



Clinical Safety & Effectiveness

Cohort # 25

Team # 18

**Decreasing Fluoroquinolone
Prescribing for Urinary Tract Infections
in the Emergency Department**



The Team

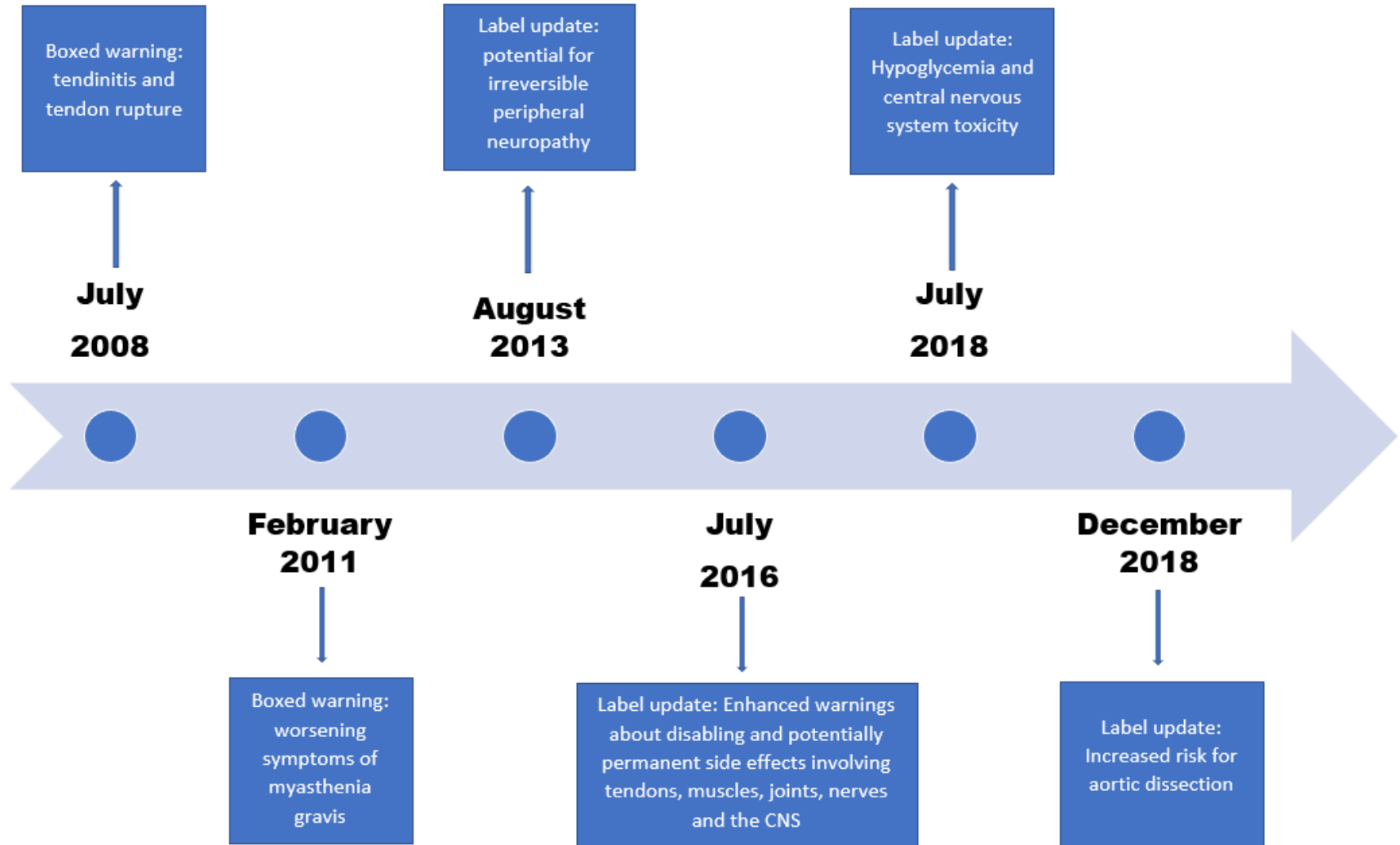
- Participants
 - Trung Vu, MD
 - Manuel Escobar, PharmD
 - Elizabeth Walter, MD
 - Jose Cadena-Zuluaga, MD
- Sponsor Department
 - Infectious Diseases

What We Are Trying to Accomplish?

OUR AIM STATEMENT

Decrease the monthly prescribing rate of fluoroquinolone antibiotics for the treatment of urinary tract infections in the Emergency Department at STVHCS by 25% by March 2020

