



# Developing a Comprehensive State Antimicrobial Resistance Program

HAI Advisory Committee  
May 14, 2015



Erin Epon, MD  
Public Health Medical Officer, Assistant Chief  
Healthcare Associated Infections Program  
Center for Healthcare Quality  
California Department of Public Health

# Objectives

1. Understand the problem of antimicrobial resistance in California
2. Understand the role of public health in addressing antimicrobial resistance
3. Describe the CDPH HAI Program antimicrobial resistance activities
  - Antimicrobial stewardship
  - Regional prevention collaboratives
  - AR surveillance and laboratory capacity

# Antimicrobial resistance is a substantial and increasing problem in California

- **260,000 illnesses** and nearly **3,000 deaths** in CA each year
- ***Clostridium difficile* infections (CDI)**
  - 250,000 illnesses and 14,000 deaths in US
  - 10,553 healthcare facility onset-CDI in CA in 2013
    - 5% increase since 2011
- **Carbapenem-resistant Enterobacteriaceae (CRE)**
  - Regional variation, with higher prevalence in southern CA in 2012
  - Recent outbreaks in northern CA suggest potential emergence in previously lower prevalence areas

# Core actions to address antimicrobial resistance (AR)

- **Improve antimicrobial prescribing** through antimicrobial stewardship
- **Preventing infections and transmission** of antimicrobial resistant pathogens
- **Tracking antimicrobial resistance** patterns

# Improving antimicrobial prescribing through antimicrobial stewardship

# Antimicrobial Stewardship

- **Promote and measure appropriate antimicrobial use**, by optimizing antimicrobial selection, dosing, route and duration of therapy
- Improve patient care – increased cure rates, reduced treatment failures
- Significant reductions in hospital rates of CDI and antimicrobial resistance
- Decreased or controlled costs

# California is a Leader in Antimicrobial Stewardship Legislation

- **California Senate Bill 739** – By January 1, 2008
  - Hospitals required to develop process for monitoring judicious use of antibiotics, sharing results with quality improvement committee(s)
- **California Senate Bill 1311** – By July 1, 2015
  - Antimicrobial stewardship policy in accordance with federal/professional guidelines
  - Physician-supervised multidisciplinary committee
  - Physician or pharmacist with AS knowledge/training
  - Report to quality improvement committees

# CDPH ASP Definition\* – 11 Elements

Basic	Intermediate	Advanced
1. Antimicrobial stewardship policy/procedure adopted	5. Annual antibiogram developed, distributed, and medical staff educated	9. Antimicrobial formulary reviewed annually and changed based on antibiogram
2. Physician-supervised multidisciplinary committee formed	6. Institutional guidelines for management of common infection syndromes developed	10. Prospective audits performed, with intervention/feedback to prescribers
3. Physician or pharmacist ASP leader received specific stewardship training	7. Antibiotic usage patterns monitored using DDD or DOT	11. Formulary restriction with preauthorization adopted
4. ASP activities reported to hospital quality improvement committees	8. Medical staff/committees provided ongoing ASP education	<div data-bbox="1302 1219 1901 1410" style="border: 2px solid blue; padding: 5px; text-align: center;"> <p><b>* As Recommended by HAI Advisory Committee, Dec 2013</b></p> </div>

# CDPH ASP Toolkit

11 sections, each addressing an element of the CDPH ASP definition

- Brief overview
- References
- Documents and/or tools illustrating real-world examples of implementation

Available at

[www.cdph.ca.gov/HAI](http://www.cdph.ca.gov/HAI)



California Department of Public Health



Antimicrobial Stewardship Program (ASP) Toolkit  
Examples for Program Implementation

2015

# Excerpt from the CDPH ASP Toolkit

## CDPH ASP Toolkit Element 1 (BASIC):

An institution-specific antimicrobial stewardship policy and/or procedure has been adopted.

ASP Policy/Procedure from Sutter Davis - Example 1.3

<input type="checkbox"/> SAFH <input type="checkbox"/> SAH <input checked="" type="checkbox"/> SDH <input type="checkbox"/> SMCS <input type="checkbox"/> SRMC <input type="checkbox"/> SSMC	<b>PHARMACY POLICY &amp; PROCEDURE MANUAL</b>	<b>Section/#:</b>
	<b>Title:</b> ANTIMICROBIAL STEWARDSHIP	<b>Initiated/Owned by:</b> Allan Yamashiro Director of Ancillary Services
	<b>Effective Date:</b> November 2013	<b>Next Review Date:</b> November 2016

### POLICY

Antimicrobial medication use will be monitored by a pharmacist for appropriate use, dose, and duration of therapy based on evidence based practice to provide the best possible patient outcomes. Pharmacists will discuss with the prescriber any changes that are recommended to be made.

# Spotlight on ASP Project

[www.cdph.ca.gov/programs/hai/Pages/AntimicrobialStewardshipProgramInitiative](http://www.cdph.ca.gov/programs/hai/Pages/AntimicrobialStewardshipProgramInitiative)

## Spotlight on Antimicrobial Stewardship Programs

The following hospitals have agreed to share progress on the implementation of their **Antimicrobial Stewardship Programs (ASP)**. Activities listed were defined by the California HAI Advisory Committee as those that comprise varying levels of Program implementation. An "✓" indicates the hospital is currently performing the activity.

	Basic Program				Intermediate Program				Advanced Program			
	1. Institution-specific antimicrobial stewardship policy and/or procedures adopted	2. Physician-supervised multidisciplinary ASP committee or workgroup convened	3. ASP support provided by a physician or pharmacist with antimicrobial stewardship training from a recognized professional organization or post graduate education	4. ASP activities routinely reported to hospital quality improvement committees	5. Annual antibiogram developed (using CLSI guidelines), distributed to medical staff, and follow-up education provided.	6. Institutional guidelines for the management of common infection syndromes adopted (e.g., order sets, clinical pathways, empiric antimicrobial therapy guides, etc.)	7. Usage patterns of antibiotics (determined to be important to the local resistance ecology) monitored using Defined Daily Dosing (DDD)	8. Regular antimicrobial stewardship education provided to hospital staff and committees	9. Antimicrobial stewardship education changes made based on local antibiogram	10. Prospective audits of antimicrobial prescriptions performed and intervention/feedback provided	11. Formulary restriction with preauthorization implemented	
<b>YOUR HOSPITAL NAME HERE</b>												
City, Hospital Type, bed size												
ID Physician:												
ID Physician email												
Pharmacist:												
Pharmacist email	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	



