



Incorporating clinical guidance into computerized prescriber order entry (CPOE) may reduce fluoroquinolone utilization for the treatment of diverticulitis at a rural community health system

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BACKGROUND

- In recent years, fluoroquinolone antibiotics have been associated with an increased rate of bacterial resistance^{1,2,3}
- Fluoroquinolone antibiotics are also associated with more adverse effects than beta lactam antibiotics, such as QTc prolongation, impaired glycemic control, tendon rupture, and central nervous system effects⁴
- The WellSpan Health antimicrobial stewardship team at WellSpan Chambersburg/Waynesboro Hospitals sought effective strategies for curbing fluoroquinolone usage
- After a drug utilization review at WellSpan Waynesboro Hospital, one of the health system's inpatient facilities, it was determined that diverticulitis accounts for a significant portion of the hospital's fluoroquinolone utilization (e.g. 27% of ciprofloxacin utilization was attributable to diverticulitis)
- The antibiotic section of the institutions' computerized prescriber order entry (CPOE) diverticulitis order set lacked clinical direction for antibiotic selection
- It was hypothesized that optimizing this order set, with more antibiotic selections and more clinical direction, could reduce fluoroquinolone utilization in the treatment of diverticulitis

OBJECTIVE

- To evaluate the efficacy of CPOE order set optimization in reducing fluoroquinolone utilization

METHODS

- This multi-center, uncontrolled before and after study included adult inpatients who received intravenous antibiotics with a coded diagnosis of diverticulitis (ICD-10 code K57) between 1 July, 2017 and 21 April, 2019
- Data collected included patient baseline demographics, antibiotic regimen(s) received during admission, and date antibiotic regimen(s) were ordered
- A change to the antibiotic section of the diverticulitis order set was implemented on 17 September, 2018
- Patients were separated into two groups: those whose antibiotics were ordered between 1 July, 2017 and 30 June, 2018 (pre-order set optimization) and those whose antibiotics were ordered between 17 September, 2018 and 21 April, 2019 (post-order set optimization)
- Ordered antibiotic regimens were compared between these two groups, and analyzed for differences in utilization of fluoroquinolone-containing antibiotic regimens
- Statistical analysis was performed by calculating relative risk with 95% confidence interval and also with the chi-square test
- Microsoft Excel (Redmond, WA) was utilized for data analysis
- This study was approved by institutional review boards (IRBs) at WellSpan Waynesboro/Chambersburg Hospitals

RESULTS/TABLES

Diverticulitis Order Set Pre-Optimization

- Antibiotics
 - Piperacillin/Tazobactam
 - Ciprofloxacin
 - Metronidazole

Diverticulitis Order Set Post-Optimization

- Antibiotics
 - First Line (No Penicillin Allergy)
 - Piperacillin/Tazobactam
 - First Line: Penicillin Allergy (Non-Anaphylactic)
 - Cefepime + Metronidazole
 - First Line: Penicillin Allergy (Anaphylactic)
 - Ciprofloxacin + Metronidazole

Pre-Order Set Optimization:

