

Improving Antibiotic Prescribing on a Long-term Care Unit

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Background

- Antibiotic misuse leads to adverse outcomes: antibiotic resistance forming multi-drug resistant organisms (MDROs), increased *Clostridioides difficile* infection (CDI) rates, allergic & adverse responses, increased mortality rates & increased economic expenses globally^{7, 11, 14, 18}
- 50-75% of antibiotic misuse in LTC.^{7, 18, 22}
- 8 theoretic domains associated with antibiotic misuse: knowledge, skill, environmental context and resources, social or professional role and identity, social influences, consequential beliefs, & reinforcement⁴
- Inappropriate prescribing patterns associated with communication and knowledge gaps were identified within the project's setting¹²
- Decision-making aids improve antibiotic prescribing in LTC facilities by improving nurse-provider communication^{5, 17, 26}
- Educational seminars engage the multidisciplinary team & have demonstrated effectiveness in decreasing antibiotic prescribing in LTC facilities^{10, 21, 25-26}
- Educating residents & their families is essential to curbing antibiotic prescribing⁸

Purpose & Aim

- The purpose of this quality improvement project is to improve antibiotic prescribing on a LTC unit by:
 - Decreasing overall antibiotics prescribed
 - Increasing beta-lactam as first-line therapy
 - Increasing adherence to guideline directed antibiotic use
- This will be completed through the implementation of a toolkit comprised of a communication template, a treatment guide, & educational handouts derived from the Agency for Healthcare Research and Quality (AHRQ) & standard guidelines
- The aim of this quality improvement project is to improve antibiotic prescribing on a LTC unit through the implementation of a toolkit within a 12-week period

Methods

- **Design:**
 - Quality improvement with a pre-post intervention design
- **Setting:**
 - 63-bed LTC unit, within a 269-bed nursing & rehab center in Maryland
- **Sample:**
 - Nurses (n=7) & providers (n=4) caring for the LTC unit residents
- **Measures:**
 - Data dictionary for data collected
 - The treatment guide was used to identify if criteria for antibiotic use was met
 - Please see the handout for these measurement tools
- **Intervention:**
 - 5 small group educational sessions targeting participants
 - Providers received training via e-mail.
 - Toolkit: Communication template², Treatment guide^{15, 23-24}, Educational handouts²

Results

Baseline Characteristics of Nurse Participants

Demographic characteristics		(n=7)	
Age, mean (SD)	45.86 (6.842)	Years of experience, mean (SD)	14.71 (2.690)
Sex, n (%)		Highest degree held, n (%)	
Male	2 (28.6)	Post-Doctoral, Doctoral, Master	0 (0)
Female	5 (71.4)	Bachelor	1 (14.3)
Race, n (%)		Associate	4 (57.1)
Caucasian	1 (14.3)	High School Diploma, GED	0 (0)
Black or African American	5 (74.1)		
Asian	1 (14.3)		
Role, n (%)			
Registered nurse	1 (14.3)		
LPN	6 (85.7)		