**“The Spotlight on Antimicrobial Stewardship Programs project helps define antimicrobial stewardship programs and activities, and spotlights volunteer hospitals that wish to highlight their programs and share their progress with others. The Spotlight on ASP Project Invitation 2014 remains open to allow additional hospitals to participate – Join today!”**

# California ASP Collaborative

- **Provide a forum to support California hospitals to develop or enhance ASPs**
  - Promote patient safety
  - Decrease CDI and antimicrobial resistance
- Facilitate compliance with CA Senate Bill 1311
- One-year project launched in January 2015

# Structure of the ASP Collaborative

- **Learning and action network**
- 12 monthly sessions, conducted via webinar
- 6 educational presentations by Faculty/Advisors, addressing Topic Areas of core ASP elements
- 6 implementation discussion sessions
  - Share experience with Topic Area, receive feedback and suggestions from Faculty/Advisors and peers

# ASP Collaborative Syllabus, Jan-June 2015

Month	Topic Area	Session	Faculty Presenter	Implementation Faculty
January	<b>Leadership Commitment and Support</b>	Educational presentation	Stephen Parodi, MD	
February		Implementation discussions	-	Stephen Parodi, MD Stanley Deresinski, MD Henry Oster, MD Daniel Uslan, MD
March	<b>Program Development</b>	Educational presentation	Jeffrey Silvers, MD Christopher Martinez, PharmD	
April		Implementation discussions	-	Jeffrey Silvers, MD Christopher Martinez, PharmD Debbie Wiechman, RN
May	<b>Actions to Optimize Antimicrobial Prescribing</b>	Educational presentation	Nan Hong, PharmD	
June		Implementation discussions	-	Nan Hong, PharmD Brian Lee, MD

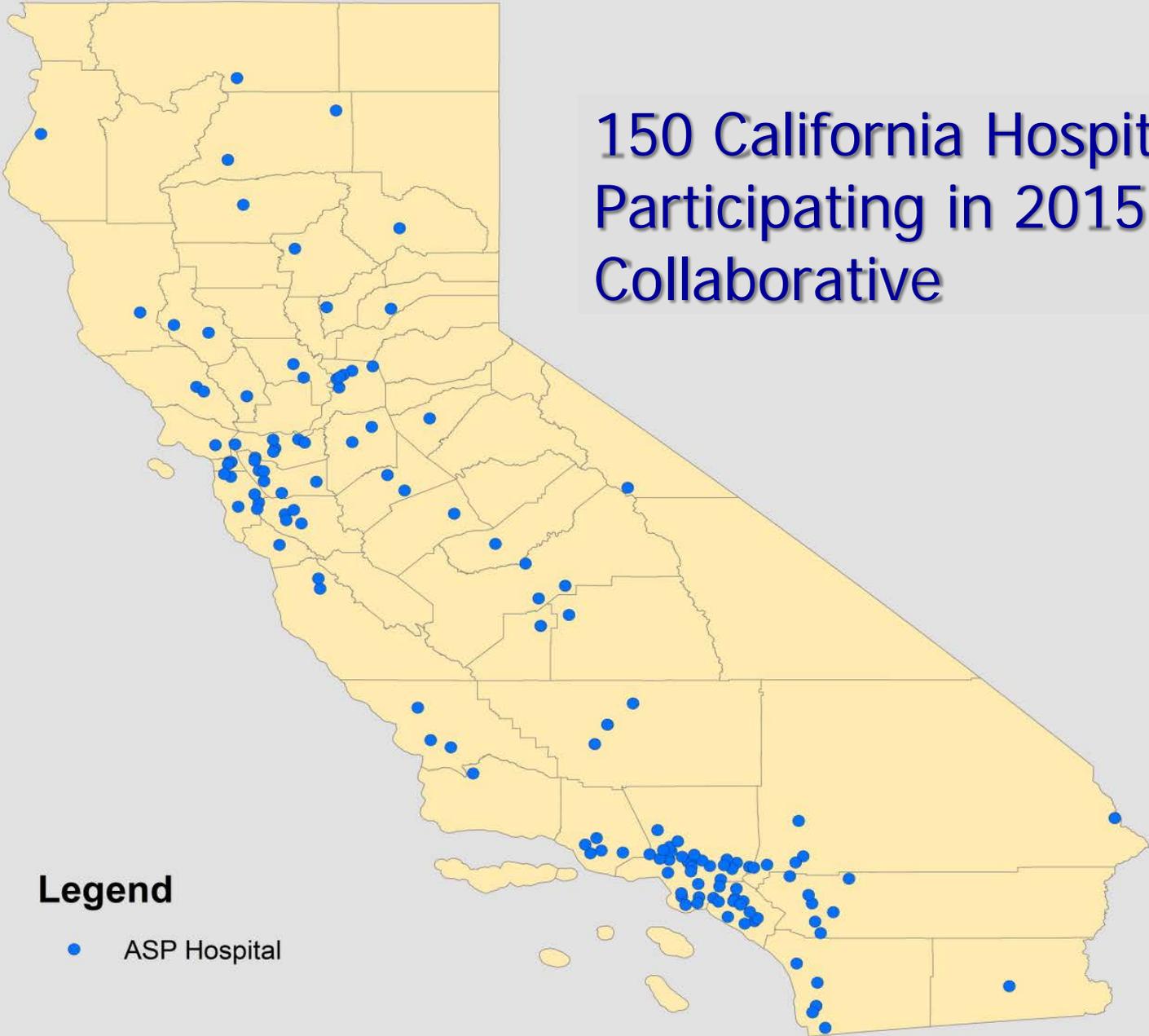
# ASP Collaborative Syllabus, July-Dec 2015

Month	Topic Area	Session	Faculty Presenter	Implementation Faculty
July	<b>Interventions</b>	Educational presentation	Javeed Siddiqui, MD	
August		Implementation discussion	-	Javeed Siddiqui, MD Christopher Graber, MD
September	<b>Tracking</b>	Educational presentation	Conan MacDougall, PharmD	
October		Implementation discussion	-	Conan MacDougall, PharmD Henry Oster, MD Debbie Wiechman, RN
November	<b>Reporting and Education</b>	Educational presentation	TBD	
December		Implementation discussion	-	TBD Brian Lee, MD

## Structure of the ASP Collaborative – cont'd

- **SharePoint site** – repository of resources, tools, and forum for Discussion
- **Grow “Spotlight on ASP” membership**, and foster mentor–mentee relationships
- **National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance (AUR) option** informatics capacity and interest assessment
- Forum for additional ASP education and collaboration opportunities
  - ASPs in Emergency Department, Pediatrics settings

