Understanding Antimicrobial Stewardship (ASP) for Nursing Homes in California

James A. McKinnell, MD
Associate Professor of Medicine
David Geffen School of Medicine at UCLA

Antibiotic Resistant Expert
LA County Department of Public Health

LUCY

72 year old female has a mechanical fall in her SNF.

PMH: moderate dementia and aspiration pneumonia. She is a nursing home resident.

T:98.6 P:106/62 R: 22 S:92%

- Alert
- Frail
- Slight temporal wasting
- No Skin Changes

LUCY

No Dysuria

No Urgency

No Frequency

No Foley

Covering Doc: UA/UCX

"Doctor, I'm calling you to let you know that the Urine Culture for HR Is Positive."

"Read me the sensitivities."
"Start Levaquin 500 mg po daily x 10 days."

LUCY

Morning of Day 3 of Therapy:

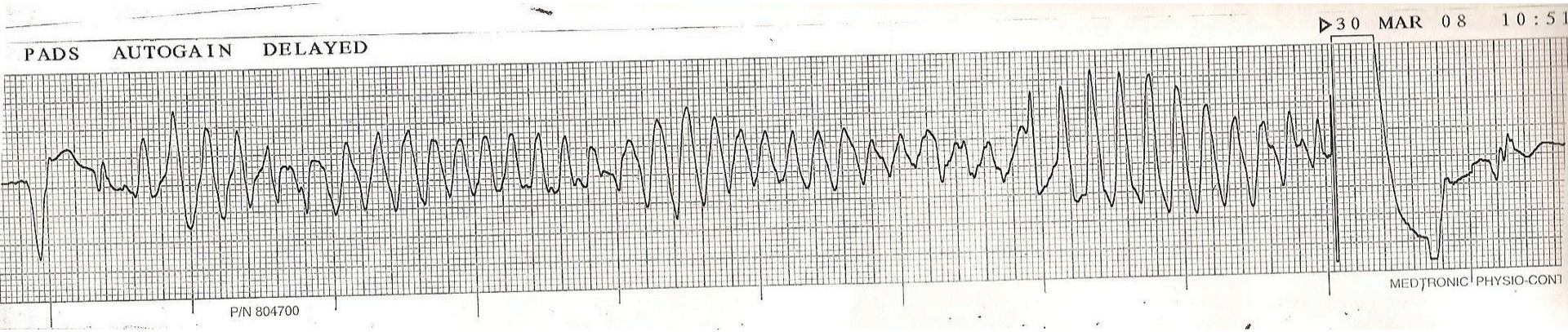
LVN finds Lucy

Cold and Pulseless

Time of Death: 6:05 AM

Why did Lucy Die?

Pop Quiz:


PADS AUTOGAIN DELAYED
30 MAR 08 10:51
P/N 804700
MEDTRONIC PHYSIO-CONT

FDA Black Box Warning

The FDA first added a Boxed Warning to fluoroquinolones in July 2008 for the increased risk of tendinitis and tendon rupture. In February 2011, the risk of worsening symptoms for those with myasthenia gravis was added to the Boxed Warning. In August 2013, the agency required updates to the labels to describe the potential for irreversible peripheral neuropathy (serious nerve damage).

In November 2015, an FDA Advisory Committee discussed the risks and benefits of fluoroquinolones for the treatment of acute bacterial sinusitis, acute bacterial exacerbation of chronic bronchitis and uncomplicated urinary tract infections based on new safety information. The new information focused on two or more side effects occurring at the same time and causing the potential for irreversible impairment. The advisory committee concluded that the serious risks associated with the use of fluoroquinolones for these types of uncomplicated infections generally outweighed the benefits for patients with other treatment options.

Today's action also follows a May 12, 2016, drug safety communication advising that fluoroquinolones should be reserved for these conditions only when there are no other options available due to potentially permanent, disabling side effects occurring together. The drug safety communication also announced the required labeling updates to reflect this new safety information.

FDA Black Box Warning For

- Sinusitis
- COPD Exacerbation
- Uncomplicated Urinary Tract Infections

Antimicrobial-Associated QT Interval Prolongation: Pointes of Interest

Robert C. Owens, Jr.,[1,2,4] and Thomas D. Nolin[1,3,4]

[1]Department of Clinical Pharmacy Services and Divisions of [2]Infectious Diseases and [3]Nephrology and Transplantation, Maine Medical Center, Portland, Maine; and [4]Department of Medicine, University of Vermont, College of Medicine, Burlington, Vermont

- TdP commonly occurs in older patients (72 +/- 15 years)

Underlying risk factors are common, but not universal:

- 24% with Concomitant QT prolonging medications
- 62% Underlying Heart Disease
- 17% Hypokalemia/Magnesemia
- 67% Female

Chest. 2005 Nov;128(5):3398-406.

A randomized trial comparing the cardiac rhythm safety of moxifloxacin vs levofloxacin in elderly patients hospitalized with community-acquired pneumonia.

Morganroth J[1], Dimarco JP, Anzueto A, Niederman MS, Choudhri S; CAPRIE Study Group.

- 394 Randomized, 387 Safety Patients >64

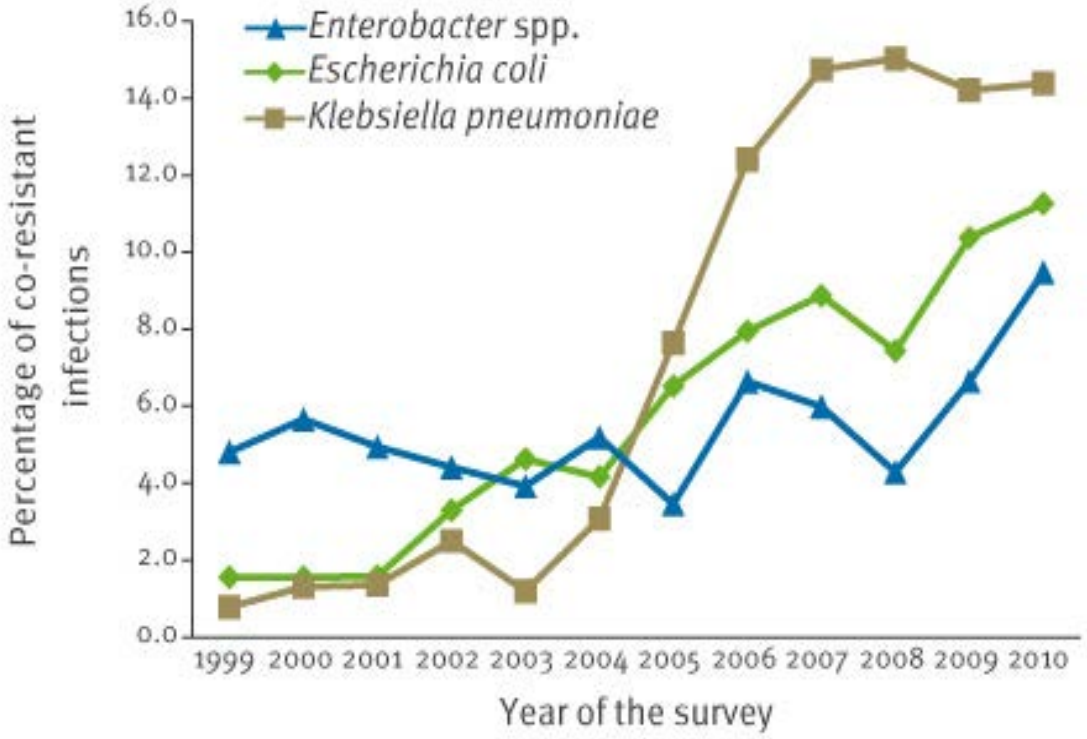
- Randomized to Moxifloxacin or Levofloxacin
- 120 with QT prolonging medications
- 26 Cardiac Events --- 6% Affected **[NNH 15]**
- **1 Case of Torsades --- 0.2% Affected [NNH 500?]**

