

Appropriate Fluoroquinolone Use at University Hospital

Basil Taha, MD, Debbie Rybak, MD, Carlos Nunez, MD, Arun Mattappallil, PharmD, Debra Chew, MD, MPH



Rutgers New Jersey Medical School – Division of Infectious Diseases
University Hospital – Department of Pharmaceutical Services

Introduction

- Fluoroquinolones (FQs) are commonly prescribed in the inpatient setting, and offer advantages of broad spectrum of activity, good tissue penetration, and convenient dosing [1-2].
- However, with widespread use, antimicrobial resistance to FQs have increased [3]. FQs also carry the risk of serious adverse effects including *Clostridioides difficile* infection, drug-drug interactions, and drug-related adverse effects, including tendinopathy, peripheral neuropathy, severe hypoglycemia, mental health side effects, and increased risk of aortic ruptures and tears [4-5].
- In 2016, the FDA advised restricting FQ use for certain uncomplicated infections, where benefits outweigh the risks, and recommended FQs be reserved for patients who have no other treatment options [6].
- In order to identify opportunities for improving antibiotic practices at our facility, we assessed appropriate inpatient quinolone use at University Hospital.

Methods

- We performed a retrospective chart reviewed on inpatients at University Hospital in Newark, New Jersey who received FQs for greater than 48 hours between January 1, 2019 and March 31, 2019.
- We collected data on demographics, comorbidities, penicillin allergy, antibiotic therapy and duration, clinical indication for FQ use, empiric vs targeted therapy, relevant microbiological data and susceptibilities, and new *Clostridioides difficile* infection after FQ use.
- We assessed appropriate quinolone use, our outcome measure, by clinical guidelines and expert ID/Antimicrobial Stewardship Program (ASP) opinion, and categorized use as either:
 - Appropriate
 - Appropriate, but not preferred
 - Not appropriate by clinical guidelines and expert opinion

Results

- We reviewed 77 charts, 1 patient was readmitted and included twice
- Of these, 58 (75%) of patients were on empiric therapy
- Mean duration of quinolone use was 4.85 days (range 2-40 days)

Figure 1: Fluoroquinolone Use (n=77)

