

# MP15-15 Targeted Antimicrobial Prophylaxis Does Not Always Prevent Sepsis after Transrectal Prostate Biopsy

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## Introduction

### Sepsis after Transrectal Prostate Biopsy (TRPB),

- Incidence = 0.5% to 6% and rising
- Commonly due to Fluoroquinolone-resistant *E. coli*

### Three Types of Antibiotic Prophylaxis Utilized at Kaiser Permanente Southern California to Prevent Post-biopsy Sepsis:

- Targeted Prophylaxis (TP), guided by the bacterial sensitivity of *E. coli* grown from Rectal Cultures
- Single Agent Empiric Prophylaxis (SAEP), using only one broad spectrum antibiotic empirically
- Augmented Empiric Prophylaxis (AEP), using more than one broad spectrum antibiotic empirically

### Why prophylaxis is needed:

#### During Transrectal Prostate

**Biopsy: Needle Inoculates  
Prostate with Rectal  
Bacteria**



## Methods

- Reviewed Three Years of Prostate Biopsies performed at 13 Southern California Kaiser Permanente Urology Departments (May 1, 2013 to April 30, 2016)
- Urologists chose TP or SAEP or AEP based on their usual practice
- TP: Ciprofloxacin PO 1 h prior to biopsy and 12 h later if rectal swab bacteria was sensitive to ciprofloxacin, OR alternative antibiotic used if rectal swab bacteria was resistant
- Study Outcome:
  - Incidence of post-prostate biopsy sepsis within 30 days of prostate biopsy
  - Sepsis was defined by Electronic Medical Record query of ICD9 and ICD10 codes

### Ciprofloxacin-Infused

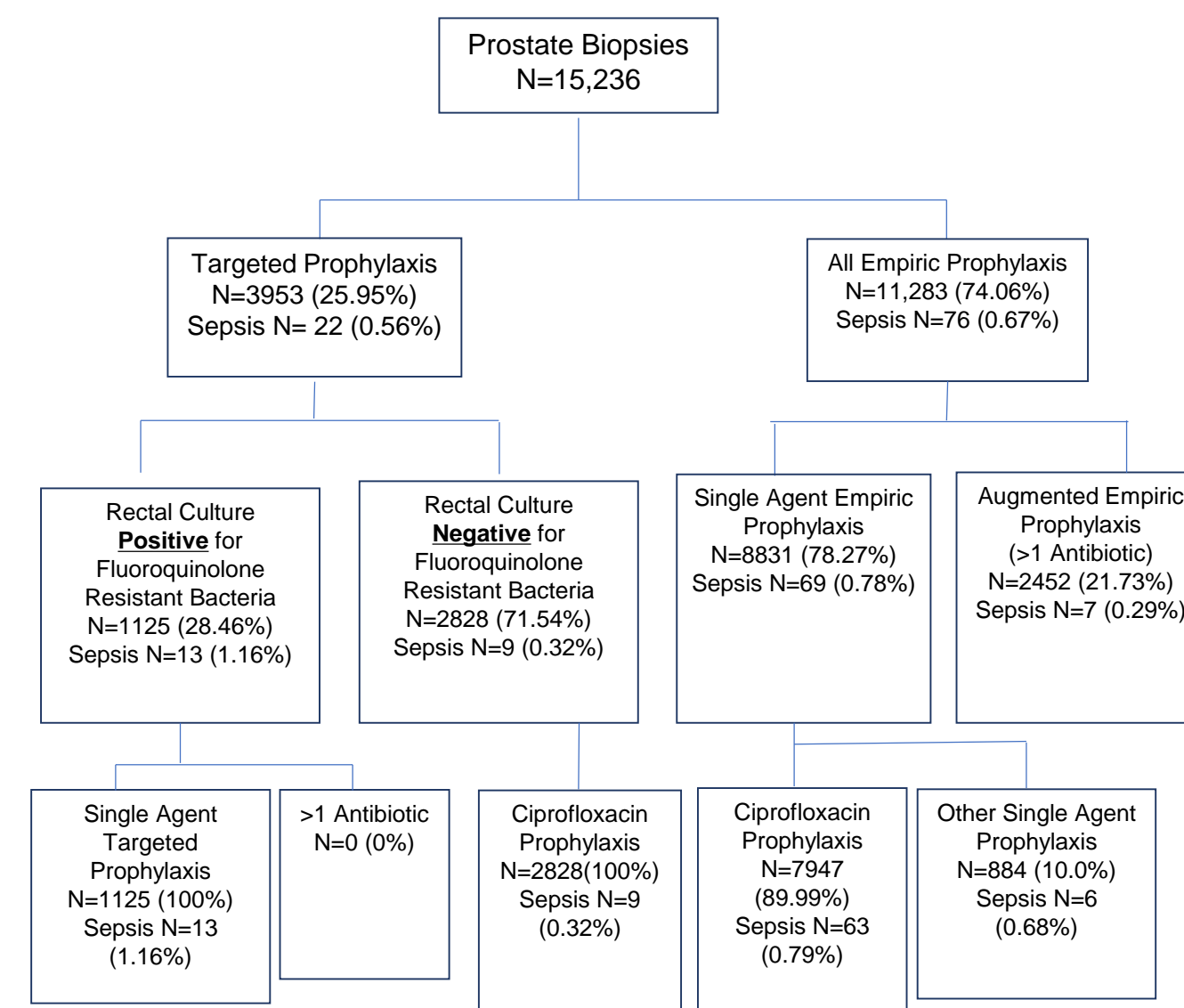
**MacConkey Agar was used to determine if rectal swab bacteria was resistant to Ciprofloxacin**



