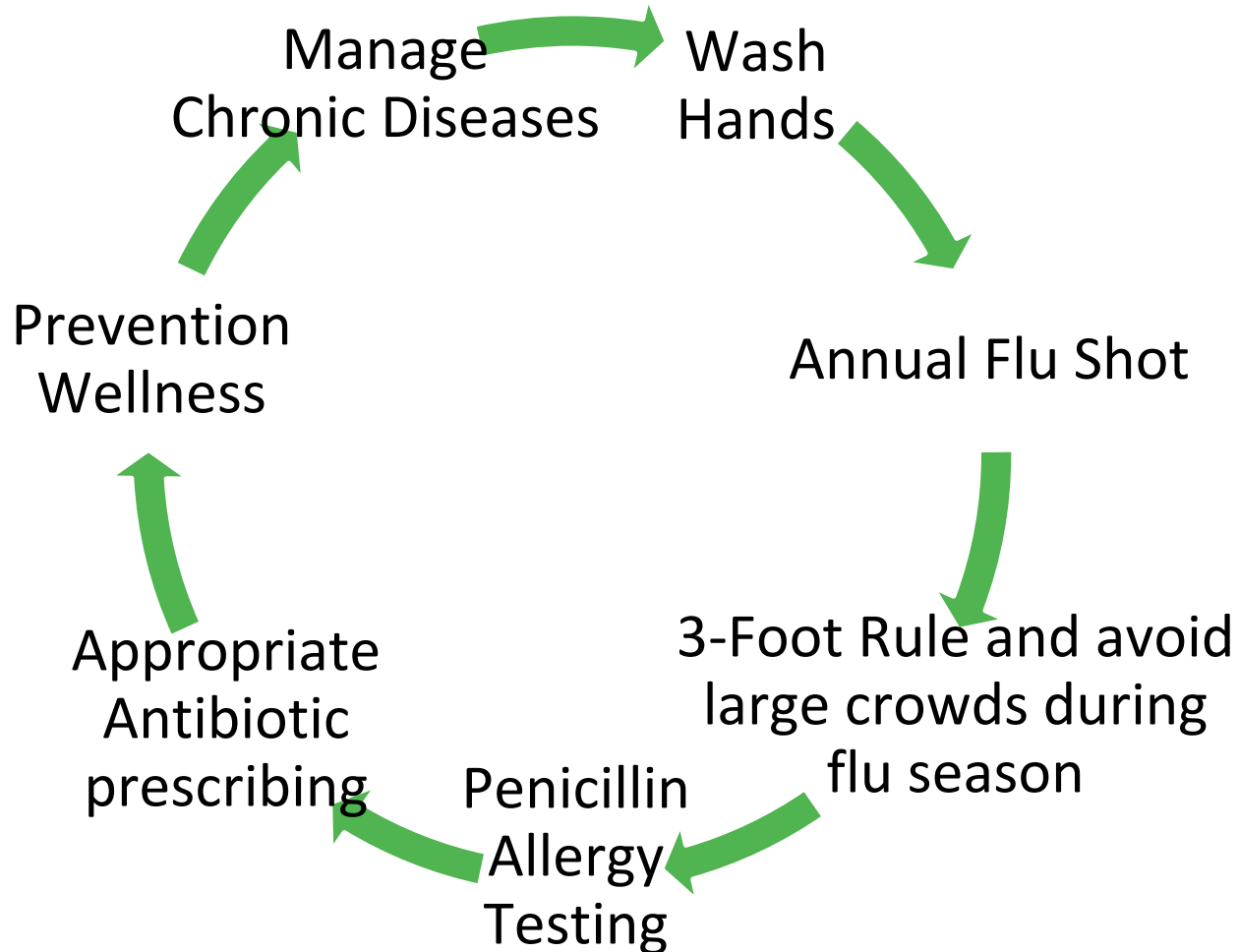
# ASP ENHANCEMENTS



- 24/7 Access and Support of Infectious Disease Physician and Team
- 20+ Years of ASP Experience with Proven Results
- Train and Empower Physician and Pharmacy Champions
- Concurrent Monitoring of Prescribing Practices
- Ongoing Review and Data Analysis to Ensure Continued Success
- Transparent Reporting and Outcomes
- Safety Bundle Recommendations



# ASP Safety Bundle



# Contact Information

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