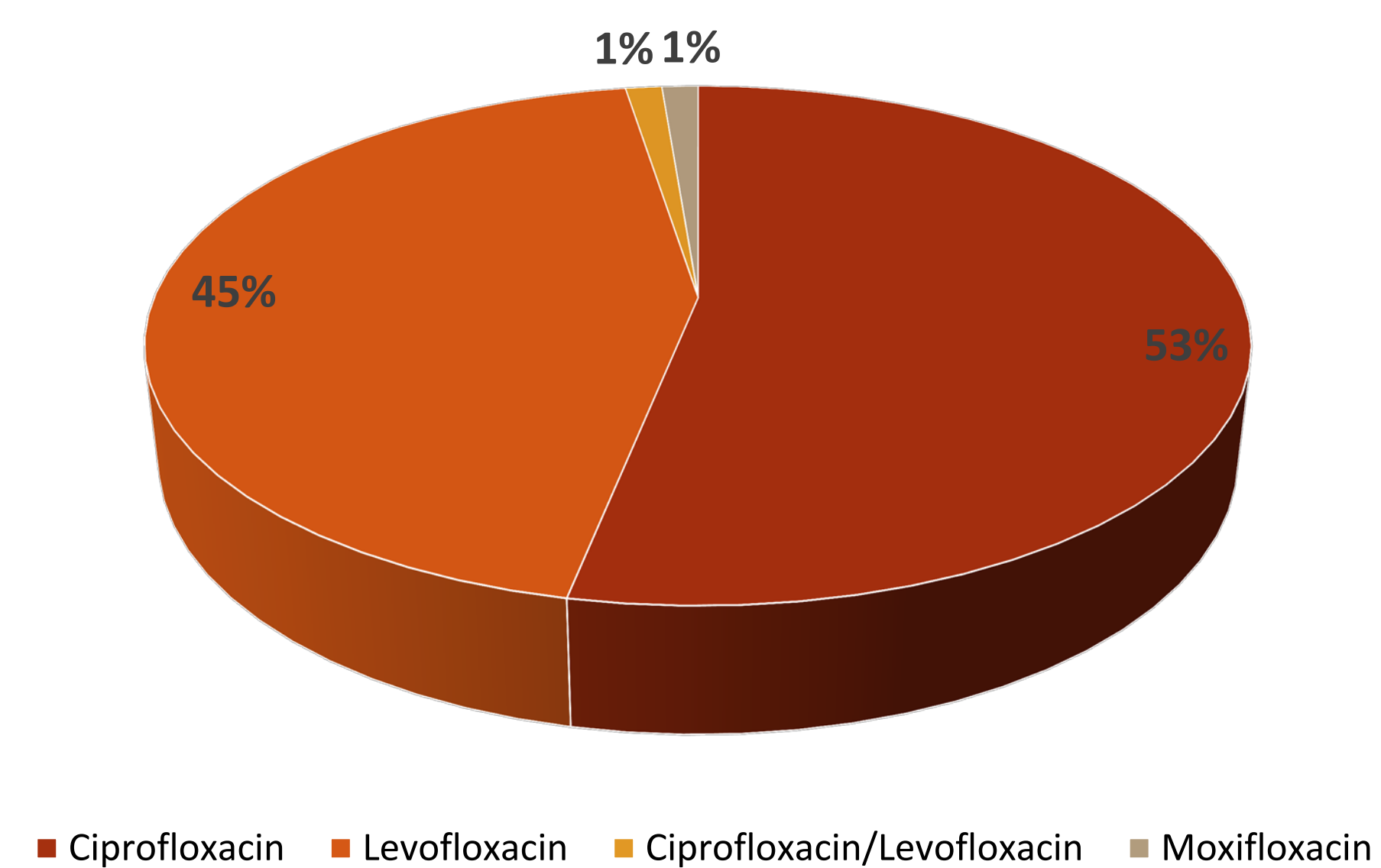


Table 1: Baseline Demographic and Clinical Factors (n=77)

Baseline Characteristics	n (%)
Mean Age	53 (range 18-84 y/o)
Male Sex	45 (58)
Hispanic Ethnicity	21 (27)
DM	25 (32)
Advanced Liver Disease	14 (18)
COPD	11 (14)
Malignancy	11 (14)
Immunosuppression	11 (14)

Figure 2: Allergy Breakdown (n=77)