- **Notably: No Renal Impairment, No Hypo K, No known QTc**

Fluroquinolone Resistance is Here

FIGURE 4

Annual rates of *Enterobacteriaceae* co-resistant to fluoroquinolones and third-generation cephalosporins, Spain, 1999–2010



2017 LA Regional Antibiogram

Gram-Negative Organism Antibiogram

		Penicillins			Cephalosporins				Carbapenems			Aminoglycosides			Quinolones		Other			
Data presented as: **Percent Susceptible** (# of Isolates Tested)	# of all isolates tested (# of hospitals reporting)	Ampicillin	Ampicillin/ Sulbactam	Piperacillin/ Tazobactam	Ceftriaxone	Ceftazidime	Cefepime	Cefazolin	Ertapenem	Imipenem	Meropenem	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Trimethoprim/ Sulfamethoxazole	Nitrofurantoin	Minocycline	Tigecycline
Acinetobacter baumannii	**2,723**	R	**43**	**27**	**10**	**27**	**40**	R	R	**27**	**39**	**36**	**37**	**40**	**27**	**26**	**48**	-	**79**	**79**
	75		2,084	1,776	1,320	1,894	1,139			1,120	1,436	1,925	2,661	2,084	2,030	1,985	2,287		154	424
Citrobacter freundii	**1,720**	R	R	**83**	**79**	**80**	**98**	R	**100**	**98**	**98**	**99**	**92**	**92**	**91**	**90**	**82**	**95**	-	**100**
	45			1,604	1,629	1,370	1,579		1,100	361	1,329	1,517	1,720	916	1,490	801	1,683	1,443		254
Citrobacter koseri	**561**	R	**90**	**99**	**96**	**97**	**99**	**93**	**100**	**99**	**100**	**99**	**99**	**97**	**99**	**98**	**96**	**86**	-	**100**
	19		85	549	527	383	483	498	248	161	364	450	561	427	372	450	550	542		61
Enterobacter sp.	**8,911**	R	R	**81**	**79**	**81**	**96**	R	**95**	**94**	**99**	**99.5**	**97**	**97**	**96**	**95**	**92**	**35**	-	**99**
	71			8508	7918	6816	8044		5333	2138	6770	7207	8818	5022	7331	4605	8510	5735		1650
Escherichia coli	**143,153**	**38**	**50**	**94**	**87**	**89**	**89**	**83**	**100**	**100**	**100**	**99**	**88**	**83**	**73**	**67**	**67**	**96**	-	**100**
	82	15,318	59,750	135,592	136,184	118,505	128,176	123,386	89,252	27,115	11,374	123,826	142,208	67,642	122,656	69,750	141,267	129,730		8,523
Klebsiella oxytoca	**3,248**	R	**66**	**93**	**93**	**96**	**97**	**53**	**100**	**100**	**100**	**100**	**96**	**94**	**95**	**95**	**91**	**85**	-	**100**
	49		1,693	2,844	2,842	2,448	2,772	2,604	1,890	717	2,408	2,679	2,948	1,692	2,588	1,358	2,780	2,046		479
Klebsiella pneumoniae	**30,629**	R	**71**	87	**85**	**86**	**87**	**81**	**96**	**90**	**97**	**95**	**90**	**84**	**86**	**84**	**83**	**35**	-	**93**
	80		13,763	24,936	25,145	20,712	23,744	21,631	15,606	6,529	19,382	24,501	25,802	15,356	21,942	13,646	24,970	20,500		1,948
Morganella morganii	**2,300**	R	**10**	**96**	**85**	**78**	**96**	R	**100**	**55***	**99**	**99**	**73**	**85**	**63**	**54**	**56**	R	-	R
	53		1,362	2,223	2,037	1,747	2,077		1,300	439	1,599	2,119	2,240	1,325	1,876	1,401	2,178			
Proteus mirabilis	**19,503**	**70**	**77**	**97**	**87**	**91**	**92**	**74**	**99**	**69***	**97**	**99**	**83**	**82**	**67**	**62**	**68**	R	-	R
	80	17,791	9,969	17,599	17,582	14,857	16,487	16,657	10,454	2,583	13,057	15,833	18,733	11,239	15,154	11,572	18,603			
Pseudomonas aeruginosa	**23,921**	R	R	**85**	R	**81**	**85**	R	R	**80**	**84**	**96**	**85**	**93**	**73**	**65**	R	R	-	R
	83			23,524		20,258	21,045			12,142	17,770	22,185	23,575	21,464	19,554	16,206				
Serratia marcescens	**2,668**	R	R	**94**	**90**	**92**	**95**	R	**99**	**96**	**97**	**96**	**97**	**79**	**87**	**86**	**98**	R	-	**99.6**
	58			1,876	2,376	2,047	2,401		1,462	555	1,987	2,417	2,663	1,707	2,330	1,581	2,256			550
Stenotrophomonas maltophilia	**1,970**	R	R	R	R	**46**	-	R	R	R	R	R	R	R	-	**81**	**92**	-	**98**	R
	51					1,082										1,511	1,996		42	

What was Lucy’s original Diagnosis?

Asymptomatic Bacteriuria

Bacteria in Urine, but no Symptoms

No Fever, Not Altered, Not Very Sick

Table 2. Prevalence of asymptomatic bacteriuria in selected populations.

Population	Prevalence, %	Reference
Healthy, premenopausal women	1.0–5.0	[31]
Pregnant women	1.9–9.5	[31]
Postmenopausal women aged 50–70 years	2.8–8.6	[31]
Diabetic patients		
Women	9.0–27	[32]
Men	0.7–11	[32]
Elderly persons in the community[a]		
Women	10.8–16	[31]
Men	3.6–19	[31]
Elderly persons in a long-term care facility		
Women	25–50	[27]
Men	15–40	[27]
Patients with spinal cord injuries		
Intermittent catheter use	23–89	[33]
Sphincterotomy and condom catheter in place	57	[34]
Patients undergoing hemodialysis	28	[28]
Patients with indwelling catheter use		
Short-term	9–23	[35]
Long-term	100	[22]

[a] Age, ≥70 years.

