

How to Manage Antibiotics in LRTIs with Positive Respiratory Pathogen Panel Like a Pro: The Utility of Procalcitonin

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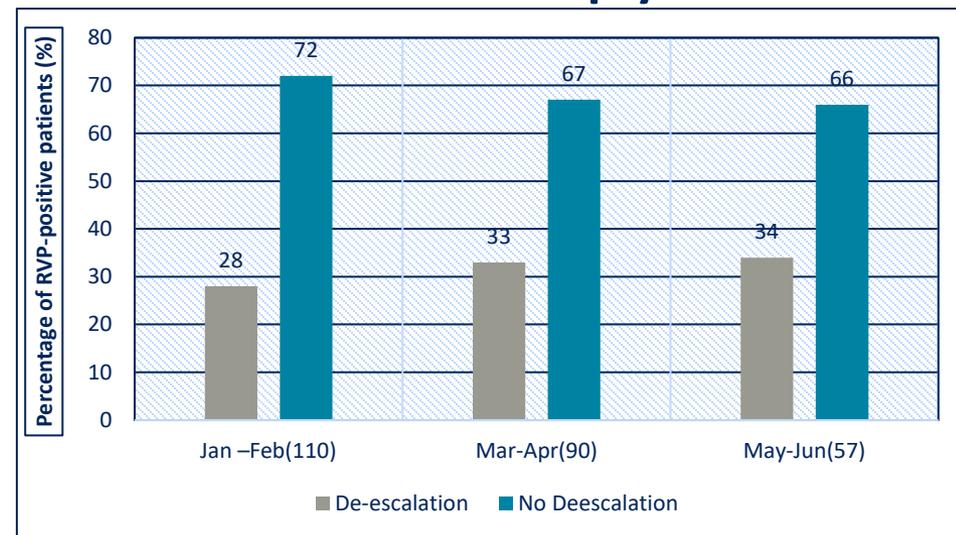
Alexandre Lacasse, MD

Background

- 30% of antibiotics in the hospital setting are unnecessary
- Procalcitonin is a highly sensitive and specific assay for confirming presence of bacterial infection when elevated
- Investigated in lower respiratory tract infections (LRTIs), systemic inflammatory response syndrome (SIRS), and sepsis
- Has been proven to be safe and efficacious

Background: LaCasse et al

- Retrospective analysis of respiratory pathogen panel (RPP)-positive patients from January-June 2017 at St. Mary's
- N = 303 (excluded 46)
- 68.3% did not have antibacterial therapy de-escalated



Focus on LRTIs

- Often unsure if source is viral or bacterial
- Common practice to obtain a respiratory pathogen panel (RPP)
 - Not common practice: stopping antibiotics when RPP is positive
- Adding PCT to support antimicrobial stewardship recommendations should increase acceptance
 - PCT cutoff ranges **<0.25 ng/mL** for discontinuation

Hypothesis

A stewardship pharmacist-driven intervention program using PCT values resulted in 75% of recommendations for discontinuation of antibiotics being accepted by clinicians.

Methods

- Retrospective use evaluation of antibiotic discontinuation recommendation success by antimicrobial stewardship pharmacists using the biomarker PCT
 - Data gathered using chart review on patients admitted between November 2019 and February 2020

Primary Outcome

- Proportion of patients whose antibiotics were discontinued based on positive RPP and low PCT
 - Out of all patients who received a pharmacist recommendation to stop antibiotics

Secondary Outcomes

- % of patients who had a pharmacist recommendation to discontinue antibiotics
- % of patients discharged on antibiotics
- Number of antibiotic days
- Duration of hospital stay
- Proportion of patients whose antibiotics were discontinued without pharmacist recommendation

Patient Criteria

Inclusion Criteria

- Adult patients over the age of 18
- Lower respiratory tract infection
- Positive RPP
- Started on antibiotics