56%

of patients ordered fluoroquinolones

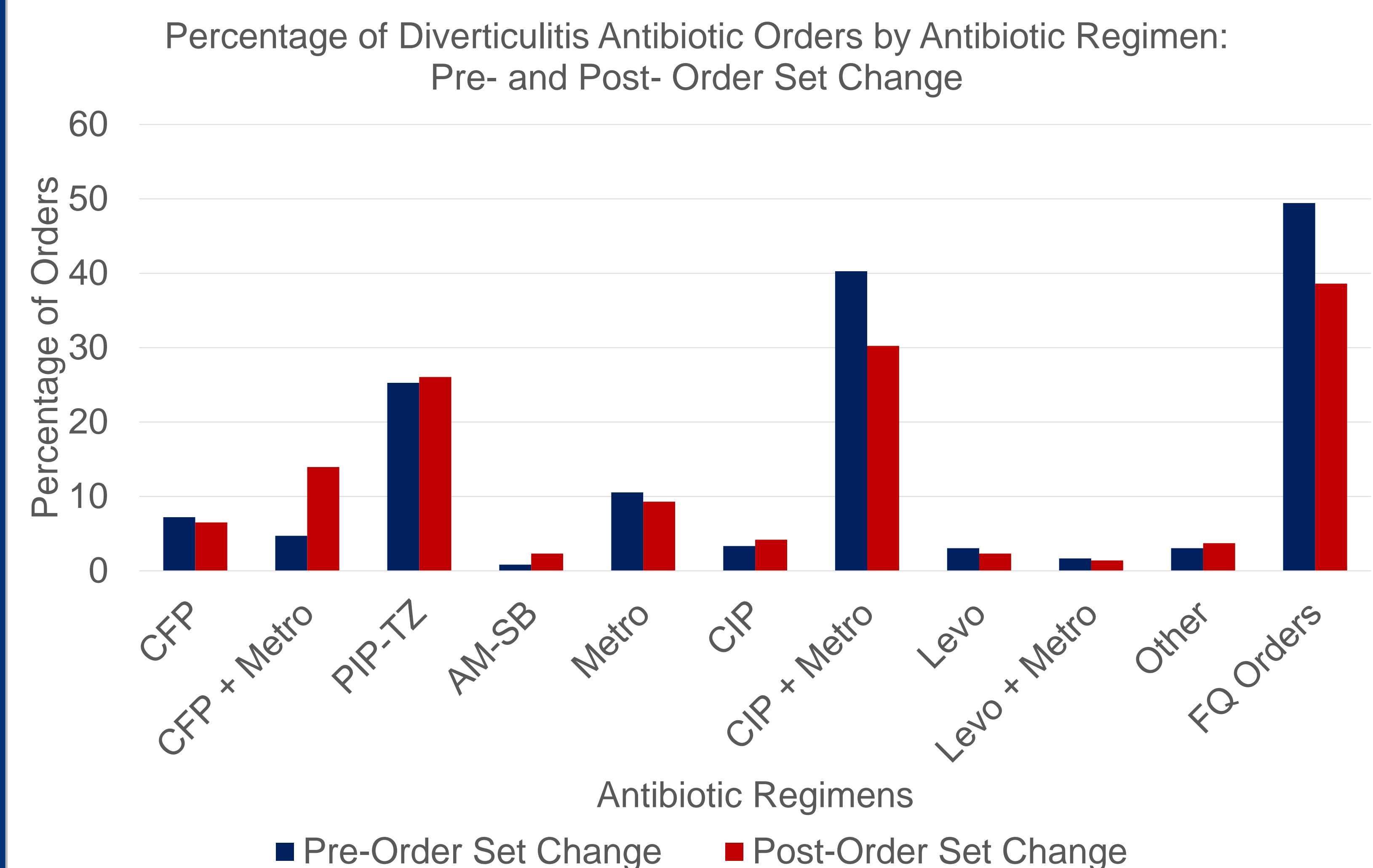
10%

Absolute Risk Reduction

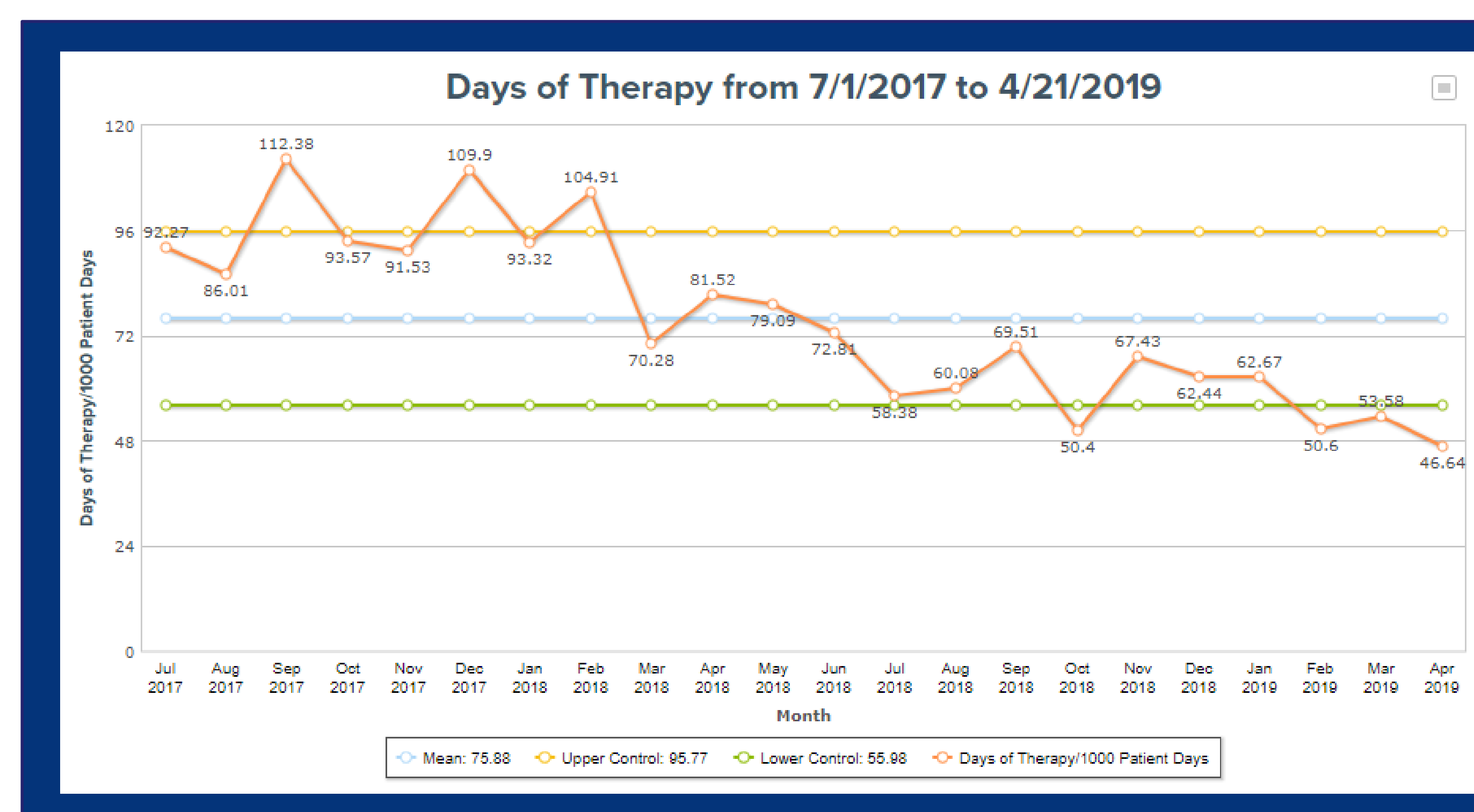
Post-Order Set Optimization:

46%

of patients ordered fluoroquinolones



Patient characteristics	
Pre-order set optimization (n=316)	
Sex	n (%)
Male	133 (42.1)
Average Age	St. Dev.
69	15.5
Post-order set optimization (n=178)	
Sex	n (%)
Male	61 (34.3)
Average Age	St. Dev
71	14.7



DISCUSSION/CONCLUSIONS

- A total of 494 patients were included in the study with 316 patients belonging to the pre-order set optimization group and 178 patients belonging to the post-order set optimization group
- 575 different antibiotic regimens were administered to the 494 patients
- The majority of patients were female in both groups of the study
- Fluoroquinolone-containing antibiotic regimens accounted for 39% of antibiotic orders for the post-order set optimization group, and 49% of antibiotic orders for the pre-order set optimization group (RR=0.78; 95% CI 0.64-0.95; p = 0.012)
- 46% of patients in the post-order set optimization group were ordered a fluoroquinolone-containing antibiotic regimen, and 56% of patients in the pre-order set optimization group were ordered a fluoroquinolone-containing antibiotic regimen (RR=0.82; 95% CI 0.68-0.99, p = 0.028)
- Limitations of this study include the influence of our antimicrobial stewardship program on antibiotic selection, limited size of the post-order set optimization group, and limited utilization of the diverticulitis order set
- Results from this study suggest that optimizing the antibiotic section of the diverticulitis order set achieved a reduction in fluoroquinolone utilization as evidenced by statistically significant reductions in the number of patients receiving fluoroquinolones and antibiotic regimens containing fluoroquinolones
- One possible explanation for the continued use of ciprofloxacin + metronidazole is that prescribers may prefer this combination as it is easier to transition to oral antibiotic therapy

FUTURE DIRECTIONS

- Perform subgroup analysis on patients whose antibiotics were ordered using the diverticulitis order set
- Examine the effects of order set optimization on other order sets related to infectious diseases

AUTHOR DISCLOSURES

- All authors: Nothing to disclose

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