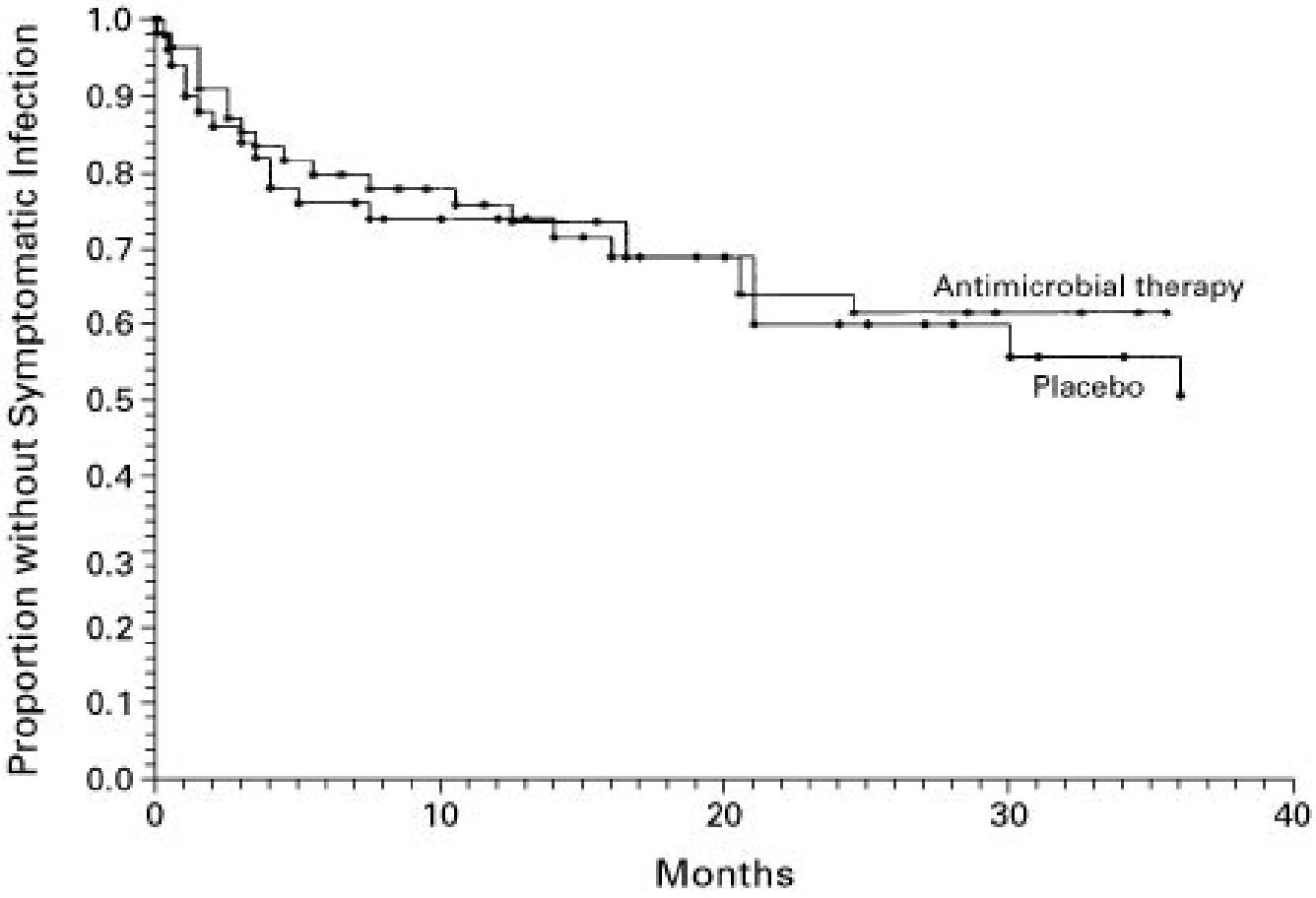
25-50% of Elderly Women in a SNF Have Asymptomatic Bacteriuria

2005 IDSA Guidelines for Asymptomatic Bacteriuria

Prospective Randomized Studies Treatment vs. No Treatment ASB

Authors	Subjects	Intervention	Outcome
Nicolle LE, et al. NEJM 1983;309:1420-5	Men, NH, median age 80	Treated 16 Not treated 20 Duration 2 years	No difference mortality or infectious morbidity 2 groups
Nicolle LE, et al. Am J Med 1987;83:27-33	Women, NH, median age 83	Treated 26 Not treated 24 Duration 1 year	No difference mortality/GU morbidity. **Increase drug reactions and AB resistance treated group.**
Abrutyn E, et al. Ann Intern Med 1994;120:827-33	Women, ambulatory and NH Mean age 82	Treated 192 Not treated 166 Duration 8 years	No survival benefit from treatment
Ouslander JG Ann Intern Med 1995;122:749-54	Women and men NH Mean age 85	Treated 33 Not treated 38 Duration 4 weeks	No difference chronic urinary incontinence

Proportion of Women with Diabetes Who Remained Free of Symptomatic Urinary Tract Infection, According to Whether They Received Antimicrobial Therapy or Placebo at Enrollment.



Harding GK et al. N Engl J Med 2002;347:1576-1583.

One of the most dangerous results in modern medicine is a positive urine culture.

A positive culture is not the same as an infection
The diagnosis of a UTI requires DIS-EASE - Symptoms
Loeb Criteria to the rescue!

CRITICAL RESOURCES:

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/SNF_ASP_Toolkit.aspx

https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship-checklist.pdf

https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/GuidanceforLawsAndRegulations/Nursing-Homes.html

LA County DPH SNF Interviews

- Random selection of 50 nursing facilities licensed in L.A. County
- Randomization stratified by >99 beds and ≥100 beds
- Questions based off CDC checklist for antimicrobial stewardship in California (mirrors state toolkit)
- Telephone-based survey process

Element 1. Leadership Commitment

SNF leadership commitment support helps ensure adequate funding and staffing of the ASP, and facilitates buy-in among clinicians.

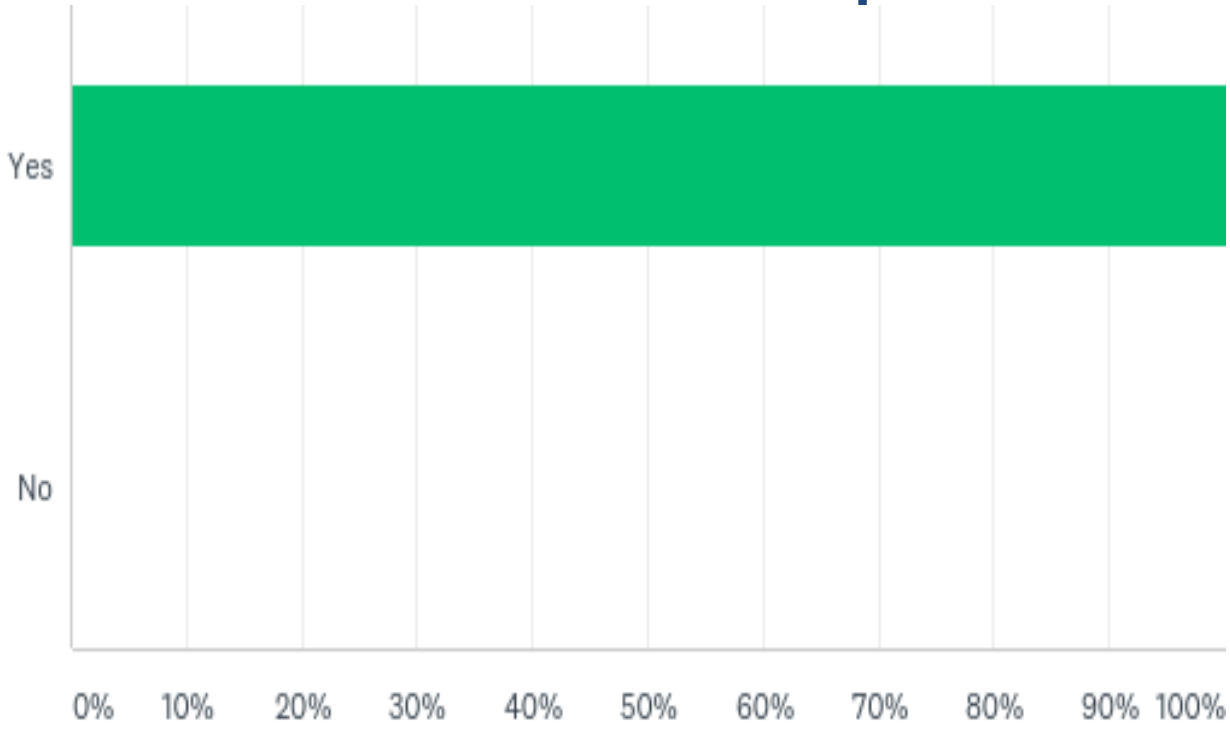
- Create a written statement in support of ASP
- Establish antibiotic stewardship as a Performance Improvement Program under QAPI
- Routinely review ASP activities during the facility quality-improvement committee meetings

Element 2. Accountability

An SNF leader should be accountable for ASP outcomes and their effectiveness assessed through clear performance standards. ASP leaders serve as liaisons and champions to promote stewardship education and practices across disciplines.