# 150 California Hospitals Are Participating in 2015 ASP Collaborative



## Legend

• ASP Hospital

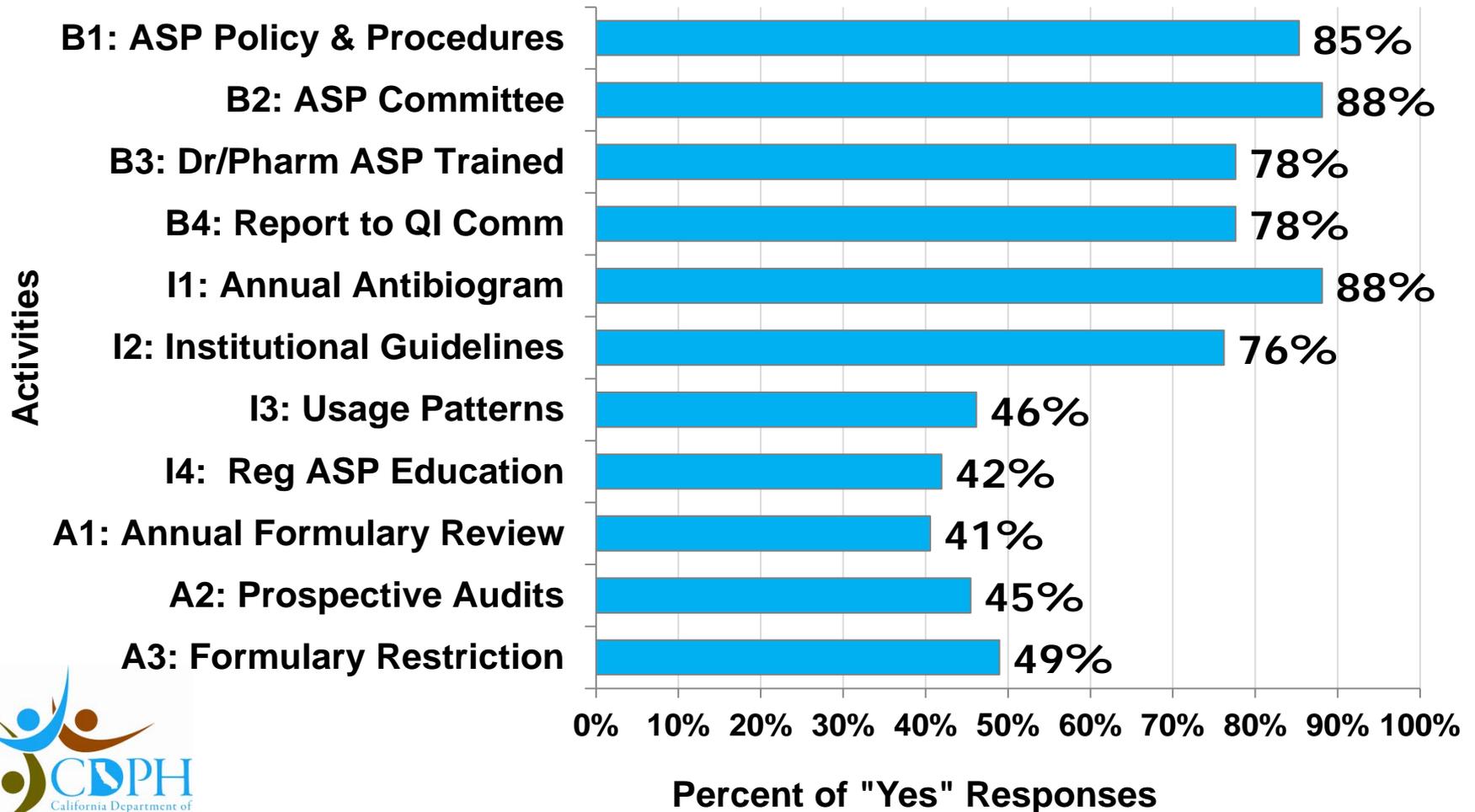
# ASP Collaborative Hospital Participants

- Bed capacity size: median 211, range: 18–1300 beds

Hospital Type	Hospital Participants, No. (%)
Community	122 (81)
Major Teaching	5 (3)
Pediatrics	8 (5)
Long Term Acute Care	9 (6)
Critical Access	7 (5)

# Baseline Status of Collaborative Hospital ASPs

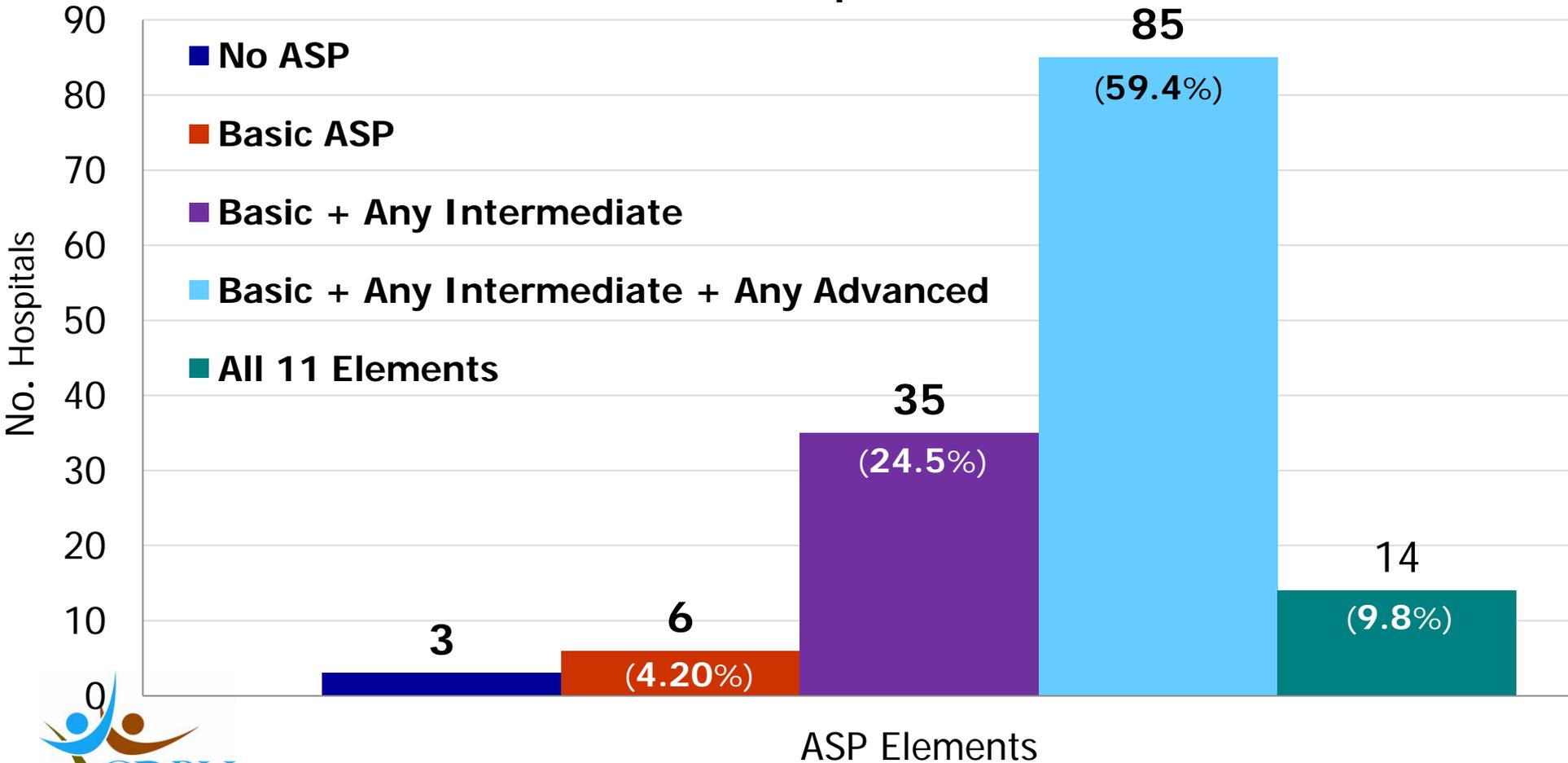
Self-assessment of Implementation of 11 ASP elements,  
143 hospitals