Exclusion Criteria

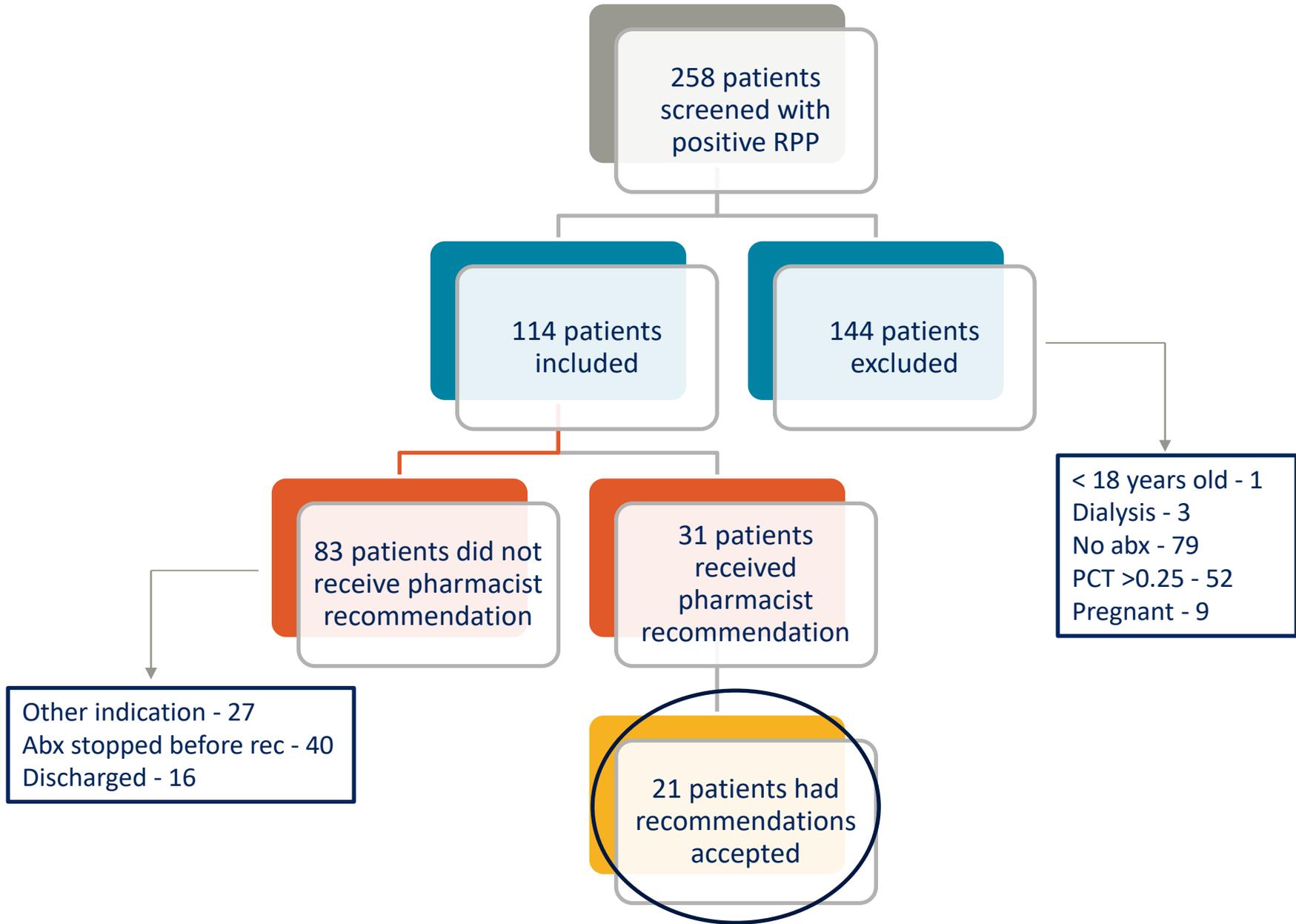
- High baseline PCT values (>0.25 ng/mL)
- Incarcerated patients
- Pregnant patients

Hypothesis:

75% of recommendations by antimicrobial stewardship pharmacists will be accepted when using both RPP and PCT to support said recommendation