*Escherichia coli* growing on MacConkey agar.

## Results

**Figure 1** Incidence of Sepsis



**Table 1** Multivariable Analysis Predicting Sepsis Outcome (SAEP vs AEP vs TP)

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p Value
Age			
Younger than 50	---	Referent	
50 to 59	0.88 (0.34-2.28)	0.97 (0.37-2.50)	0.944
60 to 69	0.77 (0.31-1.94)	0.87 (0.34-2.22)	0.777
70 and older	0.64 (0.23-1.77)	0.75 (0.27-2.10)	0.587
Ethnicity			
Caucasian	---	Referent	
Black/African American	1.28 (0.64-2.51)	1.33 (0.67-2.63)	0.415
Asian/Pacific Islander	2.48 (1.30-4.73)	2.55 (1.34-4.88)	0.005
Hispanic/Latino	2.99 (1.82-4.91)	3.06 (1.86-5.06)	<0.001
Other/Declined	1.24 (0.48-3.21)	1.26 (0.49-3.29)	0.633
Prophylaxis			
SAEP	---	Referent	
AEP	0.36 (0.17-0.79)	0.35 (0.16-0.76)	0.008
TP	0.71 (0.44-1.15)	0.75 (0.46-1.24)	0.262
Diabetes			
No	---	Referent	
Yes	0.90 (0.47-1.74)	0.97 (0.50-1.87)	0.932

**Table 2** Bacteria Causing Sepsis in TP, SAEP and AEP Groups

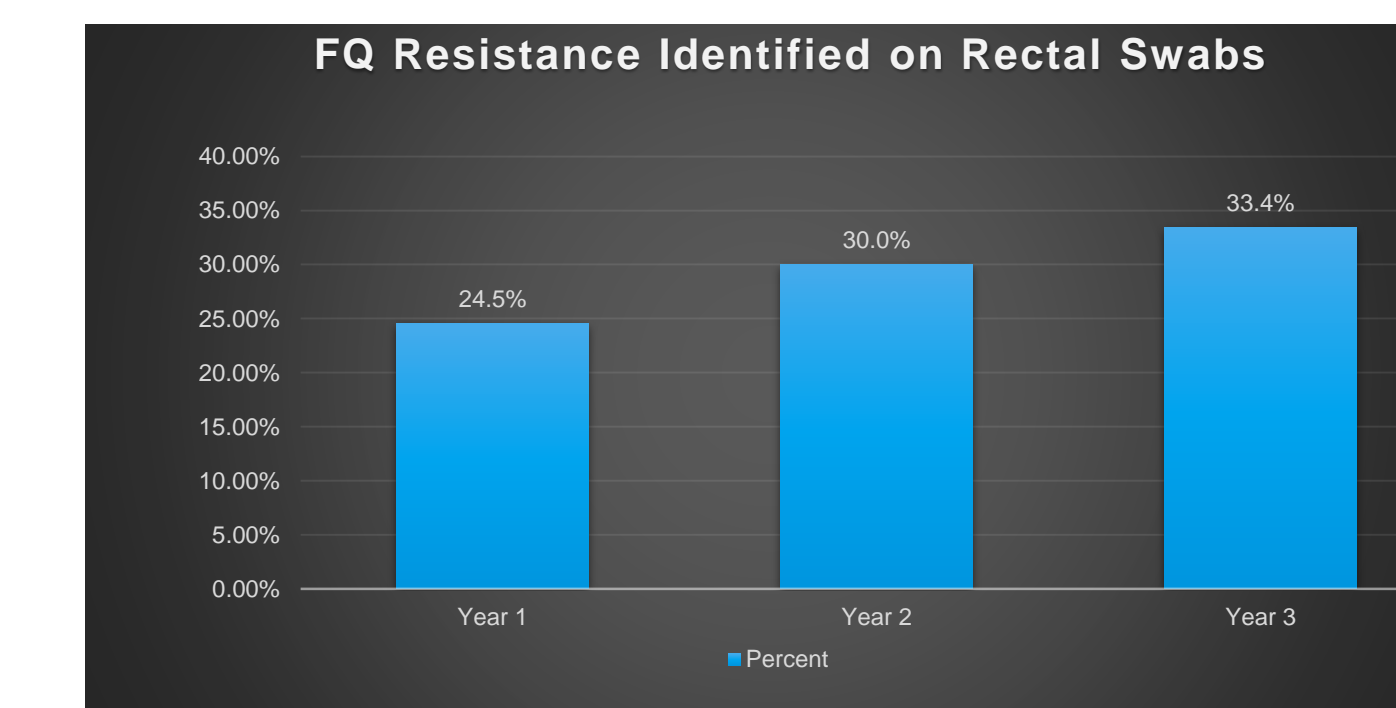
Bacteria that Caused Sepsis	TP	SAEP	SAEP	AEP	Total
	Ciprofloxacin or Other Monotherapy/ number of septic patients	Only Ciprofloxacin Monotherapy/ number of septic patients	Other Monotherapy/ number of septic patients	AEP/ number of septic patients	
FQ-resistant <i>E. coli</i>	27.3% (6/22)	60.3% (38/63)	0% (0/6)	85.7% (6/7)	51.0% (50/98)
FQ-sensitive <i>E. coli</i>	36.4% (8/22)	23.8% (15/63)	83.3% (5/6)	14.3% (1/7)	29.6% (29/98)
Non- <i>E. coli</i> bacteria	27.3% (6/22)*	4.8% (3/63)**	0% (0/6)	0% (0/7)	9.2% (9/98)
No bacteria identified	9.1% (2/22)	11.1% (7/63)	16.7% (1/6)	0% (0/7)	10.2% (10/98)