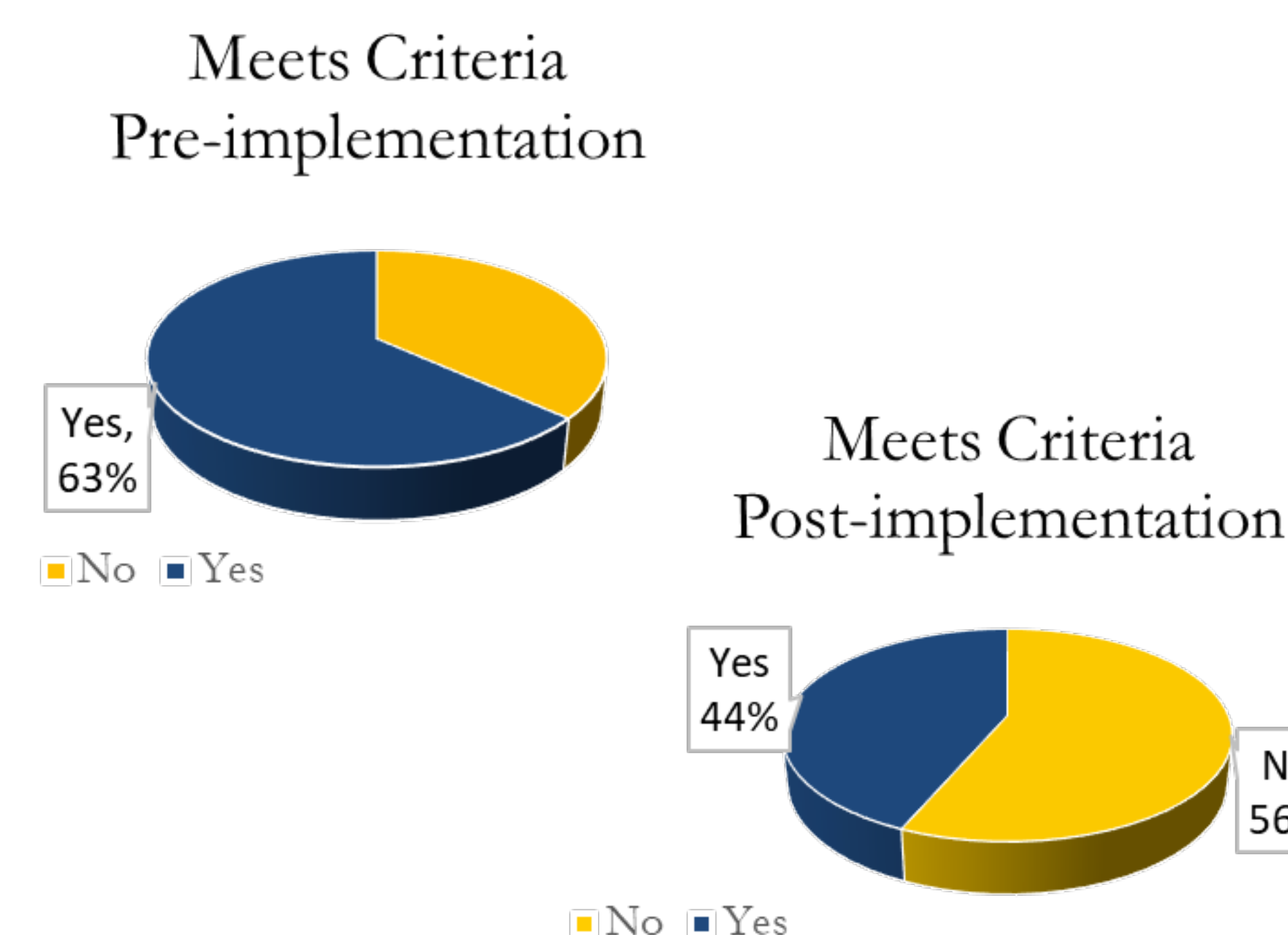
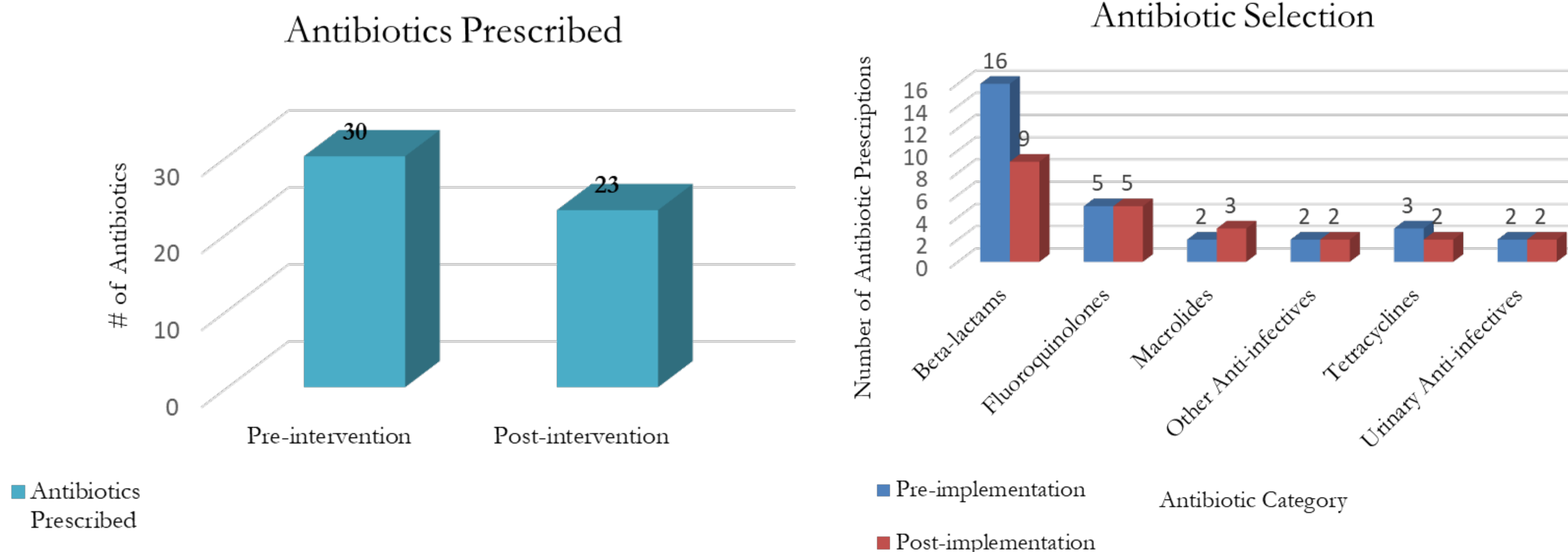
SD=standard deviation
Note. Demographics of nurse participants on the LTC unit.