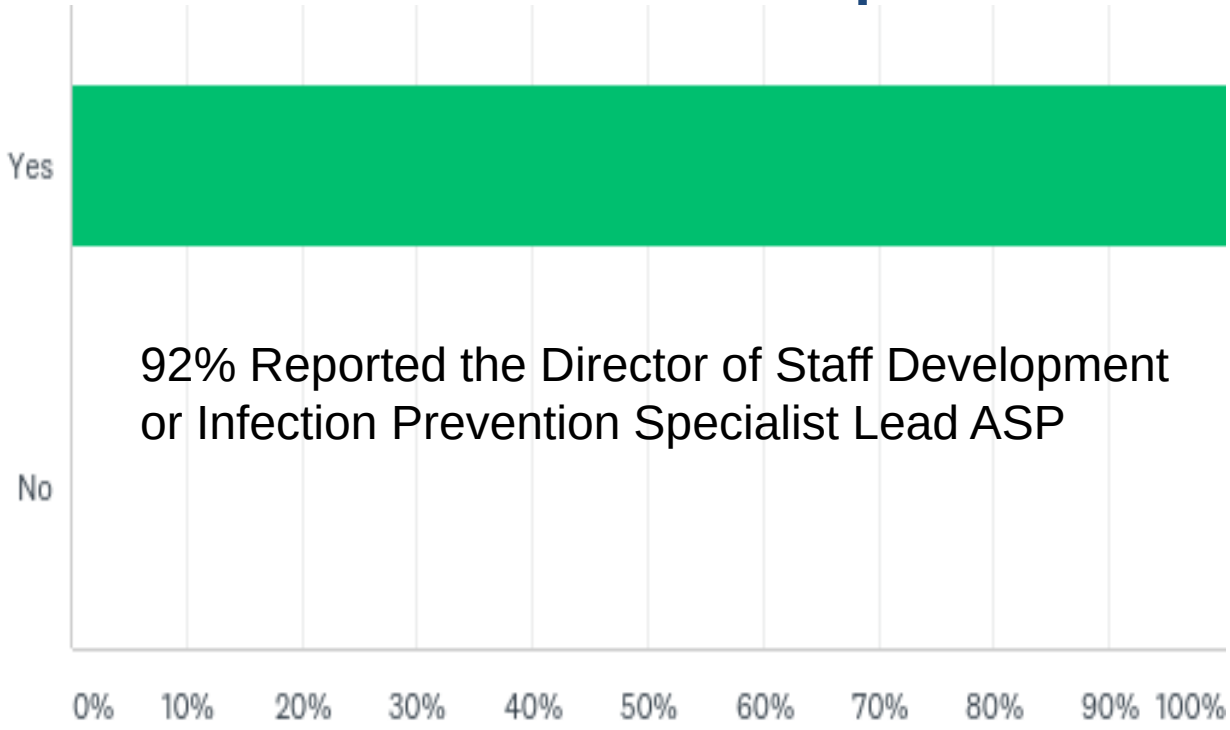
- Convene a **physician-supervised** multidisciplinary antibiotic stewardship committee, subcommittee, or workgroup

Has your facility identified a lead(s) for antibiotic stewardship activities?



ANSWER CHOICES	RESPONSES	
Yes	100.00%	35
No	0.00%	0
TOTAL		35

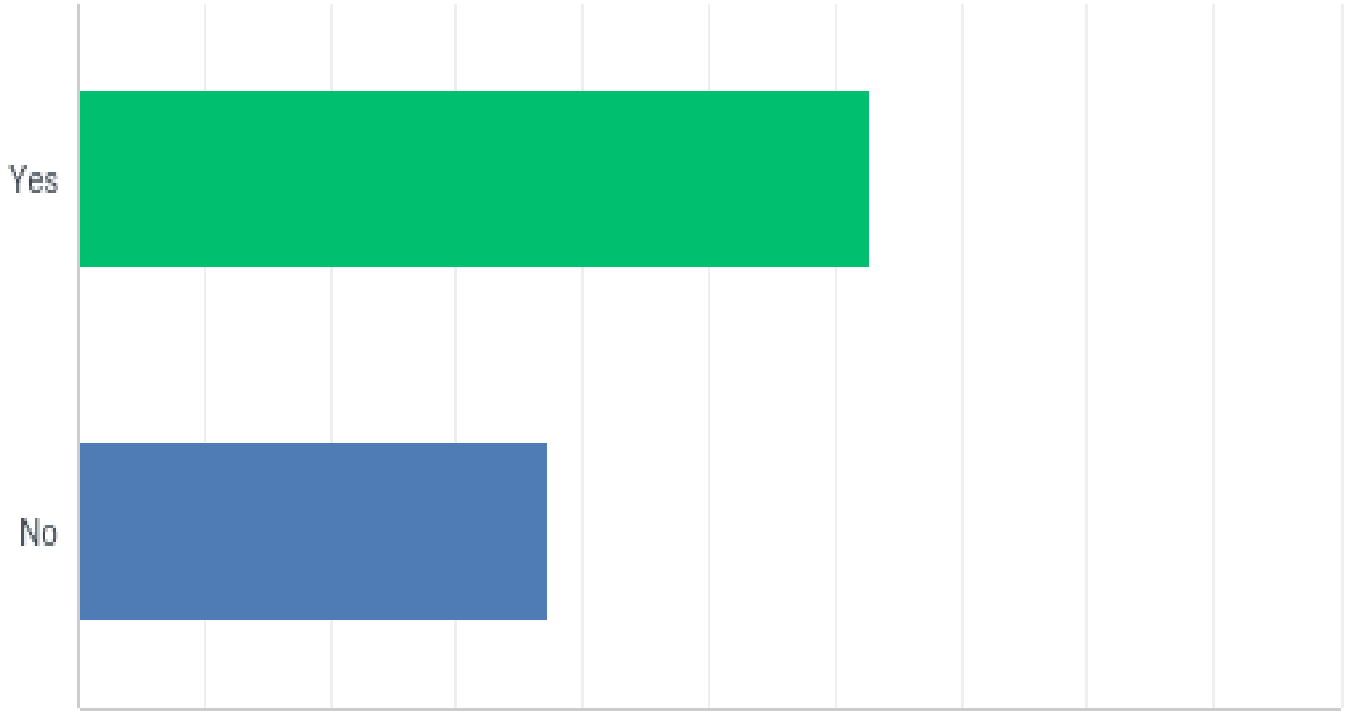
Has your facility identified a lead(s) for antibiotic stewardship activities?