Percent of "Yes" Responses

# Baseline Status of Collaborative Hospital ASPs

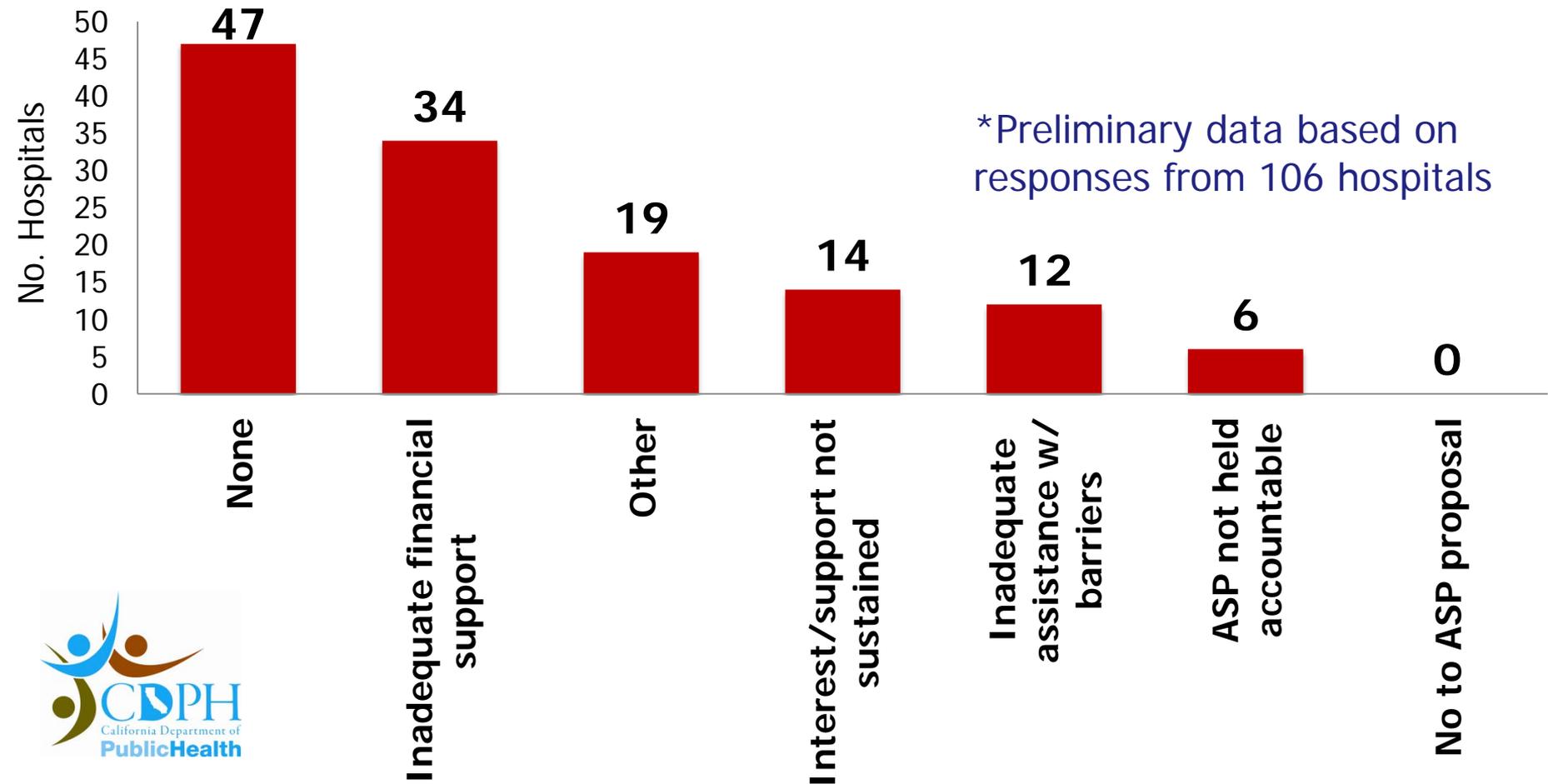
Self-assessment of Implementation of 11 ASP elements,  
143 hospitals