Baseline Characteristics of Provider Participants

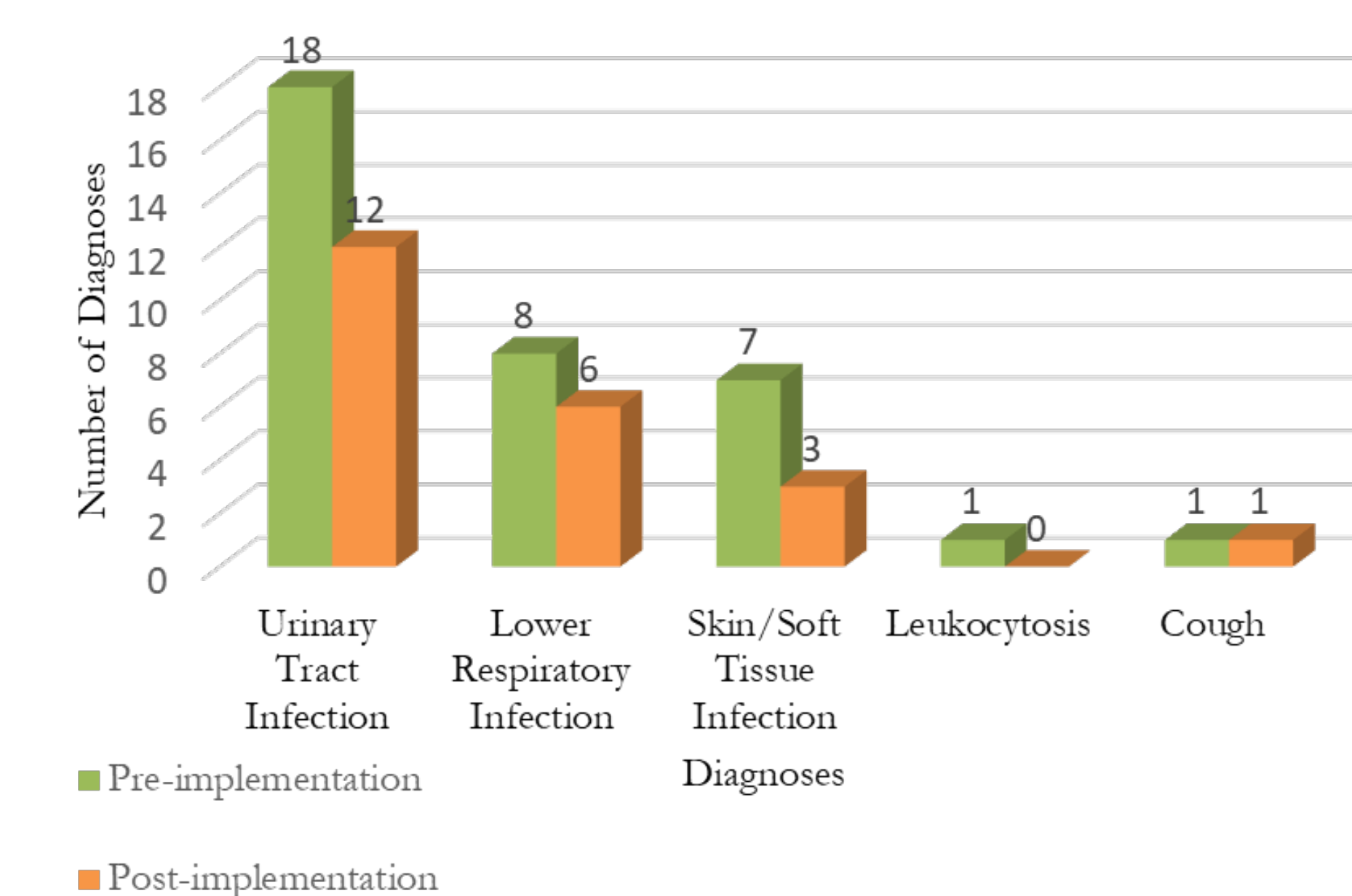
Demographic characteristics		(n=4)	
Age, mean (SD)	43.25 (7.455)	Years of experience, mean (SD)	9.25 (9.674)
Sex, n (%)		Highest degree held, n (%)	
Male	0 (0)	Post-Doctoral	0 (0)
Female	4 (100)	Doctoral	3 (75)
Race, n (%)		Master	1 (25)
Caucasian	0 (0)	GED, High School Diploma, Associate, Bachelor	0 (0)
Black or African American	2 (50)		
Asian	2 (50)		
Role, n (%)			
Physician	2 (50)		
Nurse Practitioner	2 (50)		

SD=standard deviation
Note. Demographics of the providers on the LTC unit.