92% Reported the Director of Staff Development or Infection Prevention Specialist Lead ASP

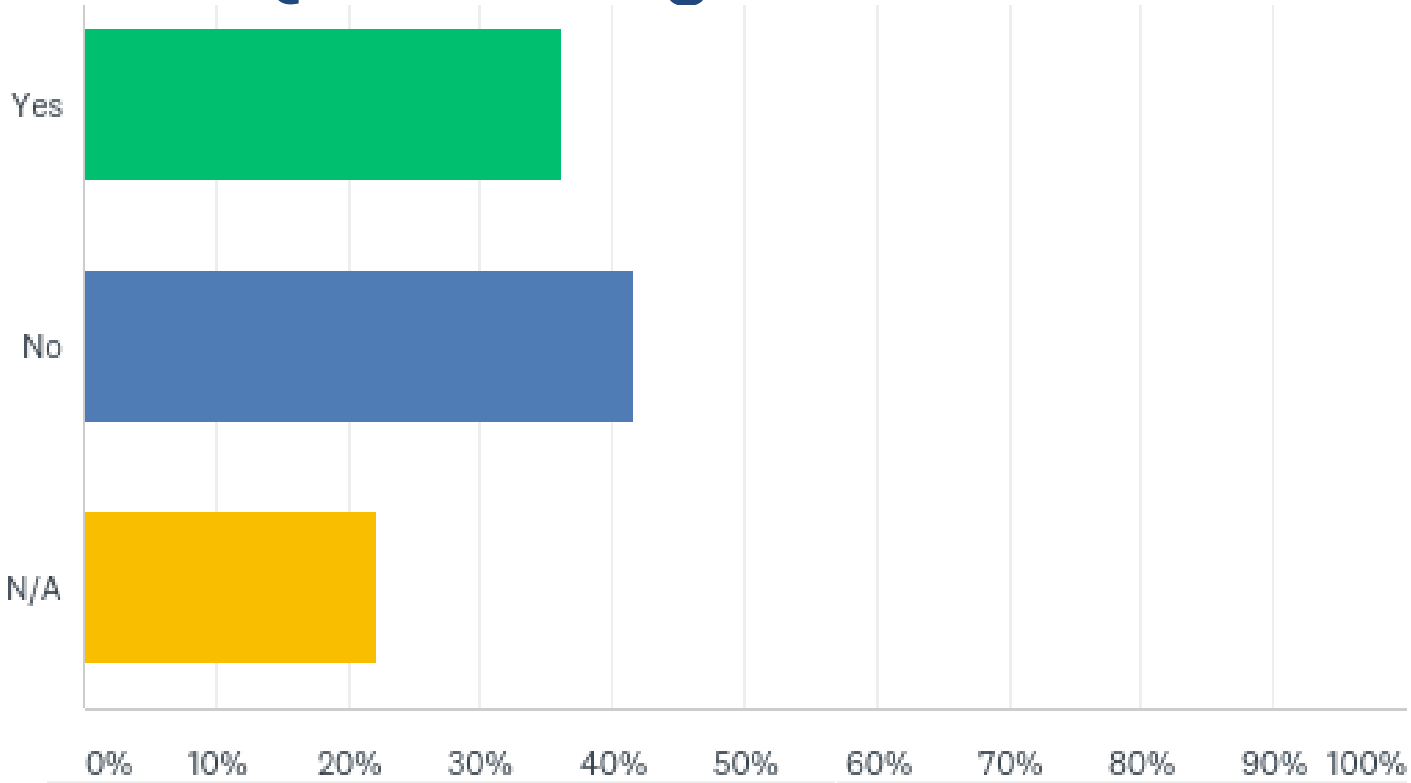
ANSWER CHOICES	RESPONSES	
Yes	100.00%	35
No	0.00%	0
TOTAL		35

Do you have a physician lead for ASP?



ANSWER CHOICES	RESPONSES	
Yes	62.86%	22
No	37.14%	13
TOTAL		35

Does the physician lead spend time outside QA meetings on ASP?



ANSWER CHOICES	RESPONSES	
Yes	36.11%	13
No	41.67%	15
N/A	22.22%	8
TOTAL		36

Element 3. Drug Expertise

SNF should establish access to individuals with antibiotic expertise to implement antibiotic stewardship activities. Suggestions:

- Obtain ASP support from a physician or pharmacist who has attended specific training on antibiotic stewardship. The trained physician or pharmacist may be consultant pharmacy staff trained or experienced in antibiotic stewardship, an external infectious disease stewardship consultant, or part of the stewardship team at a referral hospital.

- CDC, SHEA, IDSA, IDAC, etc.

THE
AMERICAN BOARD OF INTERNAL MEDICINE
INCORPORATED 1936

ATTESTS THAT

James Alexander McKinnell

HAS MET THE REQUIREMENTS OF THIS BOARD AND IS HEREBY
CERTIFIED FOR THE PERIOD 2009 THROUGH 2019
AS A DIPLOMATE IN
INFECTIOUS DISEASE

THE AMERICAN BOARD OF INTERNAL MEDICINE

CHAIR
AMERICAN BOARD OF INTERNAL MEDICINE

CHAIR-ELECT
AMERICAN BOARD OF INTERNAL MEDICINE

Griffin P. Rodgers
SECRETARY-TREASURER
AMERICAN BOARD OF INTERNAL MEDICINE

PRESIDENT
AMERICAN BOARD OF INTERNAL MEDICINE

SUBSPECIALTY BOARD ON INFECTIOUS DISEASE

CHAIR

NUMBER 280050

2009

CDC

SHEA
The Society for Healthcare Epidemiology of America

amda
The Society for Post-Acute and Long-Term Care Medicine

SHEA Antimicrobial Stewardship Training Course

Certificate of attendance awarded to

James A. McKinnell, MD

as part of the
SHEA Spring 2016 Conference held from
May 18 – 21, 2016, in Atlanta, GA.

Signed: Eve Humphreys

Date: May 21, 2016

Eve Humphreys, MBA, CAE
Executive Director, SHEA

IDAC
INFECTIOUS DISEASE ASSOCIATION of CALIFORNIA

Physician Certificate of Credit

This is to certify that

James McKinnell, M.D.

was a registered participant in attendance at

Practical Antimicrobial Stewardship 2016

September 23, 2016 — Great Wolf Lodge, Garden Grove, CA

Presented by the

Infectious Disease Association of California

CALIFORNIA MEDICAL ASSOCIATION ACCREDITED CONTINUING MEDICAL EDUCATION

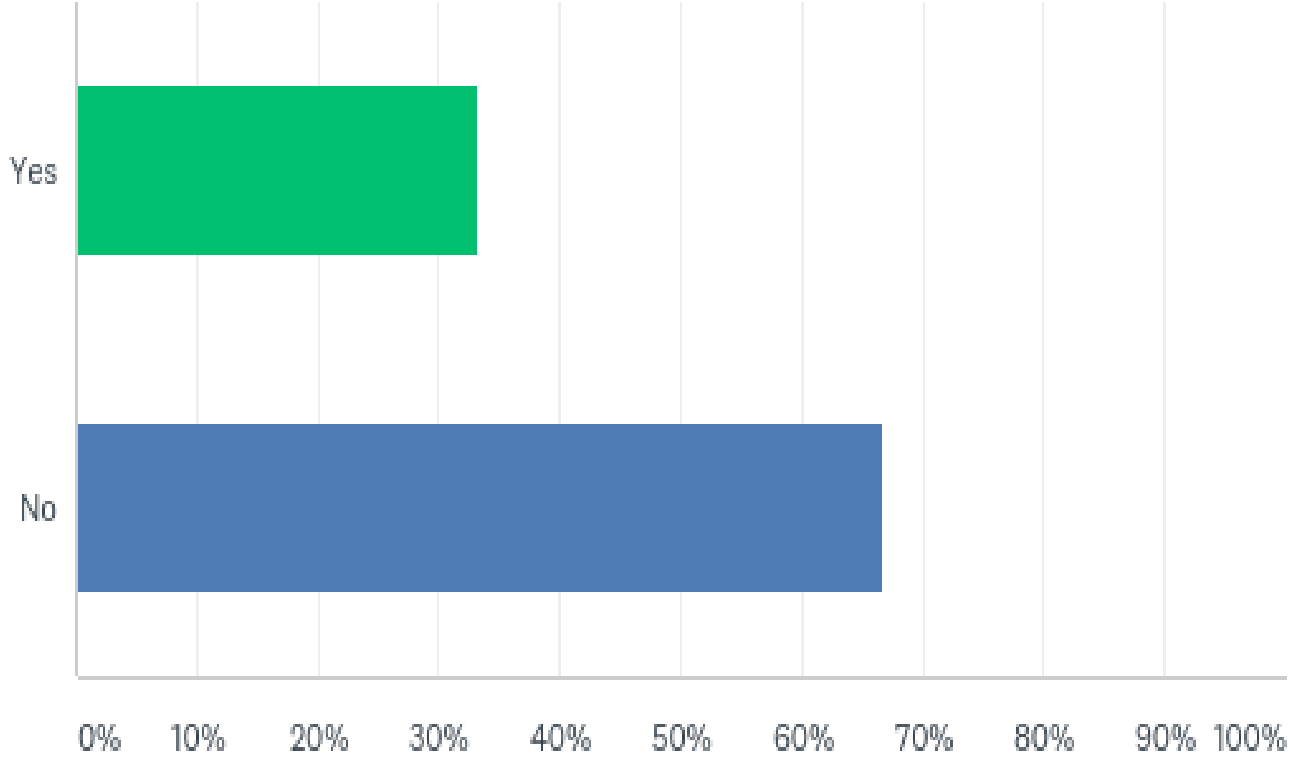
The Infectious Disease Association of California (IDAC) is accredited by the Institute for Medical Quality/California Medical Association (IMQ/CMA) to provide continuing medical education for physicians. IDAC takes responsibility for the content, quality, and scientific integrity of this CME activity.