Fluoroquinolone Safety



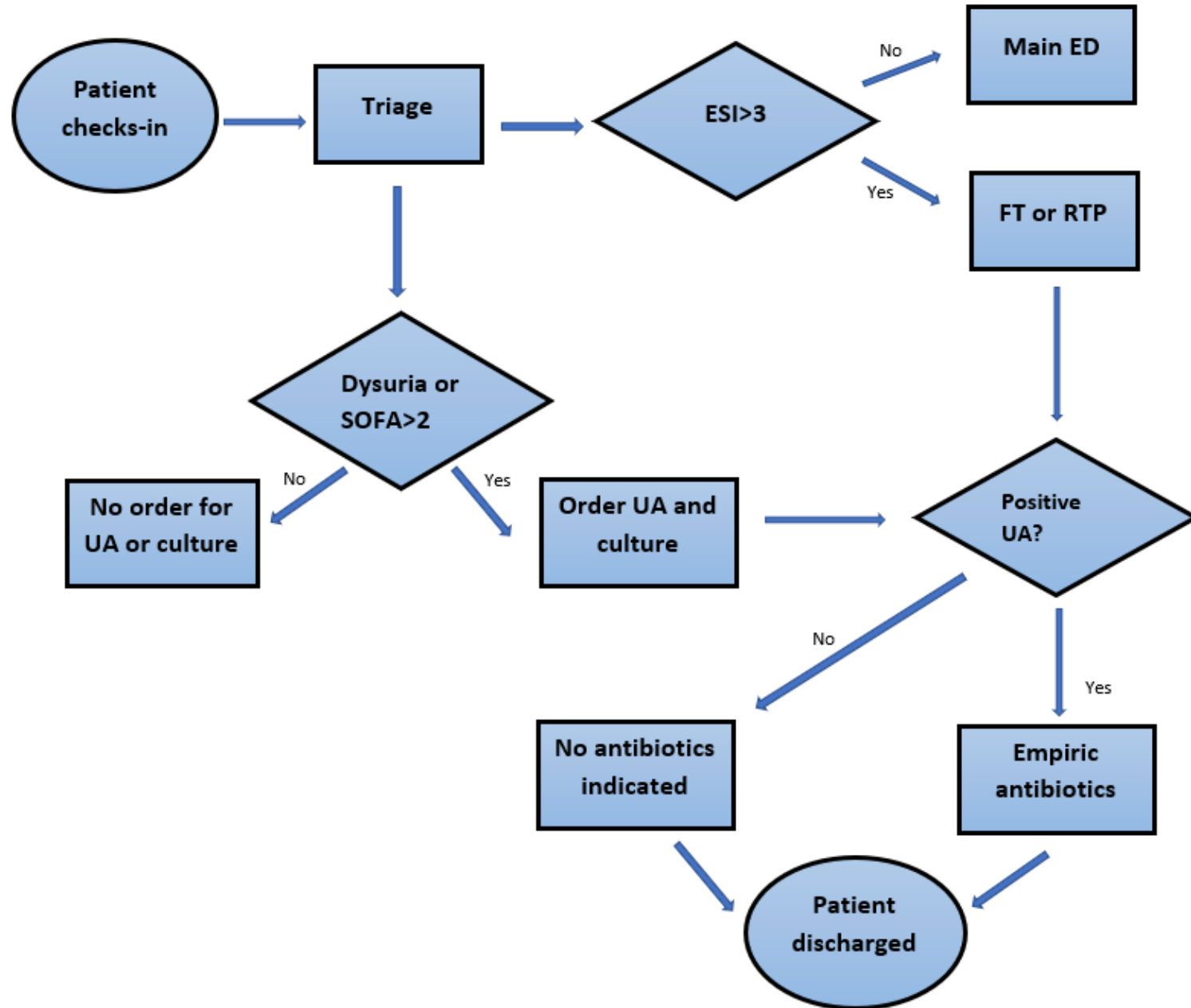
Fluoroquinolone Prescribing and Efficacy

- 25% of FQ prescriptions intended for outpatient use are prescribed in the ED at STVHCS (pre-intervention)
- FQ prescriptions made up 25% of the total antibiotic prescriptions for UTI in the ED at STVHC from 12/1/18 to 8/31/19.
 - 21% TMP SMX (74% susceptible E coli)
 - 20% nitrofurantoin (97% susceptible E. coli)
 - 17% cefpodoxime (86% susceptible E. coli)
- In urine cultures, 29% of E. coli isolates are resistant to ciprofloxacin and levofloxacin at STVHCS