Statistics

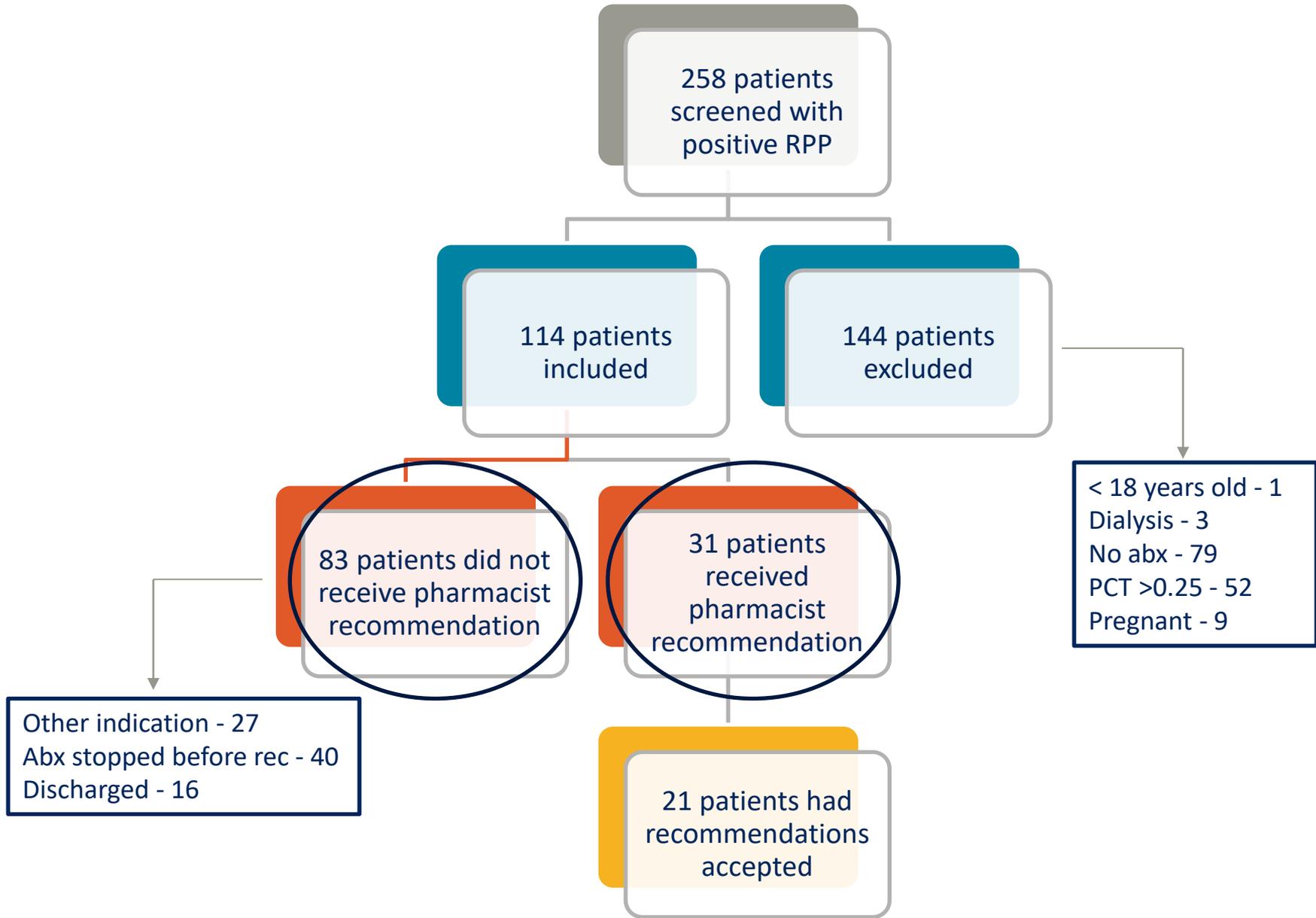
- Calculated sample size of **156** would be required to reach 80% power to detect a significance level of 0.05
- Paired t-tests were used for statistical analysis to compare to our hypothesis for the primary outcome
- Paired t-tests were also used for statistical analysis to compare the 2 groups for our secondary outcomes
 - Patients who received pharmacist recommendations vs patients who did not