IDAC designates this educational activity for a maximum of 7.00 *AMA PRA Category 1 Credits™*. IDAC certifies that the aboved named attendee participated in this educational activity for 6.0 hours. Attendees should only claim credit commensurate with the extent of their participation in the activity. This credit may also be applied to the CMA Certification in Continuing Medical Education.

Gregory Strayer, M.D.
IDAC CME Chairman

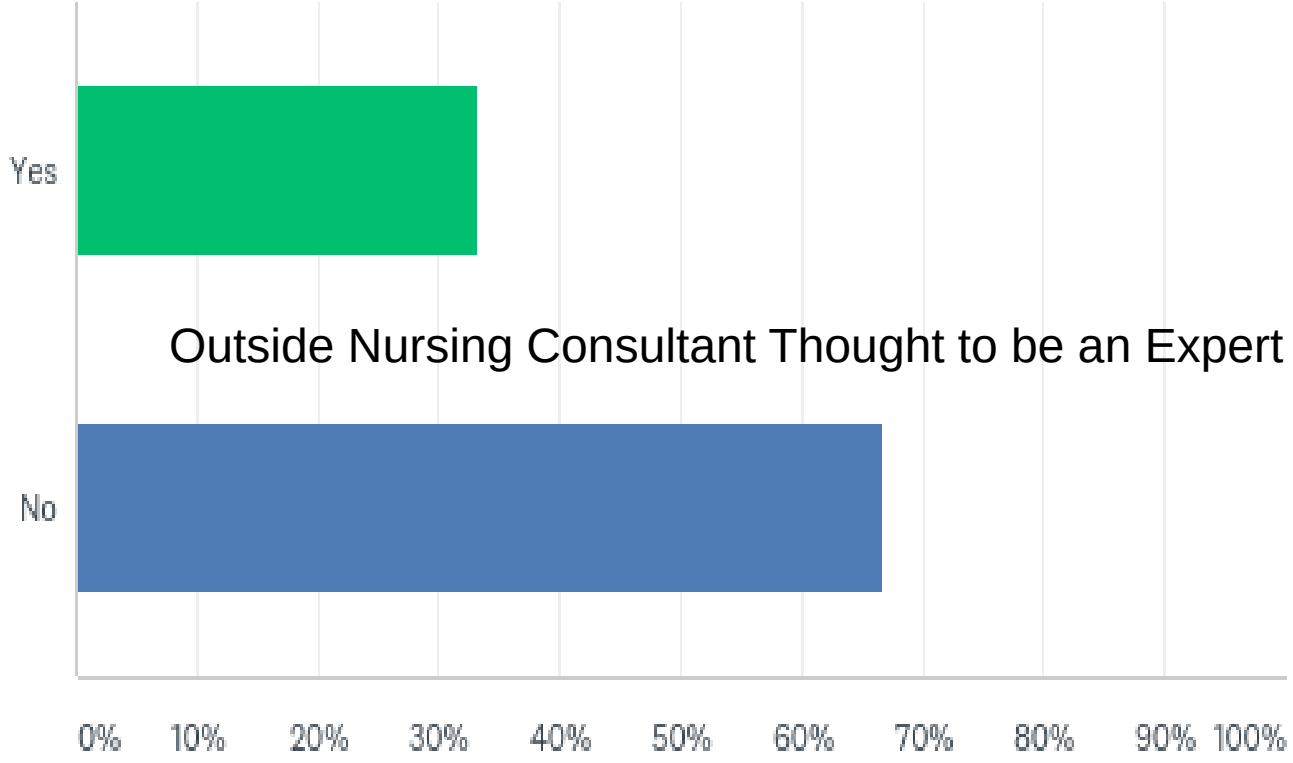
Francesca Torriani, M.D.
IDAC President

Access to individual(s) with antibiotic stewardship expertise?



ANSWER CHOICES	RESPONSES	
Yes	33.33%	12
No	66.67%	24
TOTAL		36

Access to individual(s) with antibiotic stewardship expertise?



ANSWER CHOICES	RESPONSES	
Yes	33.33%	12
No	66.67%	24
TOTAL		36

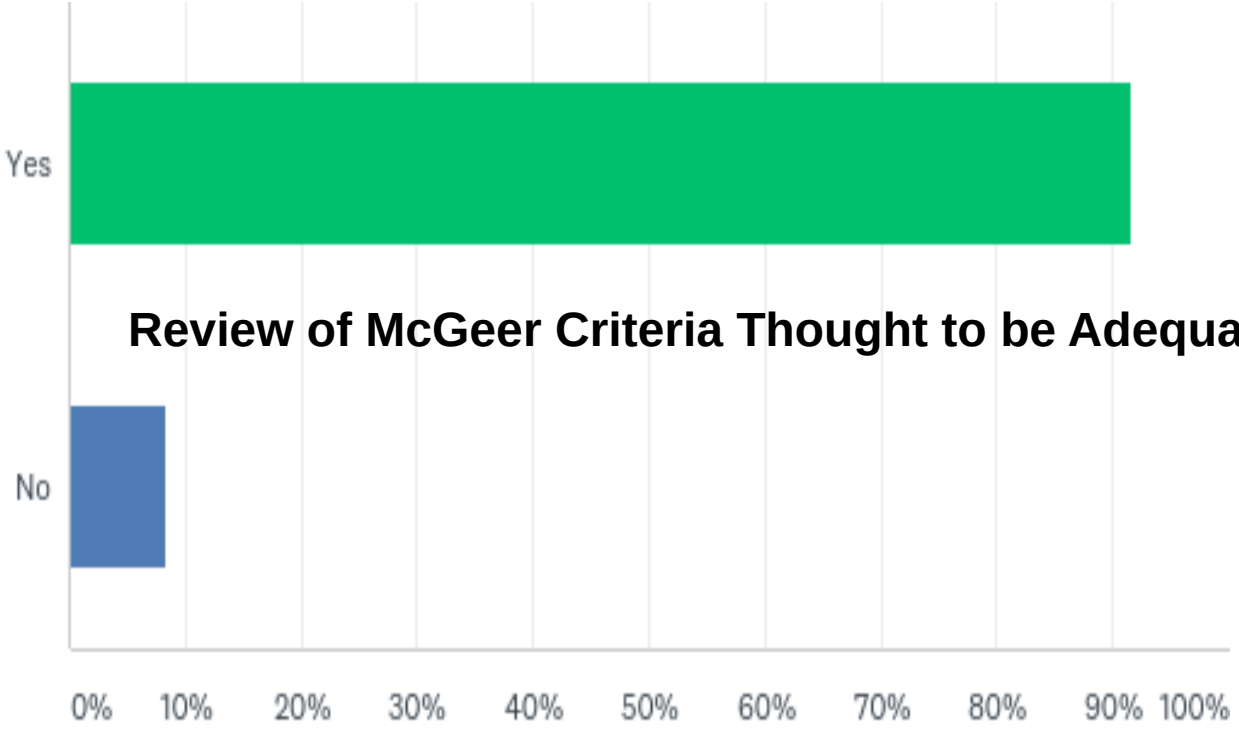
Element 4. Action

SNF should implement at least one intervention to improve antibiotic use.