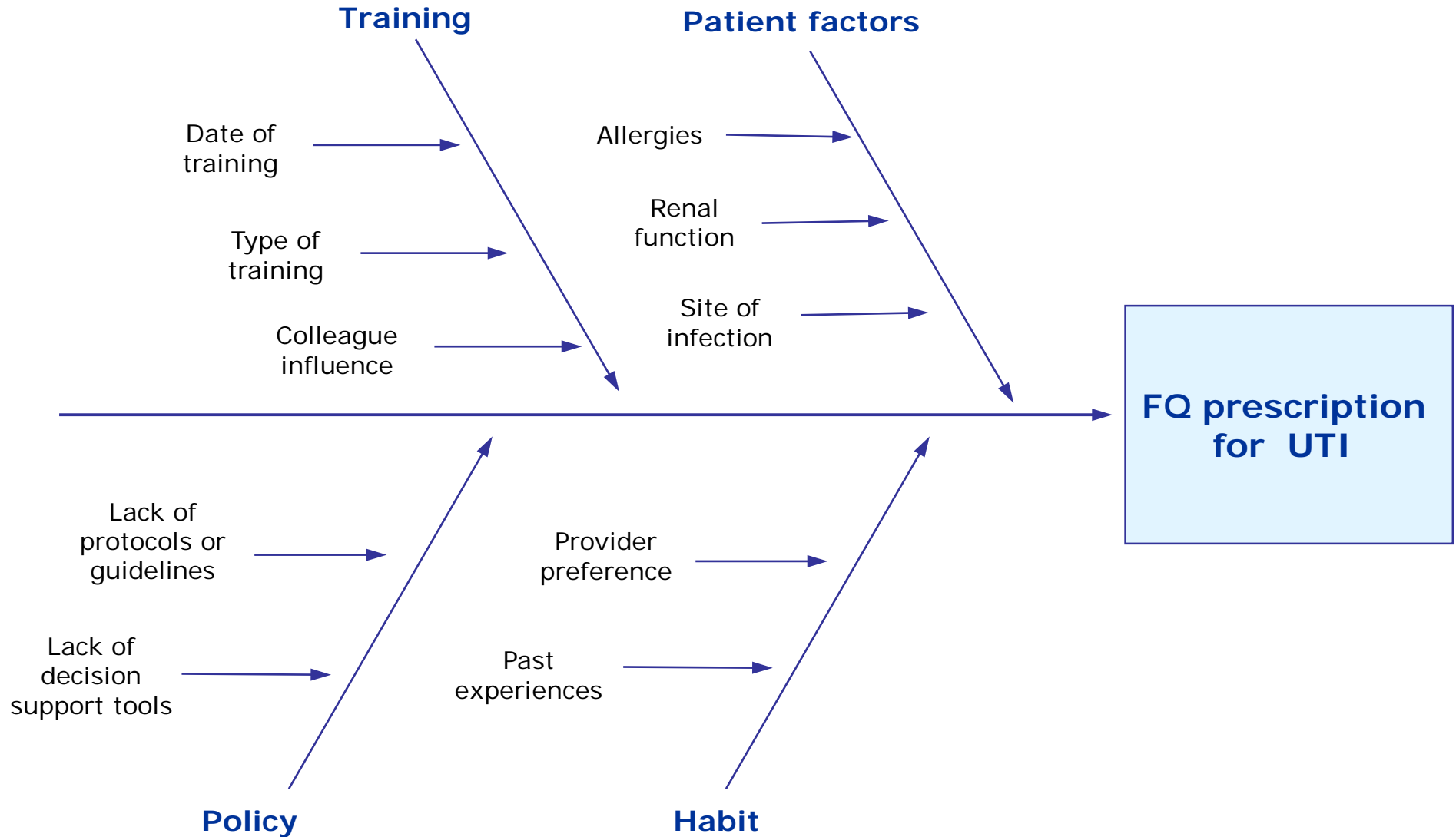
Selected Process Analysis Tools

- ALMVAH Emergency Room Visit
 - Discuss project goal with ED director
 - Flow chart for patient UTI diagnosis
 - Discuss with provider approach for treatment of UTI
 - Assess level of interest of nurse manager, ED providers, and ED director – stakeholder analysis
- Brainstorming potential problems
 - Use affinity grouping to achieve a fishbone analysis of why such high FQ prescribing occurs

Diagnosis and Treatment of UTI



Cause and Effect Analysis



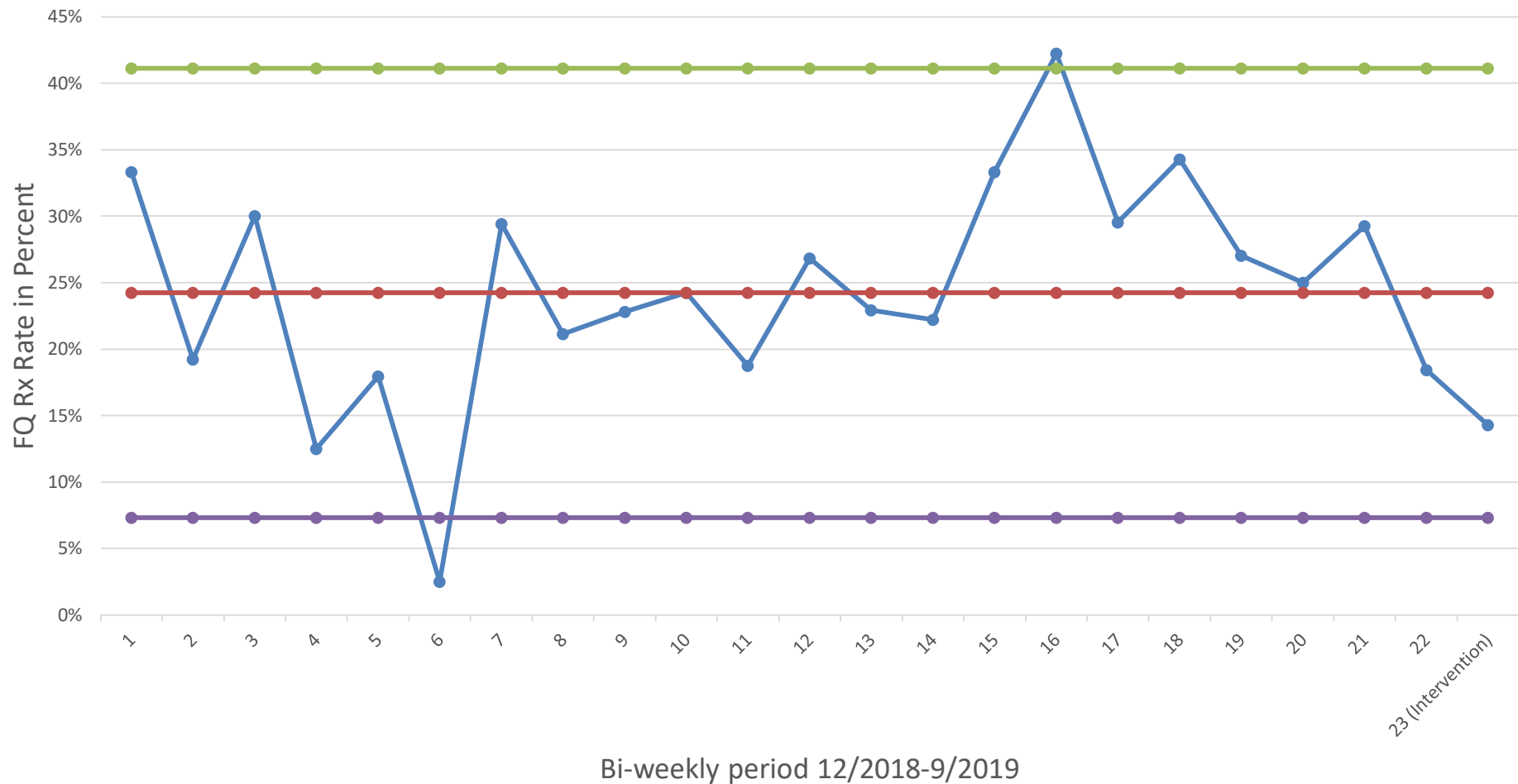
Selected Decision Making Tools

- Hypothesize frequent prescribers
 - Pareto Chart
- Decision matrix/rank ordering of common barriers to reducing FQ prescription
 - Face to face feed back
 - EMR order set
 - Protocol & antibiogram
 - Education -- Group meeting/survey