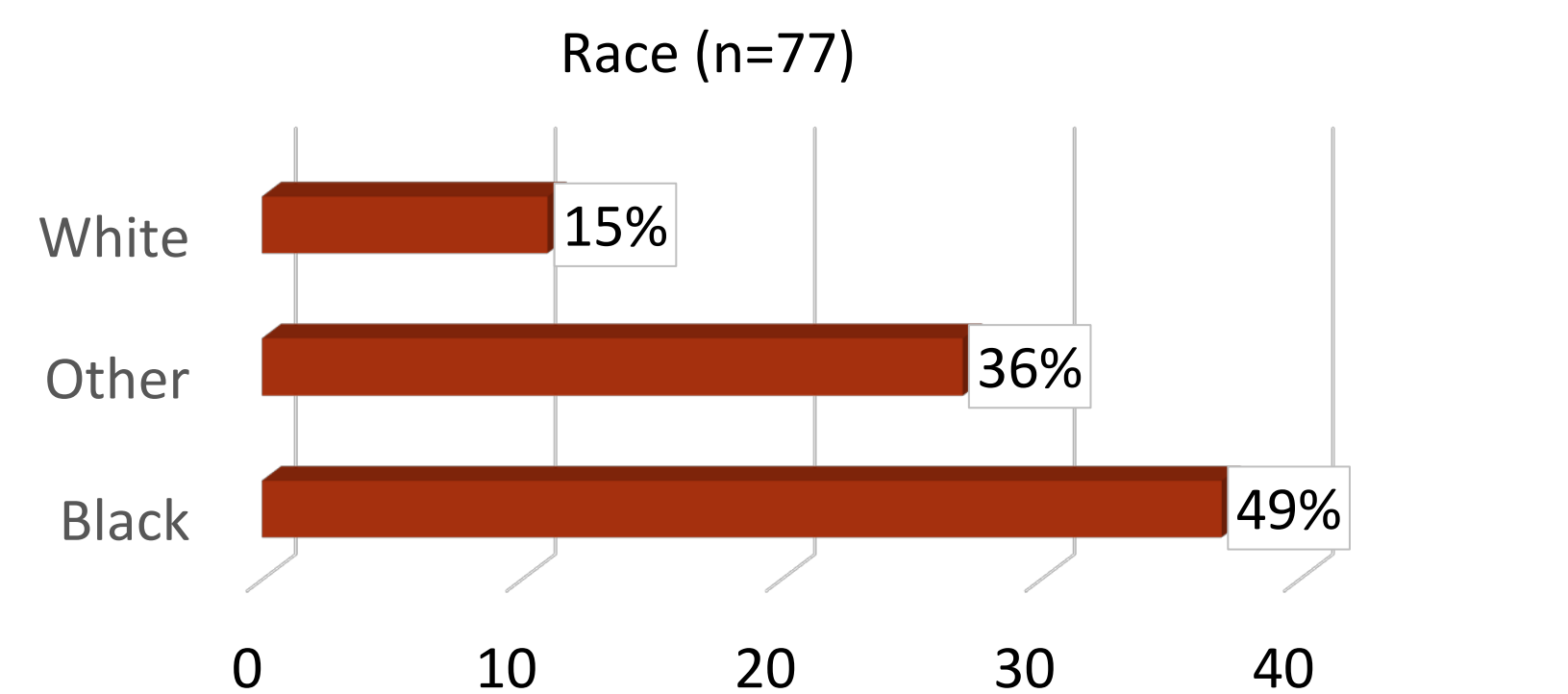
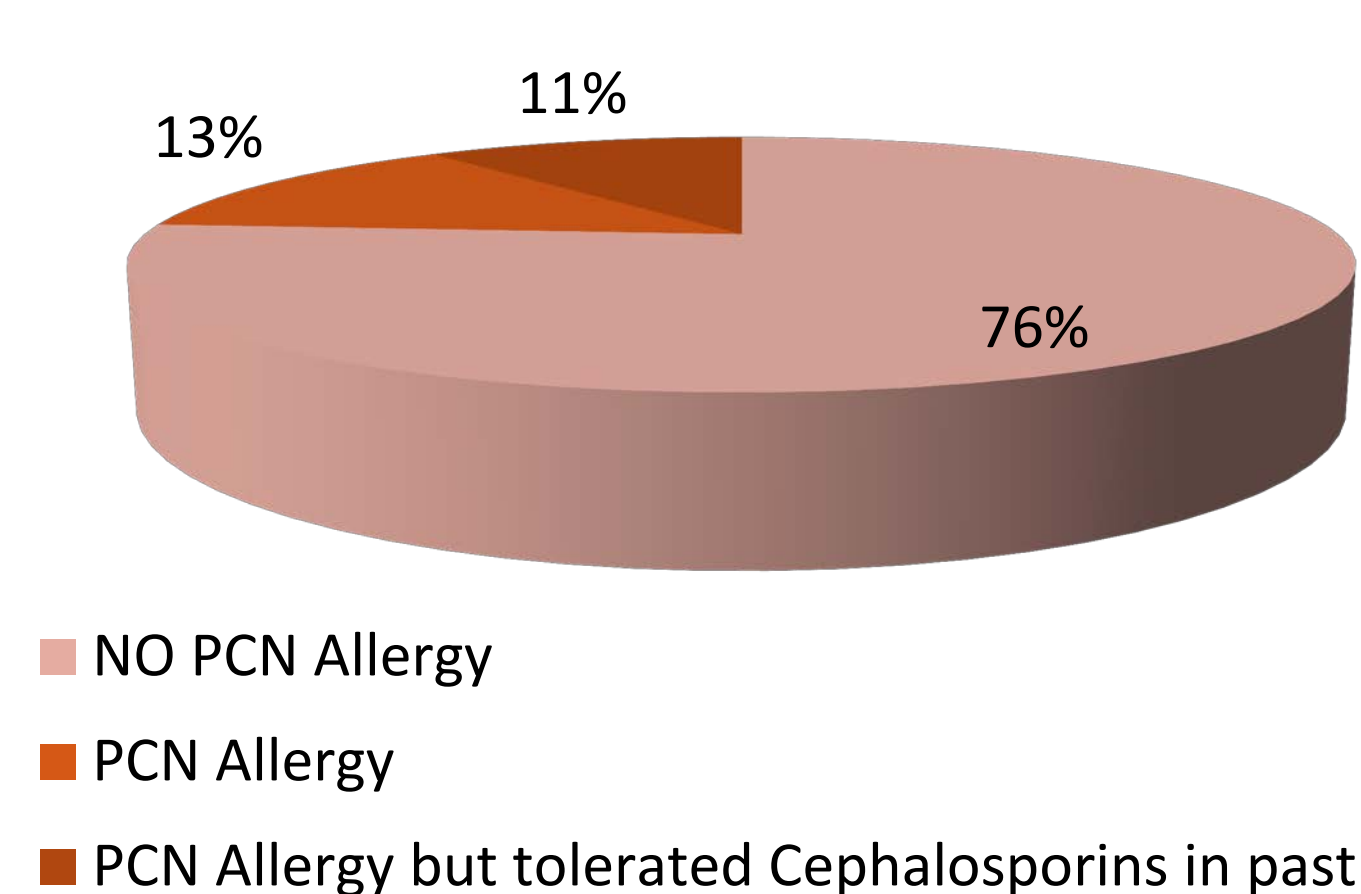