Primary Outcome

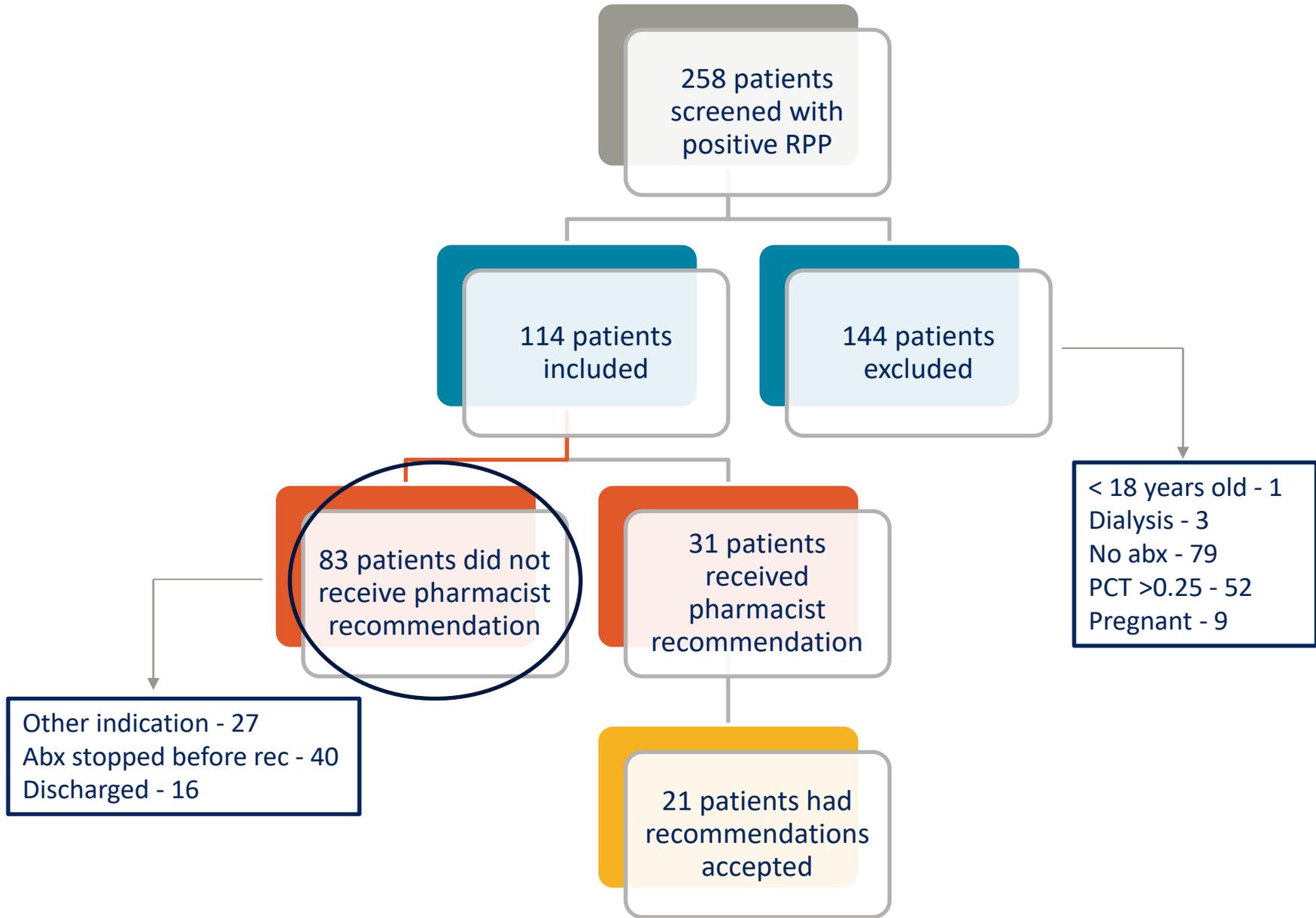
Total Patients Screened	258
Included	114
Patients with pharmacist recommendation	31 (27.2%)
Patients with acceptance of recommendation	21 (67.7%)
Discontinuation rate hypothesis	75%
P-value	0.296

*All patients had a positive RPP and negative procalcitonin level (<0.25)



Secondary Outcomes

	Rec (n=31)	No rec (n=83)	P-value
DC on Antibiotics	7 patients (22.6%)	21 patients (25.3%)	0.764
Average Number of Antibiotic Days	3.26 (total = 101)	4.90 (total = 407)	0.113
Average Duration of Hospital Stay	5.42	5.42	1.000