Plan

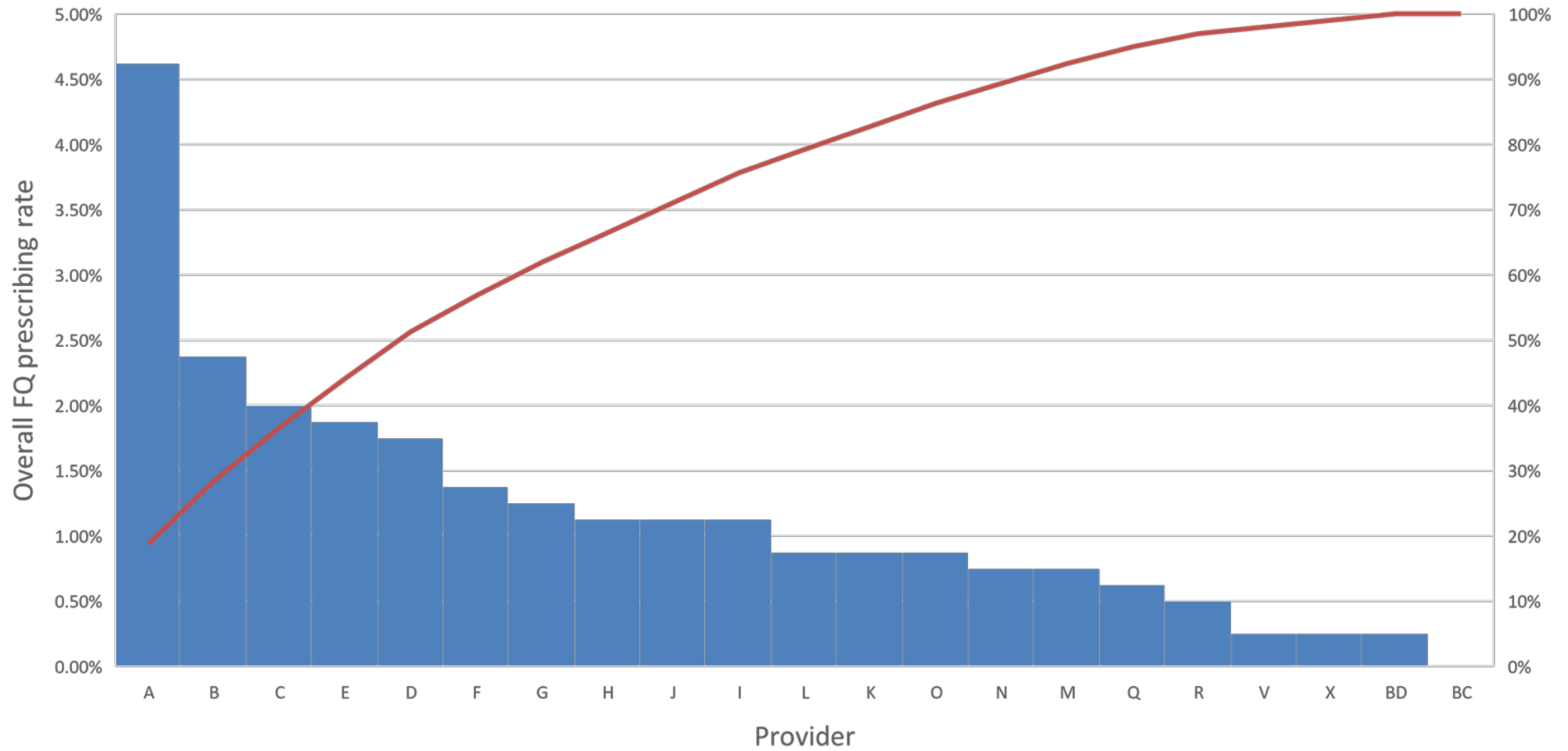
- Data Collection
 - Source: CPRS EMR
 - 10 month pre-intervention
 - FQ prescribing rates (bi-weekly)
 - Overall and provider specific data
 - Prescribing rates for other antibiotics

Process control baseline number of prescriptions for UTI- baseline



Individual Provider FQ Prescription (pre-Int)

FQ Prescription Per Total ED UTI Visit (Pre-Int)



Implementing the Change (Do)

- Review failure from prior project and what worked from other group
 - Bundle approach (EMR, individual feedback, education, antibiogram)
 - Stakeholder analysis

Indication and Interpretation of Urine Culture:

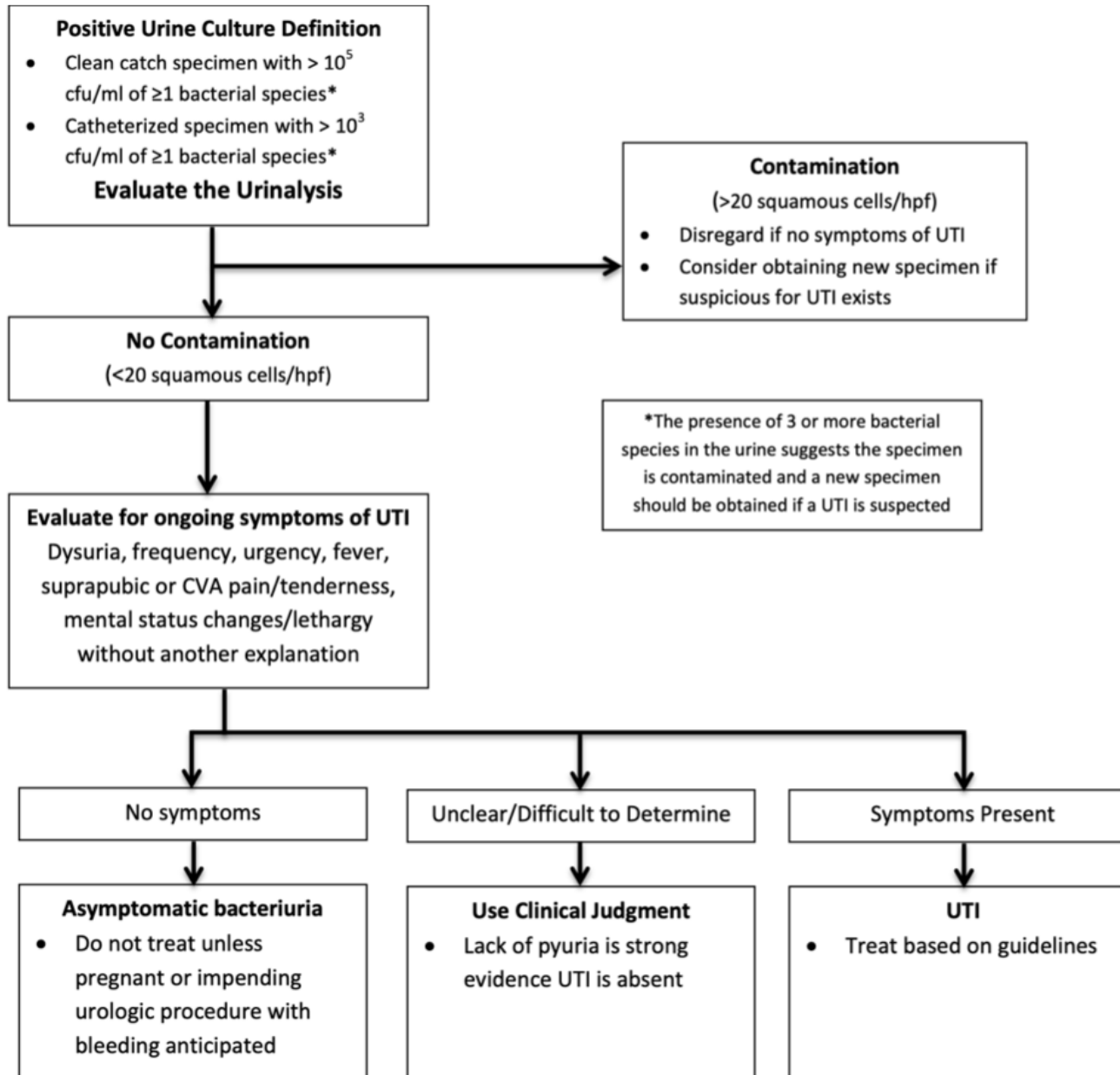
- If UTI symptoms (see case definition) or unobtainable history with sepsis of unclear source
- UTI case definition = all criteria below
 - Clean catch specimen with $>10^5$ cfu/mL or catheterized specimen with $>10^3$ cfu/mL
 - ≥ 1 bacterial colonies (presence of 3 or more bacterial species in urine suggests contaminated specimen)
 - Presence of suggestive symptoms (dysuria, urgency, frequency, hematuria, suprapubic pain)
- OR
- Unobtainable history (intubated, demented) and sepsis without clear source
- *Asymptomatic bacteriuria* = Presence of nitrite, WBC, or bacterial load alone without symptoms of UTI

Urine culture not recommended:

- Change in color, odor, or turbidity without UTI sx
- Automatic workup for fever/sepsis for patients who can provide history
- After treatment to document cure

Treatment of UTI:

- Once decision made based on above criteria, tx is based on our local annual prevalence and susceptibility, and if case is *complicated or uncomplicated*
- Factors suggesting complicated UTI: male sex, diabetes, functional or anatomic abnormality, presence of indwelling catheter/stent/nephrostomy tube, urinary diversion, flank tenderness with nausea/vomiting/severe sepsis, renal transplant, immunosuppression,
- *Complicated UTI*
 - Outpatient tx reasonable for male sex, diabetes, functional or anatomic abnormality, presence of indwelling catheter/stent/nephrostomy tube, urinary diversion
 - Please call Infectious Disease Specialty if evidence of other complicated factors



Empiric Oral Therapy	
<ul style="list-style-type: none"> • Only obtain urine cultures in patients with urinary symptoms. • Consider past cultures, local antibiogram and potential toxicities when selecting an oral antibiotic • Dosing recommendations are for patients with normal renal function. Renal dosing recommendations are provided in the CPRS order menus and the STVHCS renal dosing guideline. 	
Uncomplicated Cystitis	
PO Preferred Options	Cefpodoxime 200 mg PO BID x 5 days Nitrofurantoin 100 mg PO BID x 5 days ^{a, c} Trimethoprim/Sulfamethoxazole (TMP/SMX) 160/800 mg PO BID x 3 days
PO Not Preferred	Levofloxacin 750 mg PO daily x 3 days Ciprofloxacin 500 mg PO BID x 3 days
Complicated Cystitis (Including all males)	
PO Preferred Options	Cefpodoxime 400 mg PO BID x 7 days Trimethoprim/Sulfamethoxazole (TMP/SMX) 160/800 mg PO BID x 7 days Nitrofurantoin 100 mg PO BID x 7 days ^{a, c}
PO Not Preferred	Levofloxacin 750 mg PO daily x 5 days Ciprofloxacin 500 mg PO BID x 5 days

^aAvoid Nitrofurantoin use if early pyelonephritis is suspected due to inadequate renal tissue levels. Use only in patients that have a CrCl > 60 mL/min.