- New policies and procedures should be introduced in a step-wise fashion.

- Prioritize interventions based on the prescribing and resistance patterns or most prevalent antibiotic adverse events (e.g., Clostridium difficile infections) at the facility.

Implemented practices to improve antibiotic use?



Review of McGeer Criteria Thought to be Adequate for ASP

ANSWER CHOICES	RESPONSES	
Yes	91.67%	33
No	8.33%	3
TOTAL		36

McGeer Criteria are the Wrong Criteria for Antimicrobial Stewardship

- 78-year-old resident with temperature of 99.6 degrees, heart rate of 132, blood pressure of 90/40, white blood cell count of 13,500 and no localizing signs of infection

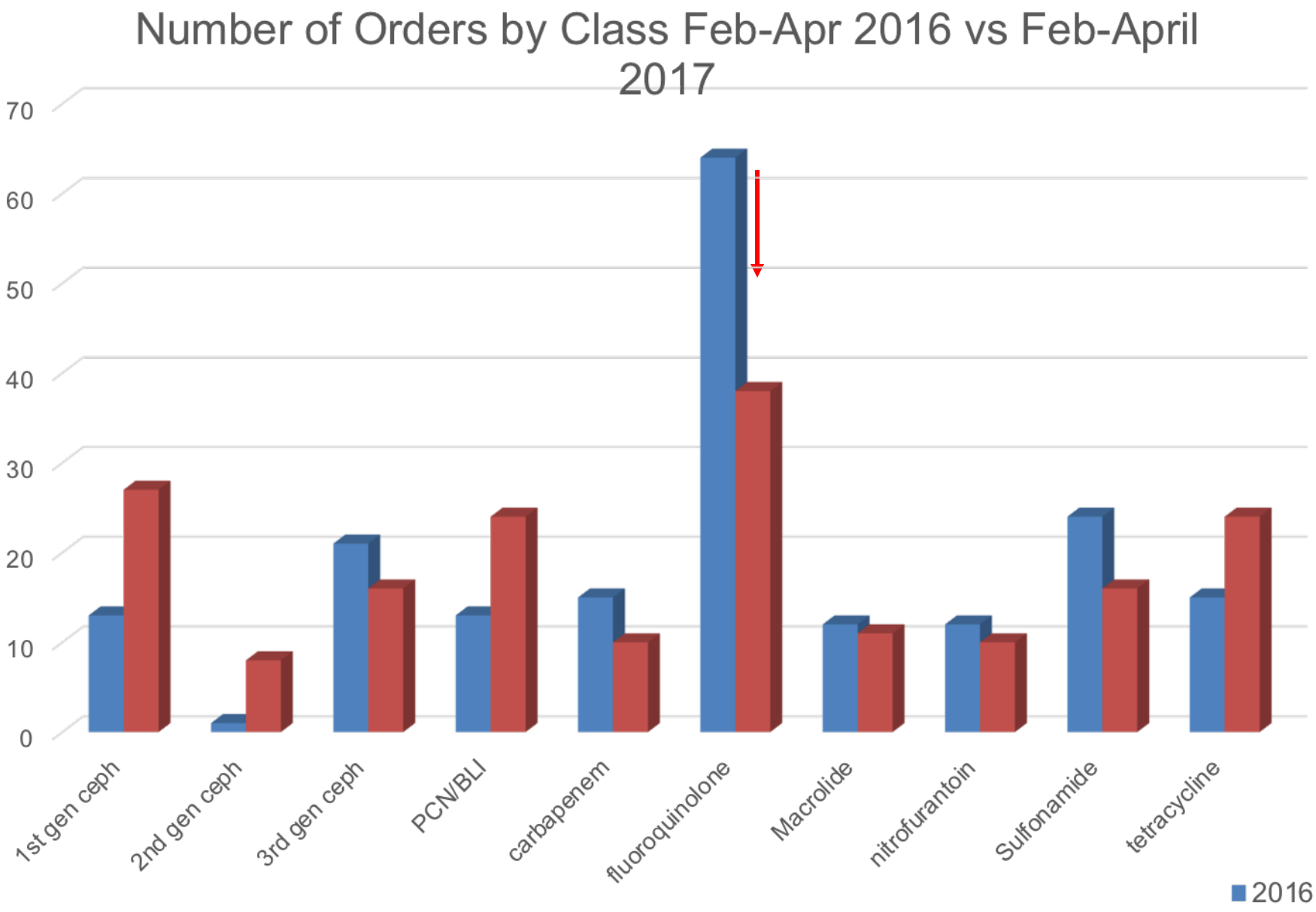
- 78-year-old resident complaining of dysuria, urgency, frequency, CVA tenderness, suprapubic pain, no evidence of fever, heart rate of 88, blood pressure of 120/80

CMS Requirement #2

- Protocols to review clinical signs and symptoms and laboratory reports to determine if the antibiotic is indicated or if adjustments to therapy should be made and identify what infection assessment tools or management algorithms are used for one or more infections (e.g., SBAR tool for urinary tract infection (UTI) assessment, **Loeb minimum criteria** for initiation of antibiotics);

Element 5. Tracking

SNF should monitor both antibiotic use practices and outcomes related to antibiotics to guide practice changes and track the impact of new interventions.


Number of Orders by Class Feb-Apr 2016 vs Feb-April 2017
70
60
50
40
30
20
10
0
1st gen ceph
2nd gen ceph
3rd gen ceph
PCN/BLI
carbapenem
fluoroquinolone
Macrolide
nitrofurantoin
Sulfonamide
tetracycline
2016

Element 6. Reporting

Regular reporting of information on antibiotic use, including adherence to antibiotic prescribing policies, to physicians, nurses, and relevant staff engages and motivates them to meet ASP goals.