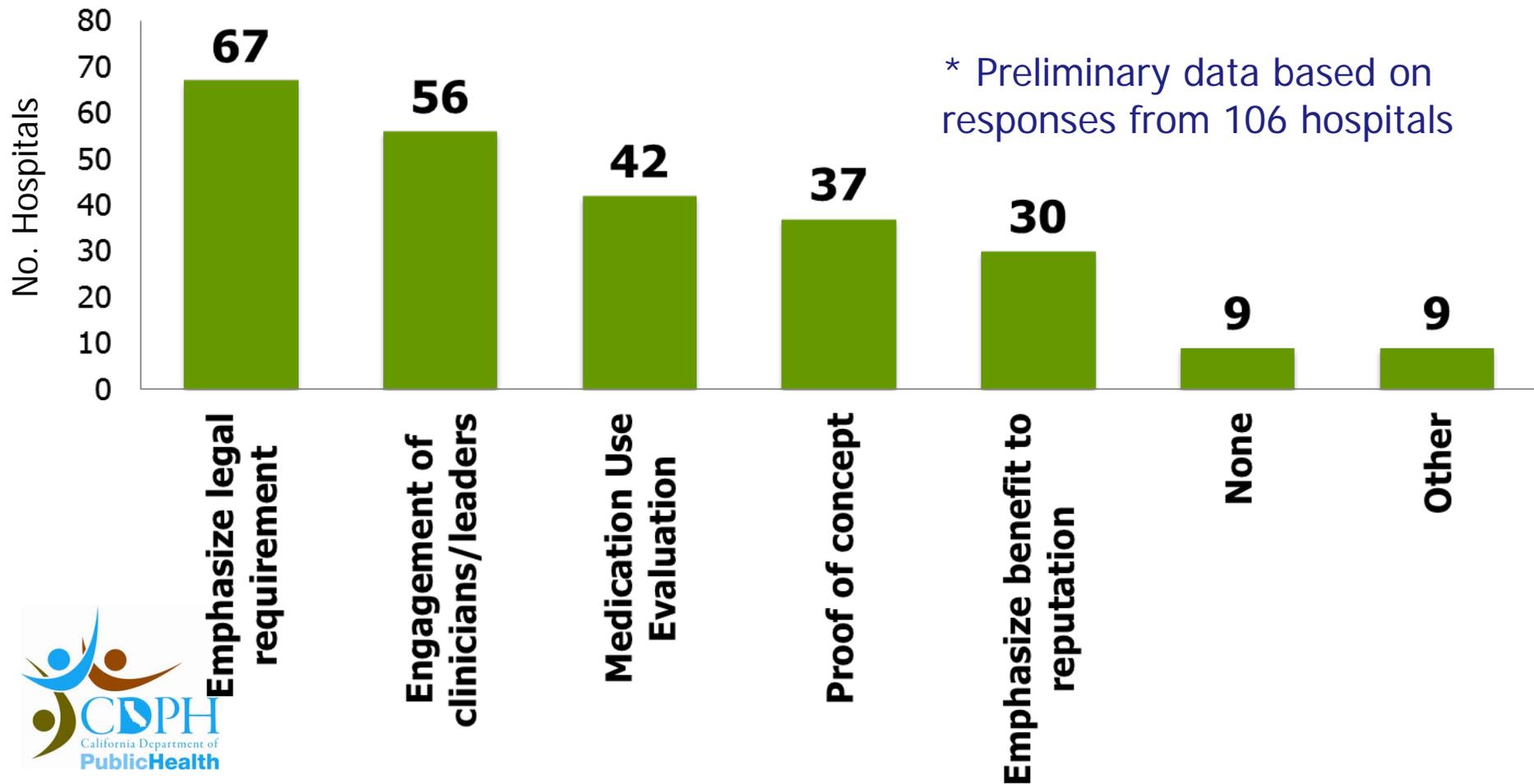
# ASP Collaborative Progress and Metrics

- **Periodic progress assessments** associated with each Topic Area, every other month
  - Detailed assessment of practices and challenges with implementation
  - Guide feedback, document successes and progress
- **Cumulative assessment** of ASP status following conclusion of Collaborative
- **Hospital-onset CDI incidence**, submitted via NHSN

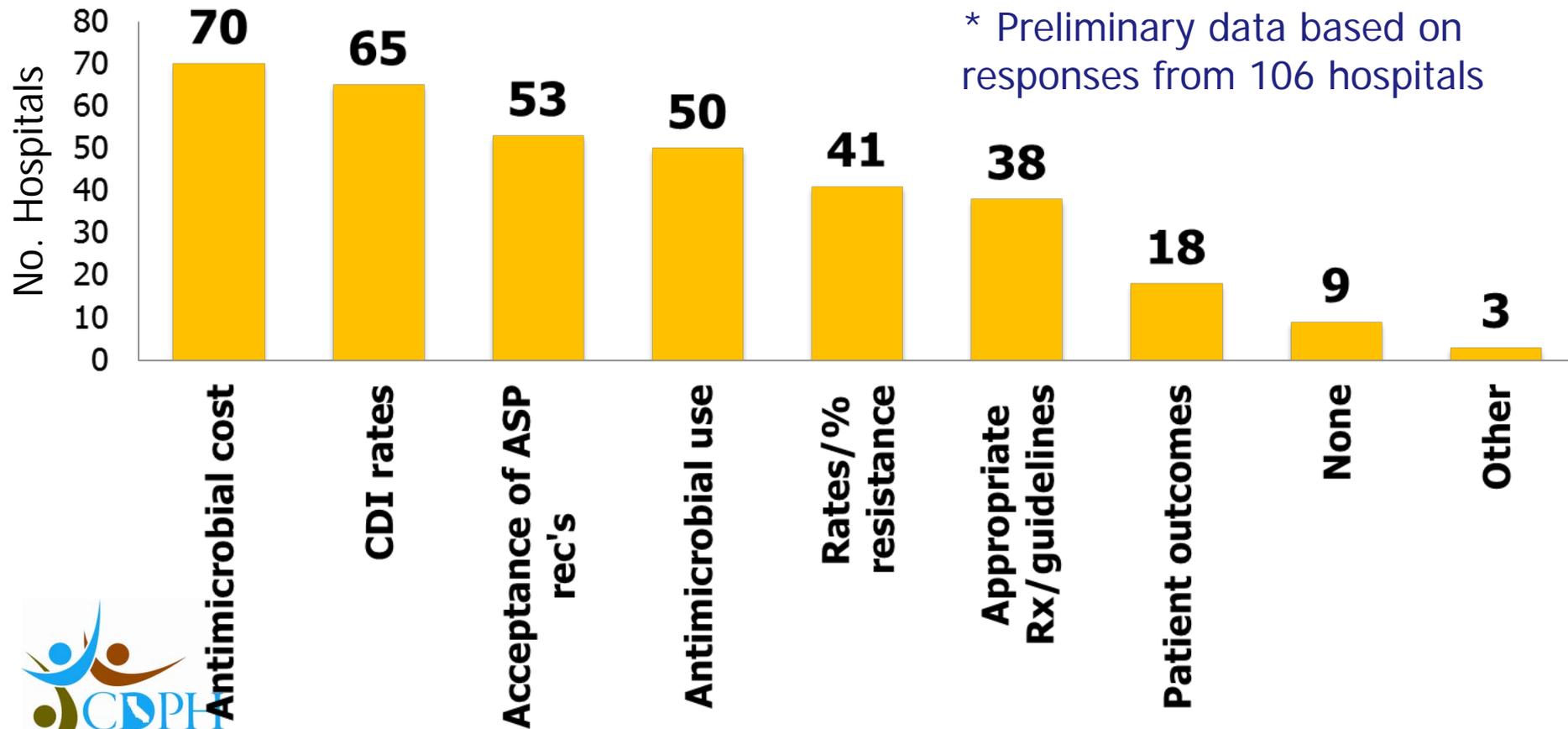
## Progress Assessment #1: What specific challenges have you encountered engaging an executive leadership partner for your ASP?\*