^c Ensure cystitis without systemic symptoms. If systemic symptoms present, avoid these agents.

STVHCS Antimicrobial Susceptibility Profile (Urine Isolates)			
Antimicrobial	<i>E. coli</i>	<i>K. pneumoniae</i>	<i>P. mirabilis</i>
Cefpodoxime	86%	86%	91%
Nitrofurantoin	97%	32%	N/A
Trimethoprim/sulfamethoxazole	74%	83%	77%
Ciprofloxacin	71%	88%	64%

Stakeholder Analysis

Stakeholder	Degree of Influence	Degree of Impact	Needs, Issues or Concerns	Value Proposition	Strategy for involvement
Medical ED Chief	High	Low	Leadership support of project and interventions	Improve quality of patient care	<ul style="list-style-type: none"> • Maintain informed • Involve in decision-making
ED providers	High	High	Modification of prescribing habits	Improve quality of patient care	<ul style="list-style-type: none"> • Provide feedback and data • Involve in decision-making
ED nursing staff	Low	Low	Assist in understanding workflow in ED	Improve quality of patient care	<ul style="list-style-type: none"> • Maintain informed

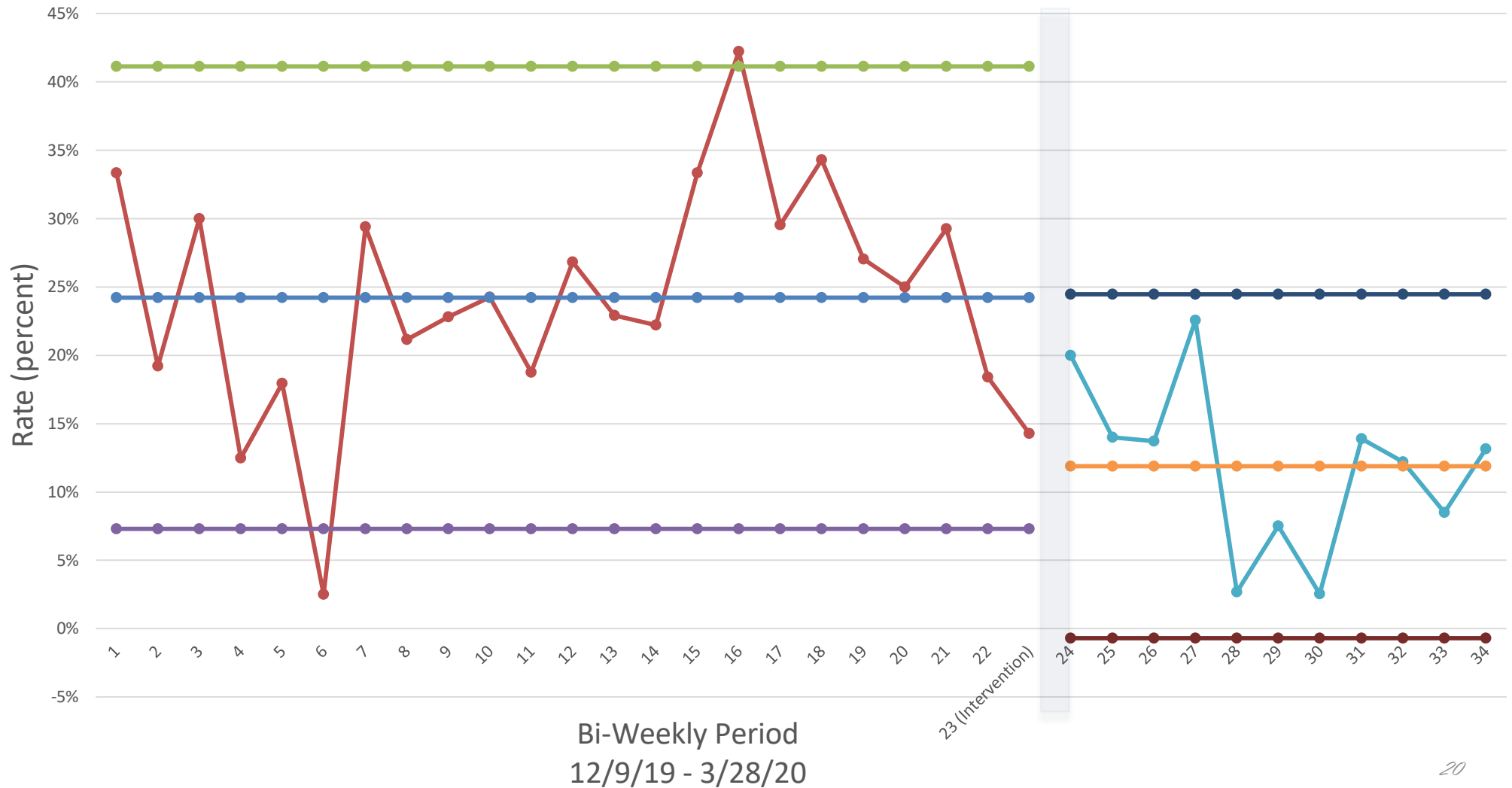
Driver Diagram

Goal	Primary Drivers	Interventions	Measure	Responsible (who/by when)
<p>To reduce Fluoroquinolone Use Rate for UTI, in the VA ED, by 25% by 3/21/2020</p>	Changing Providers Habit	<ul style="list-style-type: none"> Monthly Face-to-face discussion & feed back 	<ul style="list-style-type: none"> Pareto chart of individual performance to monitor FQ useage 	<ul style="list-style-type: none"> Start 9/2019 Ongoing until 3/2020
	Improving Providers Education	<ul style="list-style-type: none"> Protocol handout Annual meeting with group to provide update 	<ul style="list-style-type: none"> Pre- and post-intervention survey score Process Control Chart for overall ED FQ useage over time 	<ul style="list-style-type: none"> Start 9/2019 Ongoing until 3/2020
	Improving System Guidance	<ul style="list-style-type: none"> Cooperative (Ed/Pharmacy/ID) implementation of EMR order set 	<ul style="list-style-type: none"> Pareto chart Process control chart monitoring 	<ul style="list-style-type: none"> Start 11/2019 Ongoing until 3/2020
	Preventing External Disturbance (infrequent rotators)	<ul style="list-style-type: none"> Including UTI training into orientation package 	<ul style="list-style-type: none"> Process control chart monitoring 	<ul style="list-style-type: none"> To be determined