Figure 3: Appropriate Quinolone Use (n=77)

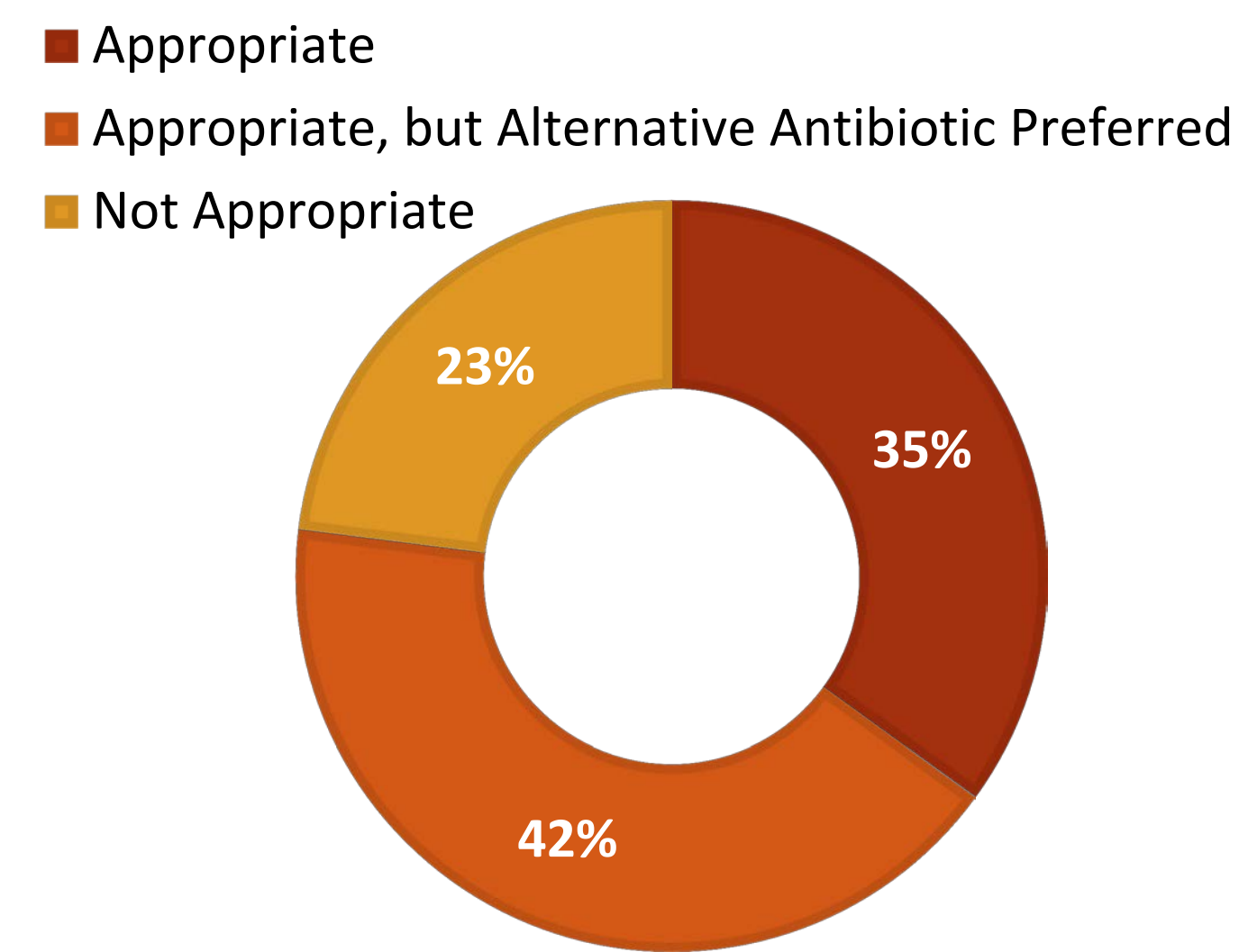


Table 2: Infectious indication for Quinolone (n=77)