# Progress Assessment #1: What strategies have you tried in order to engage and obtain support from the executive leadership partner for your ASP?\*



# Progress Assessment #1: What metrics do you use to demonstrate the value of your ASP to your executive leadership partner?\*



## Progress Assessment #2: ASP Interventions (in process)

5. Your ASP's Stewardship Interventions/Targets	Currently Implementing	Planning to Implement, Expand, or Enhance in <u>2015</u>	Planning to Implement, Expand, or Enhance in <u>2016</u>
Community-acquired pneumonia			
Urinary tract infections			
Skin/soft tissue infections			
Empiric MRSA coverage			
Clostridium difficile infections			
Positive blood cultures			
Antibiotic "Time Out"			
Formulary restriction with pre-authorization			
Prospective audit and feedback			

# Preventing infections and transmission of antimicrobial resistant pathogens

# Identification of a Target Area for a Regional CDI Prevention in California

- **Present-on-admission CDI** rates 15% higher in Los Angeles and Orange County hospitals in 2012, compared with hospitals in the rest of California
- **Inter-facility patient sharing** is well documented in Orange County (Huang et al. 2010)
  - 20% of discharged patients readmitted to a different hospital within 12 months
  - Among hospitalized patients with CDI, 26% were readmitted to a different hospital within 12 weeks of discharge

# Orange County CDI Prevention Collaborative

- **Network of facilities with shared patient population**
  - 10 acute care hospitals
  - 3 long-term acute care
  - 30 skilled nursing facilities
- One-year project from June 2015–May 2016

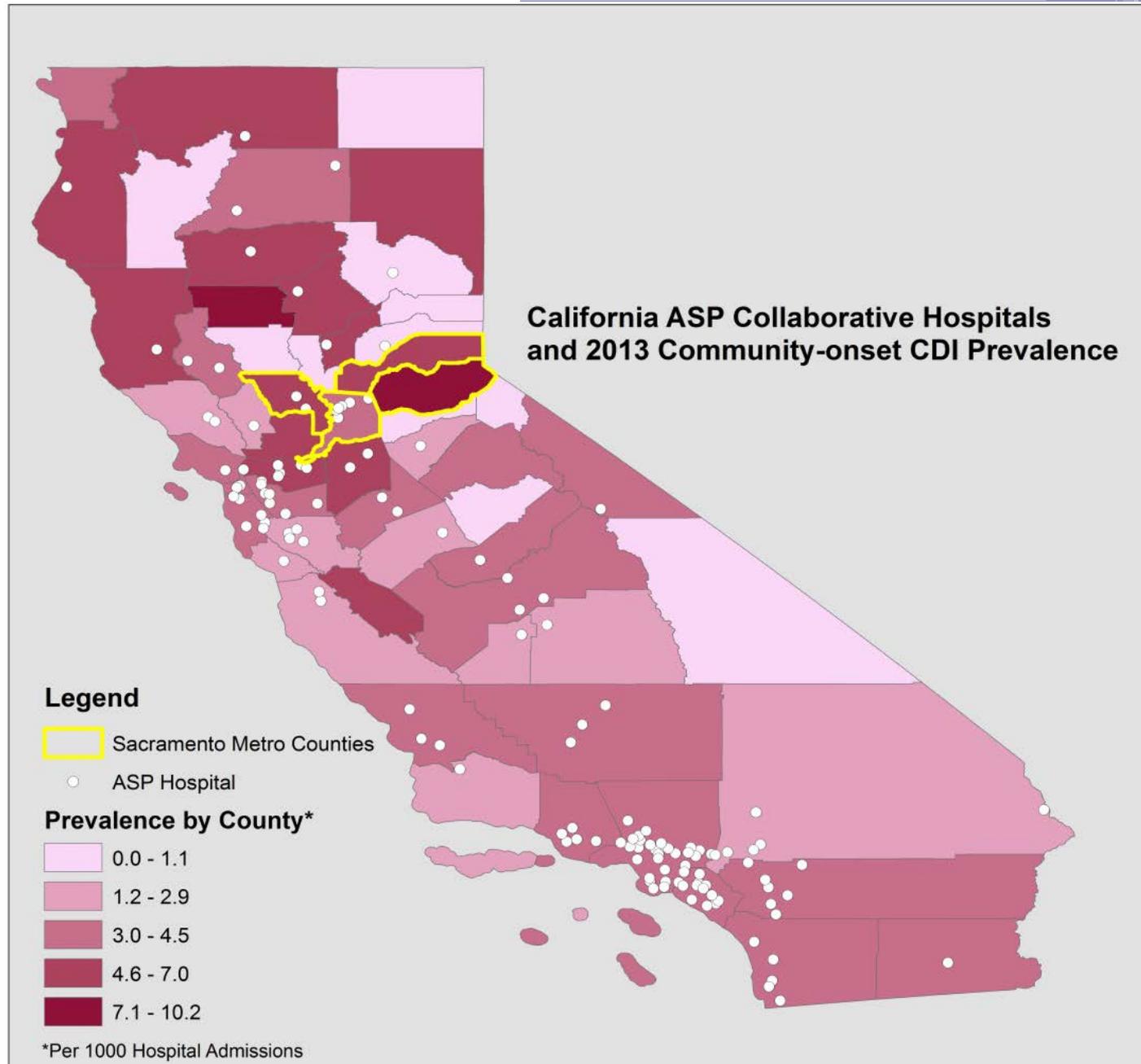
# Orange County CDI Collaborative Structure

- **On-site observational assessments** by HAI Program Liaison Infection Preventionists
  - Examine and assess adherence with CDI prevention practices
- **Development of tailored action plans**, addressing:
  1. **Adherence monitoring**
    - Hand hygiene, contact precautions, and inter-facility communication
  2. **Environmental cleaning**
  3. **Antimicrobial stewardship**