Study Results/Impact

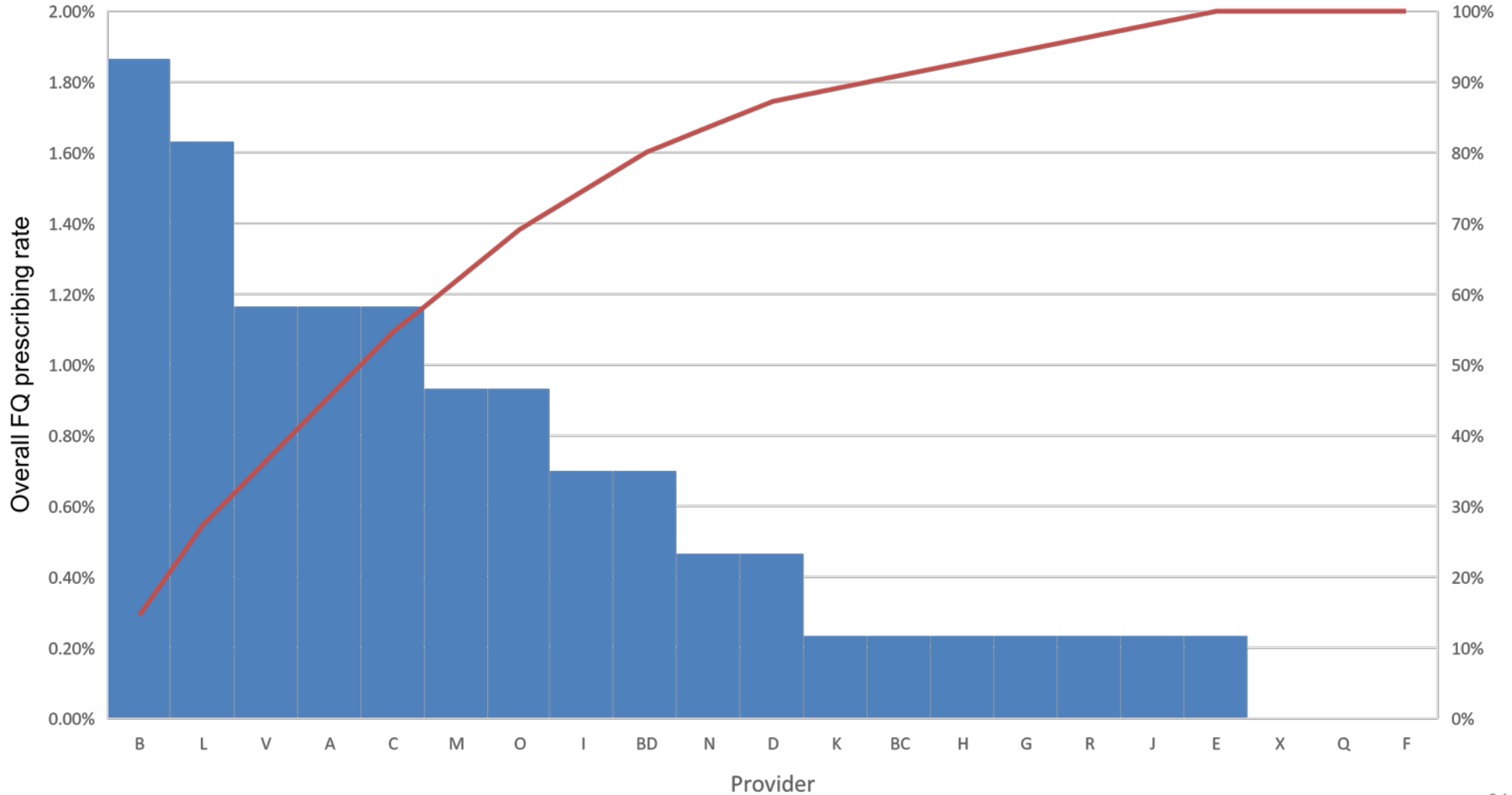
Process control chart with intervention

Fluoroquinolone Usage Rate Per UTI Prescription

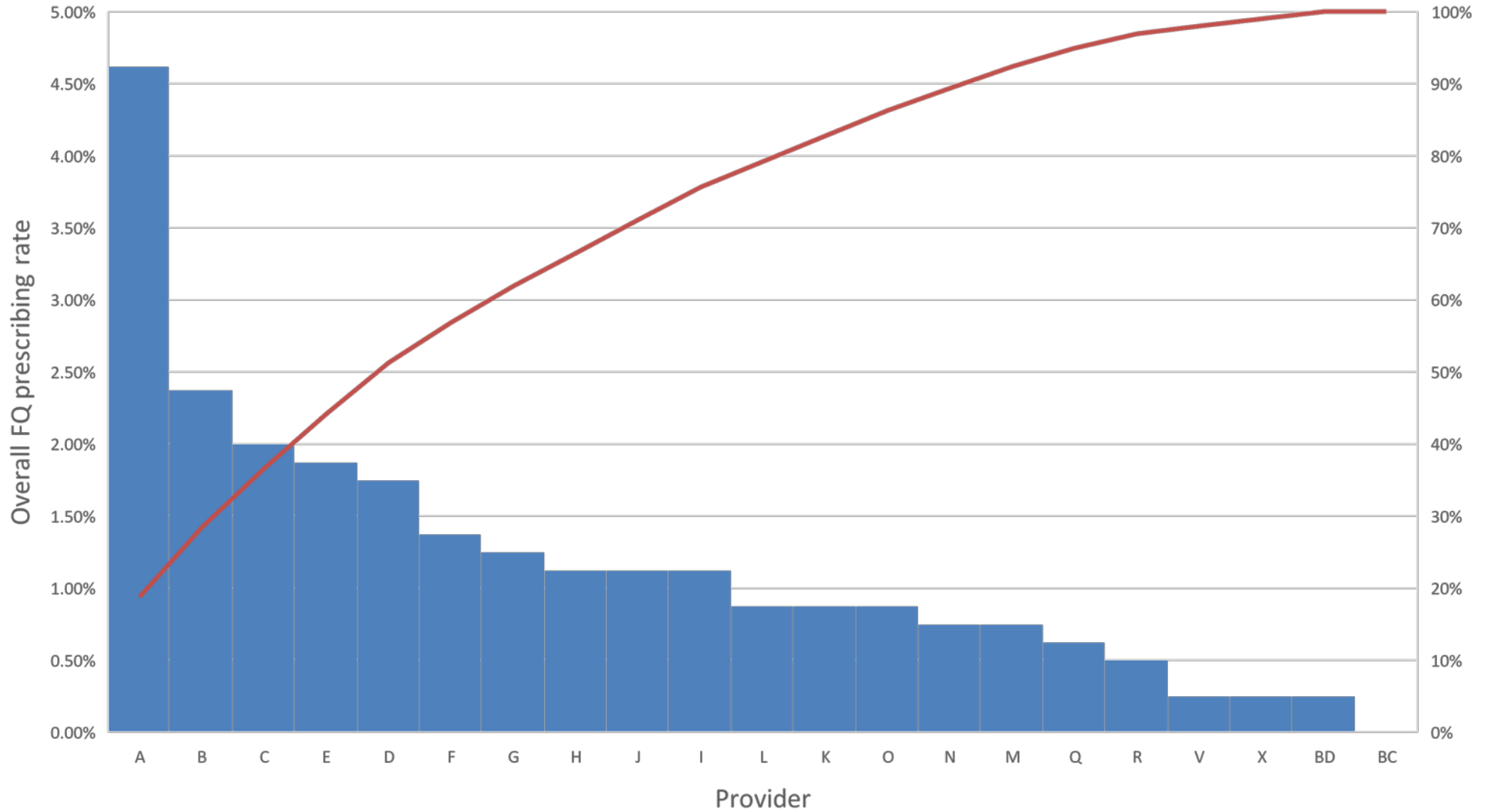


Individual Provider FQ Prescription (post-Int)

FQ Prescripion Per Total ED UTI Visits (Post-int)



FQ Prescription Per Total ED UTI Visit (Pre-Int)



Return on Investment

Determine the Return on Investment (ROI) strategy for your project.

ROI

- Project implementation cost
 - Pharmacy cost = \$ 10,000
 - Course cost = \$ 3,000
- Post-project hospital cost savings
 - C. diff rate reduction
 - Tendon rupture reduction
 - ESBL infection rate reduction
 - Sudden death
- Post-project patient cost savings
 - Patient's wage x days lost being hospitalized

ROI

- C. diff data
 - Shea et al. Fluoroquinolone restriction to decrease rate of CDI
 - 4 case/10,000 patient days → 2.2 / 10,000 (community onset CDI)
 - Joint commission (2005-2015 data): \$20,000 per case community onset-C. diff
 - Cost saving = $1.8 * 20,000 = \$36,000 / 10,000$ patient days
- ESBL data
 - Reducing ESBL infection by ASP intervention in Sweden hospital. Plos one 2014
 - 1.2 case/1,000 observed bed day (obd) → 0.5/1,000
 - Mauldin et al. cost associated with ABX resistant GNR BSI
 - \$144,000 per case vs \$106,293 per case (38,000 difference per case)
 - Cost saving = $0.7 * 38,000 = \$26,600 / 1,000$ observed bed day

ROI

- ROI
 - Investing \$10,000 one time
 - Savings
 - \$36,000/10,000 patient day for C. diff
 - \$26,600/1,000 observed bed day for ESBL BSI
 - For the Audie Murphy VA, half a year accounts for 28,000 bed days
- Unaccounted
 - Unable to find information in tendon rupture/sudden cardiac death attributable to fluoroquinolone
 - Other non-hospital associated human cost (wage lost, suffering)

Expansion of Our Implementation (Act)

- Post-study data review
- Ongoing pharmacy presence in the ED
- Ongoing individual feedback (space out to monthly)
- Biannual or annual antibiogram update and in-service
- New ED trainee inclusion

Conclusion/What's Next

- Interventions work
- Prior failures
 - Lack of face time (no trust)
 - Lack of stake holder analysis
 - Lack of individual feedback
- Need to ascertain sustained buy-in/change
- Implement within other departments
- Focus on UTI diagnosis reduction
- Some barriers
 - COVID-19
 - No required national implementation

Thank you!