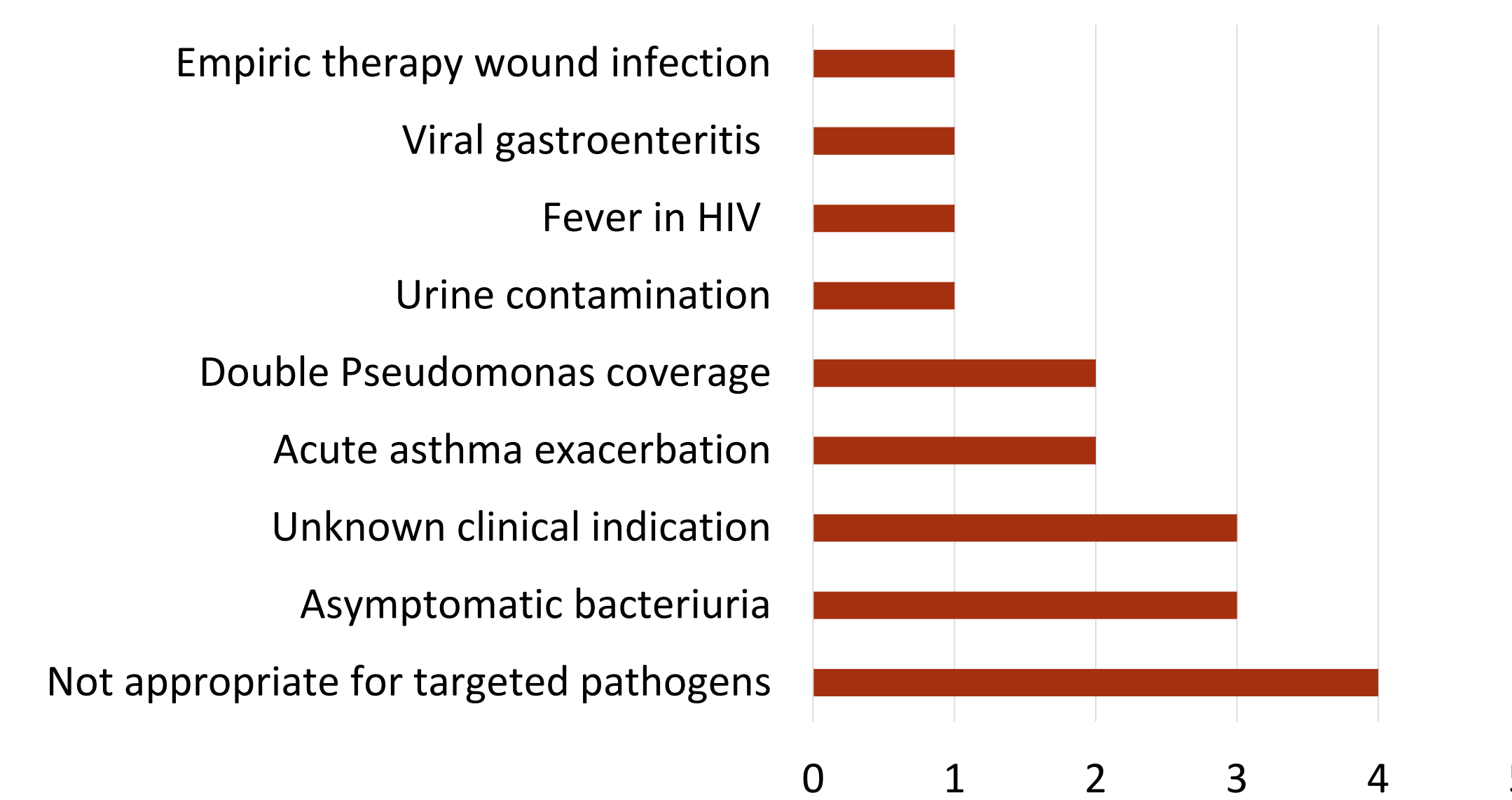
Infectious Indication	n	(%)
Complicated UTI	14	18%
Uncomplicated UTI	11	14%
SBP (Prophylaxis)	9	12%
HAP	6	8%
Intra-abdominal Infection	6	8%
CAP	4	5%
Wound Infection	4	5%
ERCP (Prophylaxis)	4	5%
VAP	3	4%
Unknown	3	4%
Aspiration PNA	2	3%
Ocular Infections	2	3%
Acute Asthma Exacerbation	2	3%
Endocarditis culture negative	1	1%
Enterocolitis	1	1%
Infectious Diarrhea	1	1%
Acute COPD Exacerbation	1	1%
ENT flap (Prophylaxis)	1	1%
Leech therapy (Prophylaxis)	1	1%

