Implementation of a targeted antimicrobial stewardship clinical decision support system on outpatient fluoroquinolone prescribing

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INTRODUCTION

- Fluoroquinolones (FQ) are broad spectrum antibiotics with several black box warnings, including central nervous system effects, peripheral neuropathy tendonitis and tendon rupture[1]
- FQ are recommended to reserve if no alternatives for:
  - Acute bacterial chronic bronchitis exacerbation
  - Acute bacterial sinusitis
  - Uncomplicated urinary tract infections
- Clinical decision support systems (CDSS) are computer-based programs assisting with guideline-directed antimicrobial prescribing
- CDSS implementation has reduced inappropriate antibiotic prescribing[2-5]

OBJECTIVE AND ENDPOINTS

To determine if implementation of a targeted CDSS would reduce the incidence of inappropriate outpatient FQ prescribing

Primary Endpoint: Overall reduction in outpatient FQ prescribing

Secondary Endpoints:

- Inappropriate FQ prescribing by indication
- Emergency room visit or hospitalization within 90 days consistent with FQ adverse reaction
- Fluroquinolone orders by provider type
- Appropriate renal dosing
- History of multi-drug resistant organisms (MDRO)

METHODS

Multi-center, quasi-experimental pre/post study with intervention in an outpatient ambulatory care setting from with no education or training prior to implementation of alert-driven CDSS from

A total of 2,447 patients were included for analysis. Of these, 1,105 patients were included in the Pre-CDSS group, and 1,342 patients were in the Post-CDSS group.

Inclusion Criteria:

- Oral antibiotic prescriptions in an outpatient setting for one of seven predetermined indications
- Prescribed a FQ or antibiotic included in alerts
- ≥ 18 years of age

Exclusion Criteria:

- Encounter that led to emergency department visit or hospitalization within 24 hours
- Indication marked inappropriately at time of prescribing
- Repeat patient encounters
- Pregnant women
- Inmates

RESULTS

Table 1. Baseline Characteristics

Characteristic	Pre-CDSS (n = 1,105)	Post-CDSS (n = 1,342)	P-value
Mean age, years*	53.8 ± 14.7	53.3 ± 15.99	0.42
Female, n (%)	862 (78)	1019 (76)	0.22
Body weight, kg*	91.1 ± 28.7	91.5 ± 27.9	0.73
Serum Creatinine*	0.9 ± 0.9	0.9 ± 0.6	1
Race, n (%)			0.12
Caucasian	645 (58.4)	823 (61.3)	
Black	347 (31.4)	367 (27.3)	
Asian	14 (1.3)	14 (1.1)	
Other	99 (8.9)	138 (10.3)	
Mean QTc, ms*	440 ± 50.2	449 ± 27.7	**0.00001**

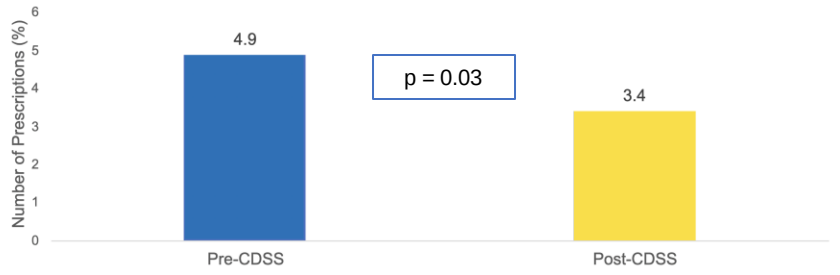
*mean ± SD

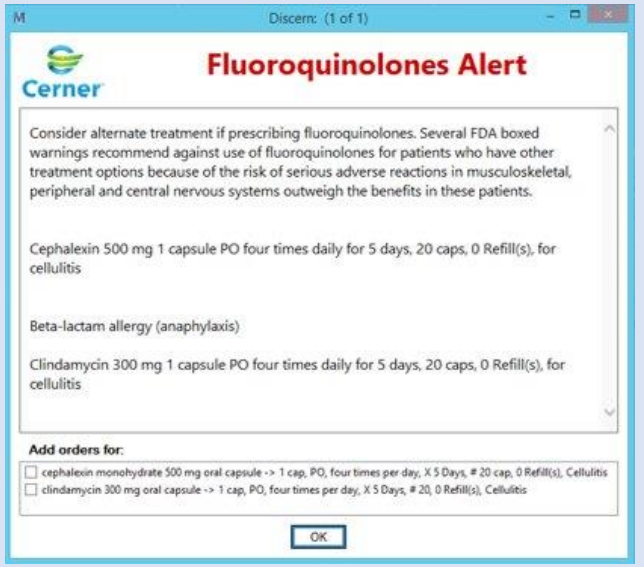
Table 2. Primary and Key Endpoint Results

Variable, n (%)	Pre-CDSS (n = 1,105)	Post-CDSS (n = 1,342)	P-value
Fluoroquinolone	54 (4.9)	46 (3.4)	**0.03**
Abscess	5 (8.5)	3 (4.9)	**0.003**
Cellulitis	9 (9.6)	9 (12.3)	**0.03**
COPD Exacerbation	3 (2.2)	6 (4.1)	0.08
Dental	2 (4.4)	0 (0)	**< 0.00001**
Sinusitis	4 (2.4)	1 (0.2)	**< 0.00001**
SSTI	7 (5.3)	1 (0.8)	**< 0.00001**
uUTI	24 (5.1)	26 (6.1)	0.28

COPD = Chronic Obstructive Pulmonary Disease
SSTI = soft tissue skin infection
uUTI = uncomplicated urinary tract infection

Figure 1. Outpatient Fluoroquinolone Prescribing





DISCUSSION

- The implementation of a CDSS significantly reduced overall FQ prescribing
- Additionally, there was a significant reduction in targeted FQ prescribing for abscess, dental abscess, sinusitis and SSTI
- There was a significant increase in FQ prescribing for cellulitis
- No significant differences in secondary endpoints
- History of MDRO was higher in the Pre-CDSS group and QTc was significantly higher in the Post-CDSS group
- Future studies should further evaluate a multimodal CDSS, include the local antibiogram within the alert, provide education to prescribers and suppress FQ susceptibilities

REFERENCES

1. Office of the Commissioner. U.S. Food and Drug Administration, FDA, 2018.
2. Gunn LR, et al. Appl Clin Inform. 2018;9(1):149-155.
3. Jindai, Kazuaki, et al. Infect Cont Hosp Ep. 39.9 (2018): 1108-1111.
4. Lin, Kevin, et al. Open Forum Inf Dis Vol. 7. No. 6. US: Oxford University Press, 2020.
5. Shoff, Christopher J., et al. Infect Cont Hosp Ep 41.11 (2020): 1351-1353.

DISCLOSURES

The authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that have a direct or indirect interest in the subject matter of this presentation.