- Regularly provide written summaries of antibiotic stewardship goals, antibiotic use, and outcome measurements to prescribers and nursing staff
- Conduct real-time audits/reviews of individual prescriber practices and provide personalized feedback to clinical providers

Prescribing Patterns of the Highest Antibiotic Prescribers

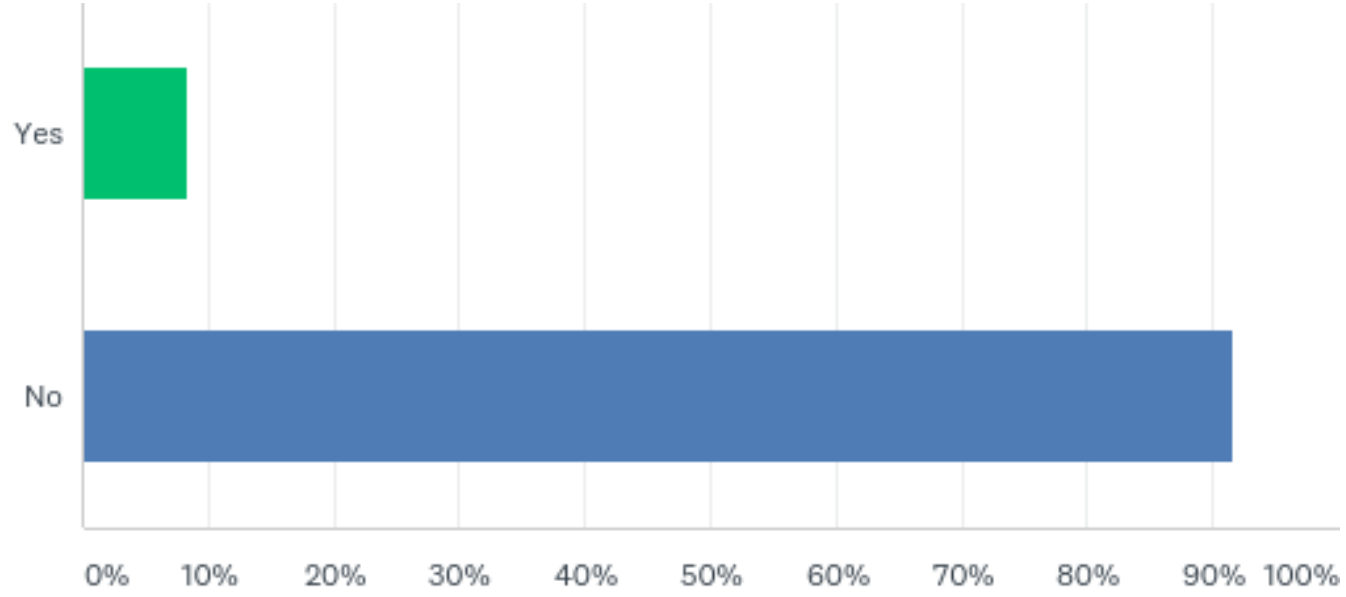
Prescriber	Antibiotic Orders (n)	Ave DOT	FQ Orders	non-FQ Orders	FQ ave DOT
Doctor	48	7.6	12.5%	87.5%	6.7
Doctor	21	7	33.3%	66.7%	6.6
Doctor	21	6.3	9.5%	90.5%	8.5
Doctor	20	6.2	40.0%	60.0%	7.3
Doctor	20	6.3	35.0%	65.0%	4.6
Doctor	15	8.4	20.0%	80.0%	10.3

Element 7. Education

SNF ASP should educate both **clinical providers** and **nursing staff** on the rationale and goals of antibiotic stewardship interventions, and the responsibility of each group for ensuring implementation. SNF should also **engage residents and their family members** in antibiotic use and stewardship education to ensure their support when clinicians make appropriate antibiotic use decisions.

- Regularly provide education and updates about antibiotic resistance and opportunities for improving use to clinical providers, nursing staff, residents, and families.

Did you have any antibiotic stewardship deficiencies?



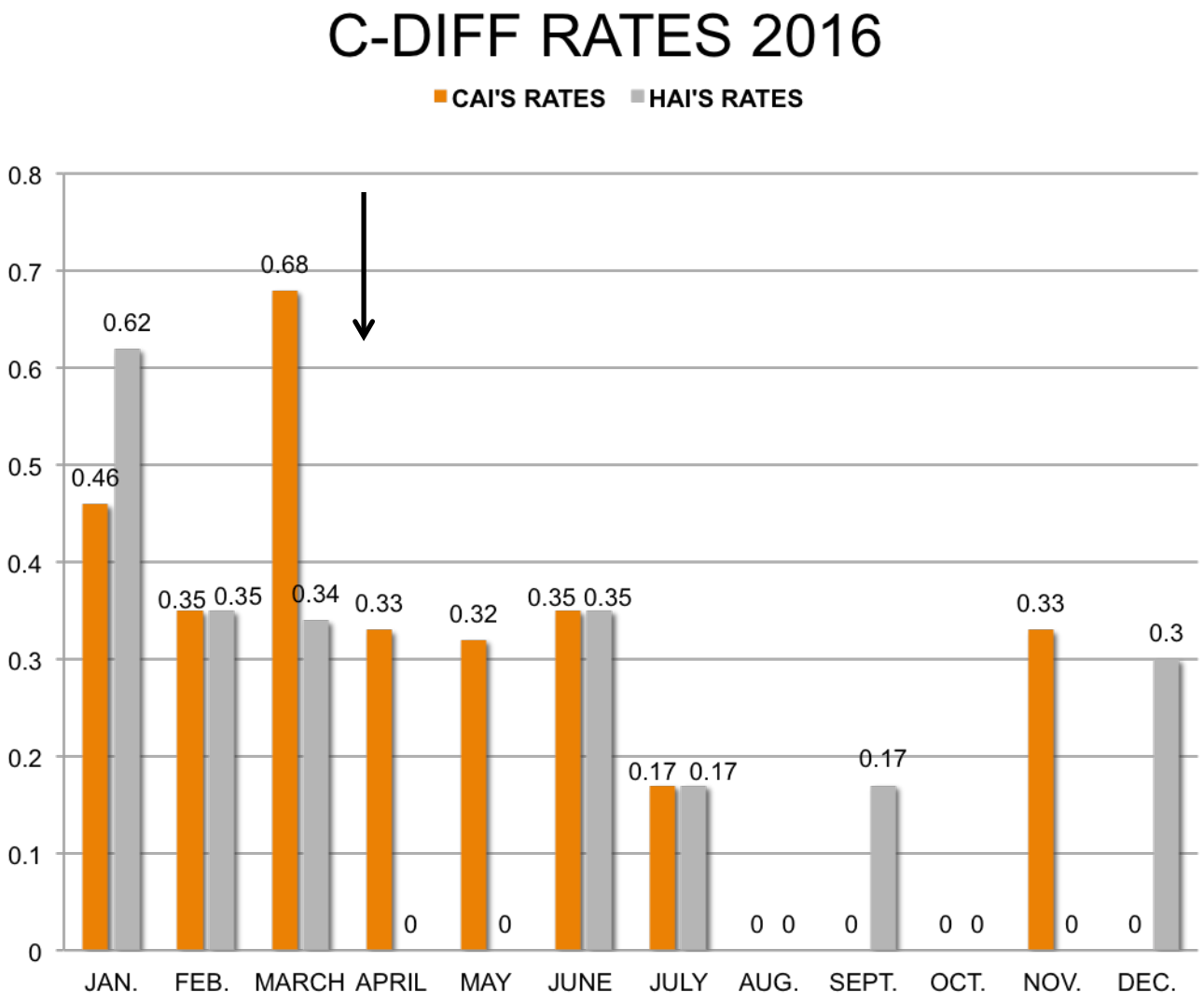
ANSWER CHOICES	RESPONSES	
Yes	8.33%	3
No	91.67%	33
TOTAL		36

ASP Confusion

- Nursing homes are confusing infection prevention with antimicrobial stewardship
  - Structure of program is wrong
  - Insufficient expertise
  - Incorrect application of clinical criteria

- Some facilities may meet the regulations with paper compliance, but still fail to have a robust program
  - Few deficiencies have been issued to date

Stewardship Can Be Done in SNFs!


C-DIFF RATES 2016
CAI'S RATES
HAI'S RATES
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.46
0.62
0.35
0.35
0.68
0.34
0.33
0
0.32
0
0.35
0.35
0.17
0.17
0
0
0
0.17
0
0
0.33
0
0
0.3
JAN.
FEB.
MARCH
APRIL
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

I’m happy to take questions during the break.