Results (Continued)

Table 3: Appropriate Quinolone Use by Clinical Indication (n=77)

Infectious Indication	Appropriate		Appropriate Not Preferred		Not Appropriate		
	n	(%)	n	(%)	n	(%)	
UTI	Uncomplicated	2	3	5	6	4	3
	Complicated	8	10	6	8	0	0
Pneumonia	CAP	2	3	2	2	0	0
	HAP	0	0	3	4	3	4
	VAP	0	0	2	3	1	1
	Aspiration PNA	1	1	1	1	0	0
Intra-abdominal Infection	1	1	5	6.5	0	0	
Wound Infection	1	1	2	2.5	1	1	
Ocular Infections	0	0	0	0	2	3	
Prophylaxis	10	13	4	5	1	1	

Table 4: Reasons for Inappropriate Quinolone Use (n=77)



- Adverse Events
- 5 patients developed new *Clostridioides difficile* infection
 - Of these, only 1 received other antibiotics besides a quinolone
 - 1 deemed to have inappropriate quinolone use
 - 3 were deemed to have appropriate quinolone use, but not preferred therapy

Limitations

- Study sample was small with limited time-frame
- This was a retrospective study and data was not collected in a standardized manner
- Appropriateness definition was determined by the ASP team but may differ from clinical judgement/expertise of others

Discussion

- We found that a majority of inpatients were prescribed quinolones that were either not clinically indicated or were prescribed quinolones when other preferable agents were available.
- This study highlights opportunities to improve antibiotic practices and to promote antibiotic stewardship in our facility.
- ASP plans to continue a second phase of this study looking at appropriate quinolone use after providing direct "audit and feedback" to providers to assess pre- and post-intervention quinolone use.

References

- Thabit, A. K., Fatani, D. F., Bamakhrama, M. S., Barnawi, O. A., Basudan, L. O., & Alhejaili, S. F. (2019). Antibiotic penetration into bone and joints: An updated review. *International Journal of Infectious Diseases*, 81, 128–136. doi: 10.1016/j.ijid.2019.02.005
- Baggs, J., Fridkin, S. K., Pollack, L. A., Srinivasan, A., & Jernigan, J. A. (2016). Estimating National Trends in Inpatient Antibiotic Use Among US Hospitals From 2006 to 2012. *JAMA Internal Medicine*, 176(11), 1639. doi: 10.1001/jamainternmed.2016.5651
- Zervos, M. J., Hershberger, E., Nicolau, D. P., Ritchie, D. J., Blackner, L. K., Coyle, E. A., ... Lubowski, T. J. (2003). Relationship between Fluoroquinolone Use and Changes in Susceptibility to Fluoroquinolones of Selected Pathogens in 10 United States Teaching Hospitals, 1991-2000. *Clinical Infectious Diseases*, 37(12), 1643–1648. doi: 10.1086/379709
- Stahlmann, R., & Lode, H. M. (2013). Risks associated with the therapeutic use of fluoroquinolones. *Expert Opinion on Drug Safety*, 12(4), 497–505. doi: 10.1517/14740338.2013.796362
- Center for Drug Evaluation and Research. (n.d.). FDA warns about increased risk of ruptures or tears in the aorta blood. Retrieved from <https://www.fda.gov/drugs/drug-safety-and-availability/fda-warns-about-increased-risk-ruptures-or-tears-aorta-blood-vessel-fluoroquinolone-antibiotics>
- Center for Drug Evaluation and Research. (n.d.). FDA advises restricting use of fluoroquinolones for certain infections. Retrieved from <https://www.fda.gov/drugs/drug-safety-and-availability/fda-drug-safety-communication-fda-advises-restricting-fluoroquinolone-antibiotic-use-certain>