# Orange County CDI Collaborative Structure

- **Quarterly in-person conferences**
  - Review up-to-date evidence on *Clostridium difficile* transmission within and between healthcare facilities
  - Discuss strategies to enhance inter-facility communication and coordination
  - Share successful strategies
- **Training and assistance for long-term care facilities enrolling and submitting CDI data via NHSN**
  - Use NHSN data to assess regional prevalence

# Identifying Target Area for the Next Regional CDI Prevention Collaborative



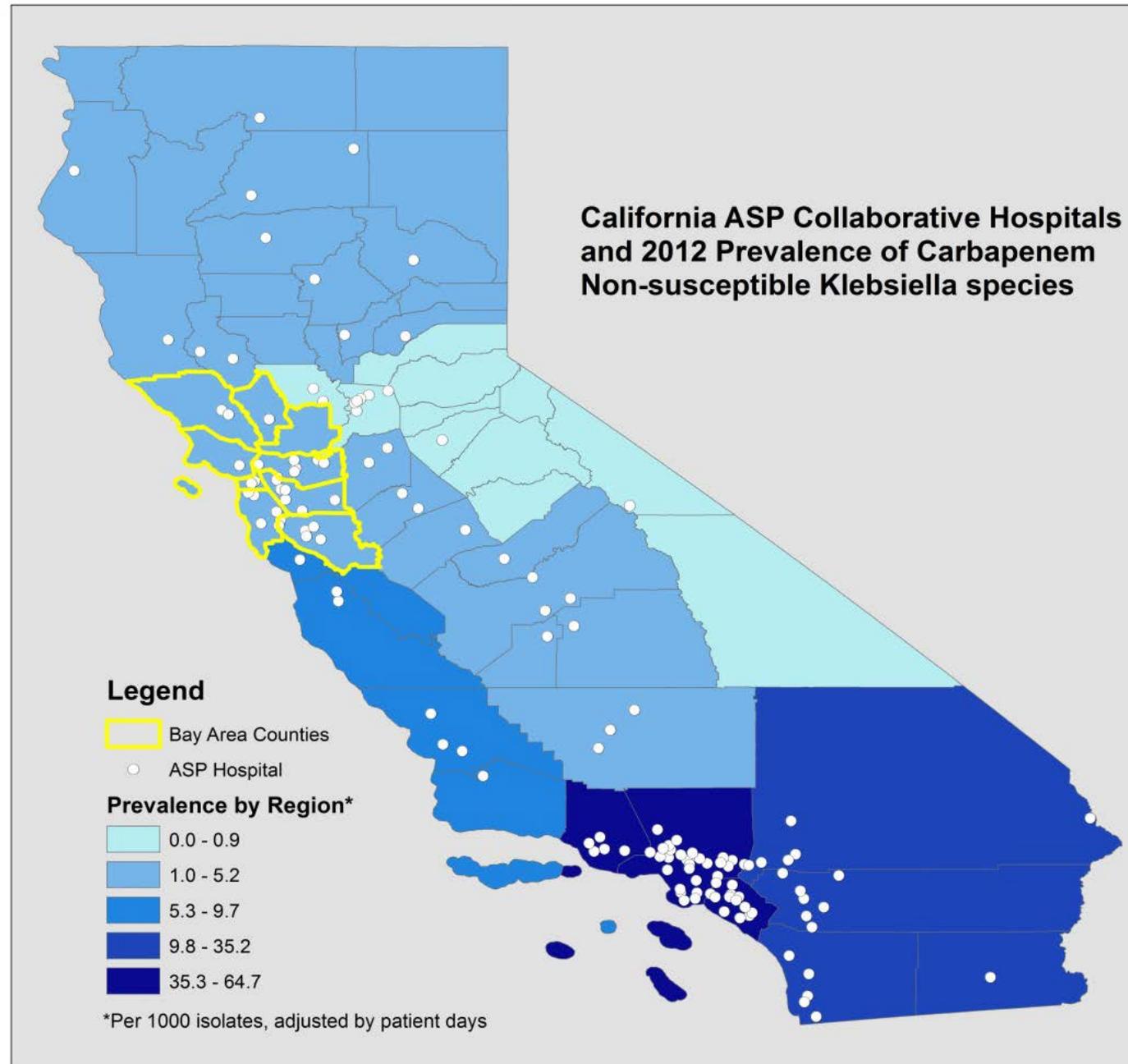
# Carbapenem-Resistant Enterobacteriaceae (CRE) in California

- **2012 CRE Prevalence Survey** (n=319 hospitals)
  - Assessment of CRE infection prevention measures, screening practices, laboratory protocols, and staff awareness
  - Prevalence of carbapenem non-susceptible *Klebsiella*
- Highest prevalence of carbapenem non-susceptible *Klebsiella* spp. among patients from:
  - Los Angeles metro area
  - Long Term Acute Care (LTAC) hospitals

# Identification of a Target Area for Regional CRE Prevention Efforts

- **“In regions with no or few CRE colonized or infected patients, there may be a critical opportunity to prevent further emergence of CRE by taking an aggressive approach early in the process.” – CDC CRE Toolkit, 2012**
- Multiple clusters and outbreaks of CRE during recent years in northern California acute and long-term care facilities highlight opportunities to prevent further spread of CRE in California

# Identifying Target Area for a Regional CRE Prevention Collaborative



# Regional Coordination of CRE Prevention

## Public Health Activities

- Perform regional surveillance to measure scope of CRE problem
- Provide feedback to facilities on CRE prevalence
- Educate all healthcare facilities on CRE epidemiology and need for increasing vigilance
- Educate all healthcare facilities on CRE prevention measures

## Facility-based Activities

- Engage administrators to prioritize CRE prevention and ensure control plan
- Provide training to HCWs
- Review practices to ensure core CRE prevention measures are in place
- Ensure CRE screening is being performed when necessary

- **Ensure communication of CRE status upon inter-facility transfers**



# CRE Prevention Strategies for Acute and Long-term Care Facilities

## CORE

1. Hand Hygiene
2. Contact Precautions
3. Healthcare Personnel Education
4. Minimize Device Use
5. Patient and Staff Cohorting
6. Laboratory Notification
7. Antimicrobial Stewardship
8. CRE Screening