\* 5 of the 6 were sensitive to ciprofloxacin  
\*\*all 3 were sensitive to ciprofloxacin

**Table 3** Antibiotic Sensitivity of Bacteria Causing Sepsis in Relation to the Antimicrobial That Was Given for Prophylaxis

	TP	EP	p value
	Sensitive to prophylaxis	16 (72.7%)	
Resistant to prophylaxis	4 (18.1%)	49 (72.1%)	

**Figure 2** Incidence of Ciprofloxacin-resistant *E. coli* on rectal cultures increased annually from 24.5% to 33.4%.



## Summary

TP: 3953 procedures SAEP and AEP: 11283 procedures

### Incidence of post-prostate biopsy sepsis (Figure 1):

- TP 0.56%, (22/3953)
- SAEP 0.67% (69/8831)
- AEP 0.29% (7/2452)

### Bacteria Causing Post-Biopsy Sepsis (Table 2):

For the TP group, *E. coli* was the cause in: 64% (14/22)

- 36% (8/22) were ciprofloxacin-sensitive *E. coli*
- 27% (6/22) were ciprofloxacin-resistant *E. coli*
- 27% (6/22) were bacteria other than *E. coli*
- 9% (2/22) were not identified due to negative blood and urine cultures

For the SAEP and AEP group, *E. coli* was the cause in: 85.5% (65/76)

- 28% (21/76) were ciprofloxacin-sensitive *E. coli*
- 58% (44/76) were ciprofloxacin-resistant *E. coli*
- 5% (3/76) were bacteria other than *E. coli*
- 11% (8/76) were not identified due to negative blood and urine cultures

### Antibiotic Sensitivity of Organisms Causing Sepsis in Relation to the Antimicrobial That Was Given for Prophylaxis (Table 3):

- TP group: 73% (16/22) developed sepsis even when given the "correct" antibiotic
- EP group: 28% (19/69) developed sepsis even when given the "correct" antibiotic

## Conclusions

- The post-transrectal prostate biopsy sepsis rates attained at Kaiser Permanente Southern California are among the lowest in the literature
- AEP was shown to be superior to SAEP or TP (p=0.008)
- On multivariable analysis, being Asian/Pacific Islander or Hispanic/Latino ethnicity was associated with a higher incidence of harboring FQ-R bacteria on rectal swab cultures
- Incidence of Fluoroquinolone-resistant *E. coli* on rectal swabs increased annually from 24.5% to 33.4%.
- 73% of TP and 28% of EP patients who developed sepsis received a prophylactic antibiotic to which the sepsis-causing bacteria was sensitive.
- The failure of Targeted Prophylaxis (TP) to eliminate post-biopsy sepsis with its attendant risks of loss of life or limbs may further compel urologists to augment Empirical Prophylaxis with antibiotics of last resort. However, since Augmented Empirical Prophylaxis (AEP) violates principles of good antibiotic stewardship, perhaps we should consider avoiding the rectum altogether by switching to transperineal prostate biopsy, an approach associated with a negligible rate of post-biopsy sepsis.