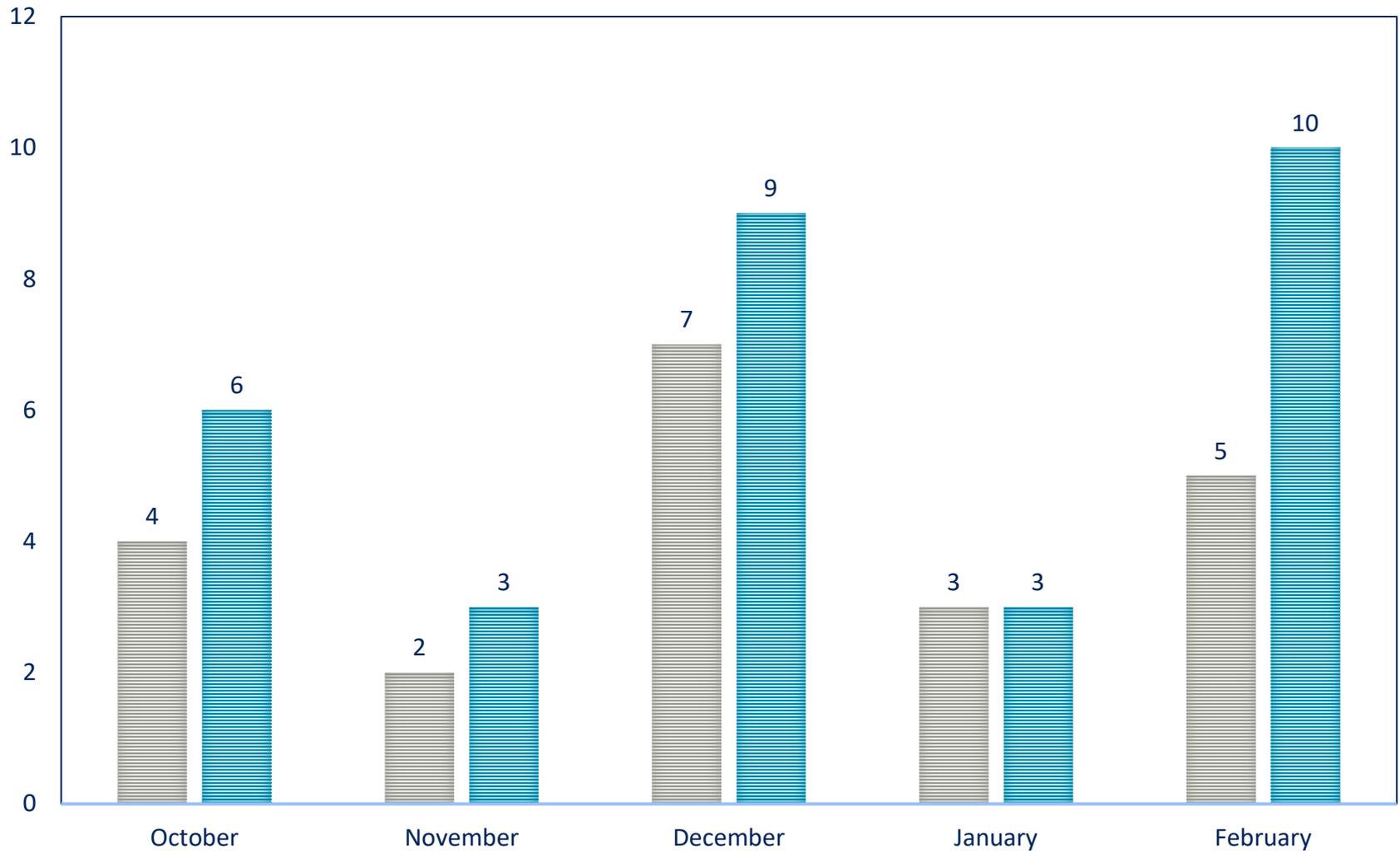


Provider Actions Without RPh Intervention

	# of Patients (% out of all patients without RPh intervention) N=83
Antibiotics discontinued without PCT	16 (19.28%)
Total antibiotics discontinued	40 (48.19%)
Provider ordered PCT	38 (45.7%)
Provider ordered PCT and discontinued antibiotics	20 (24.1%)

RECOMMENDATION MADE VS ACCEPTED

■ Sum of Rec Accepted ■ Count of Rec Made



Discussion

- Primary outcome was not statistically different from our hypothesis
 - Did not meet power, final sample size was only 114
- No statistically significant difference in any of the secondary outcomes
 - Clinical differences are worth discussing – less days of antibiotics and less patients discharged on antibiotics
- Subjective impression of improved antibiotic stewardship after data collection period was complete
- May help soften transition to changes to the COPD exacerbation antibiotic orderset that are in process of being approved by P&T



Strengths

- Large proportion of patients with provider ordering PCT
- % of recs accepted was close to our hypothesis
- Real time education to physicians

Limitations

- Small final N
 - Did not meet power
- Variance in interpretation of PCT value
- Difficulty capturing all patients

Conclusions

- The combination of negative PCT value (<0.25 ng/mL) and positive RPP was successful in 67.7% of patients having their antibiotics discontinued in suspected LRTI
- Most common reason for rejecting recommendations was anti-inflammatory benefits of macrolides and interpretation of PCT as elevated
- Most common diagnosis was COPD exacerbation

Conclusions cont'd

- Education on use of antibiotics in COPD exacerbations could be beneficial
 - As well as interpreting procalcitonin levels
- Procalcitonin appears to be ordered by practitioners more frequently compared to the beginning of the study
- Major improvement compared to results obtained by Lacasse et al

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