## Supplemental

1. Active Surveillance Testing
2. Chlorhexidine Bathing

# Tracking antimicrobial resistance patterns

# California Antimicrobial Resistance (AR) Laboratory Surveillance Network (Proposed)

- **Determine and monitor AR prevalence**
- **Assess laboratory AR capacity**
  - Identify and characterize AR pathogens
  - Perform surveillance cultures
  - Electronically report laboratory data
- **Establish network** of clinical laboratories, hospital infection prevention staff, and state and local public health agencies
  - Share/receive regional AR prevalence data, determine AR reference testing resources

# California Antimicrobial Resistance (AR) Laboratory Surveillance Network (Proposed)

- **Carbapenem resistant Enterobacteriaceae (CRE)**
  - *E. coli*, *Klebsiella pneumoniae* / *oxytoca*, *Enterobacter* spp.
  - Resistant to a carbapenem antimicrobial
    - MIC  $\geq 4$   $\mu\text{g/mL}$  for doripenem, imipenem and meropenem;  $\geq 2$   $\mu\text{g/mL}$  for ertapenem
  - Production of a carbapenemase (i.e., KPC, NDM, VIM, IMP, OXA) demonstrated by recognized test\*
- Adoption of revised carbapenem breakpoints
- Methods to detect carbapenem resistance & mechanism
- Ability to perform surveillance cultures of rectal swabs



\*e.g., PCR, metallo- $\beta$ -lactamase test, modified-Hodge test, Carba-NP

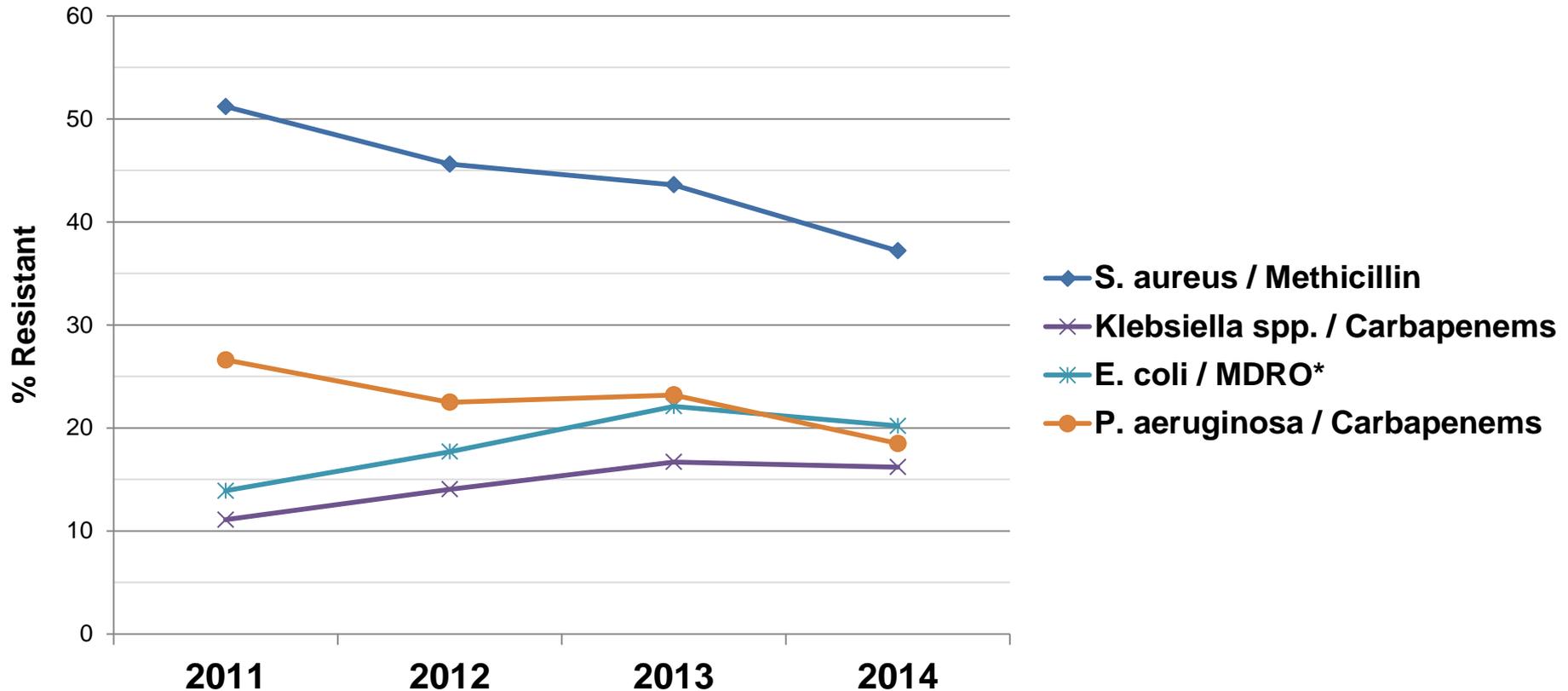
# California AR Laboratory Surveillance Network (Proposed – continued)

- *Pseudomonas aeruginosa* and *Acinetobacter baumannii*
  - Antimicrobial resistance profiles
  - Multi-drug resistant isolates
- **Selective reporting** practices
  - Secondary antimicrobial susceptibility results reported only when isolate is resistant to primary agents

# California HAI Resistance Analyses

- First analysis looked at **pathogen-level information from central line-associated bloodstream infection (CLABSI)** data, as submitted to NHSN
- Identify pathogens and characterize antimicrobial resistance patterns, including multi-drug resistance
- Assess changes over 2011–2014
- Compare with national analyses and trends
- Subgroup by region, urban vs. rural, hospital type
- Future analyses will be performed for pathogens associated with other infection types, e.g. surgical site

## Resistance Trends by Select CLABSI Pathogen, 2011-14



- MRSA decreased 9.4% ( $p < 0.01$ )
- *Klebsiella* species increased 13.3% ( $p = 0.11$ )
- *E. coli* increased 12.9% ( $p = 0.06$ )
- *P. aeruginosa* decreased 10.0% ( $p=0.21$ )

# Summary

- **Antimicrobial resistance (AR), including CDI, is an urgent public health problem in California**
- **Core actions to prevent AR** include improving antimicrobial use, preventing infections and transmission of AR pathogens within and between healthcare facilities, and tracking antimicrobial resistance patterns
- The CDPH HAI Program is building a comprehensive **AR Prevention Program** including activities to:
  - Promote and support California healthcare facilities to develop, implement and sustain effective ASPs
  - Establish and support regional AR prevention collaboratives
  - Facilitate and conduct surveillance of AR pathogens

# Questions?

For more information, please contact  
The HAI Program at  
[HAIProgram@cdph.ca.gov](mailto:HAIProgram@cdph.ca.gov)

Thank you