Antibiotic Data Collection



Diagnosis Associated with Antibiotic Selection



Discussion

- 23.3% (30→23) decrease overall antibiotic use: correlates with literature
- Decreased criteria met: incomplete communication tools, limited data in chart reviews?
- Beta-lactams, 1st line therapy: used majority of time; large decrease related to allergy?¹⁶

Limitations

- Decreased sense of urgency and lack of participation among key stakeholders
- True stakeholder emerged late
- Communication tool integration foiled timeline, thus skewing results
- Small sample size: time frame limited data collection
- Participant attrition & turnover limited this project
- Communication tool was not used consistently
- Statistical analysis limited to descriptive statistics given nature of data collected

Conclusion

1. Project demonstrates the toolkit's use decreases overall antibiotic use on a LTC unit
2. For future success in implementing this intervention, address the limitations outlined
3. Dissemination & Sustainability:
 - Present findings to leadership
 - Mitigate limitations for sustainability and implement throughout project setting to unify participants and establish the intervention facility-wide
4. Future implications:
 - Toolkits bundled with audit & feedback from infectious disease consultation & education directed towards residents & their family may reveal superior antibiotic prescribing improvements¹⁰
 - Infectious disease consultations via telemedicine may be more cost effective¹⁹
 - Examine participant knowledge towards antibiotic use: true barrier?
 - Examine residents & their family's knowledge/perceptions towards antibiotic use

Reference

Please see reference list
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Data dictionary- Antibiotics		Duration (# of days)		Drug Category	Diagnosis
Antibiotic	Route				
Amox/Clauv= 0	Oral=0	0-12	Beta-lactams= 0	UTI= 0	
Doxy = 1	Intravenous= 1		Tetracyclines= 1	Lower Respiratory Infection (PNA, COPD, Bronchitis, URI) =1	
Azithromycin= 2			Macrolides= 2	Skin/Soft Tissue Infection (Cellulitis, Abscess, Wound infection)= 2	
Pip-Tazo= 3			Fluoroquinolones= 3	Cough= 3	
Cipro= 4			Anti-infective= 4	Leukocytosis= 4	
Cephalexin= 5			Urinary Anti-infective= 5		
Cefepime= 6					
Linezolid= 7	Provider		Hospital abx initiation?	SBAR complete?	
Cefuroxime= 8	SG= 0		No= 0	No= 0	
Levofloxacin= 9	MS= 1		Yes= 1	Yes= 1	
Nitrofurantoin= 10	NO= 2				
Moxifloxacin= 11	JB= 3		Treatment Criteria Met?		
Sulfa/Trim DS= 12	GK= 4		No= 0		
Ertapenem= 13	SA= 5		Yes= 1		
Cefdinir= 14	DS= 6				

Urinary Tract Infections

Empiric Tx:

Uncomplicated: Nitrofurantoin 100mg po Q12H x 5days (CrCl >30); Cefdinir 300mg po Q12H x 5days

Complicated: Cefdinir 300mg po Q12H x 14 days; TMP/SMX 800/160mg po Q12H x7 days

Without Urinary Catheter +1 of the following:	With Urinary Catheter +1 of the following:
<ul style="list-style-type: none"> 1) Acute dysuria alone 2) Fever 100F or neutrophilia +1 of the following symptoms OR afebrile or no neutrophilia +2 of the following symptoms: <ul style="list-style-type: none"> - Frequency - Urgency - Suprapubic tenderness - Gross hematuria - Costovertebral angle tenderness (CVAT) - New urinary incontinence 	<ul style="list-style-type: none"> 1) Fever 100F or neutrophilia 2) New CVAT 3) Rigors/ shaking chills 4) Delirium 5) New onset hypotension

Lower Respiratory Infection

Empiric Tx:

Augmentin 875mg po Q12H; Cefdinir 300mg po Q12H; If severe case, then add Azithromycin 500mg po Q24H as well;

Severe PCN allergy: Moxifloxacin 400mg po Q24H

Typical Duration: 5-7days

Fevers >102F +1:	Fever 100-102F +1:	Afebrile, >65 y/o, +COPD +2:	Afebrile, >65 y/o, -COPD +:	PNA (all three)
<ul style="list-style-type: none"> - RR >25 breaths/minute - New/worsening cough - New/ increased sputum - O2 <94% on room air/ 3% baseline decrease 	<ul style="list-style-type: none"> - Pulse >100 - Delirium - Rigors - RR >25 	<ul style="list-style-type: none"> - New/ worsening cough - Purulent sputum 	<ul style="list-style-type: none"> - New/ worsening cough - Purulent sputum AND +1: - RR >25 - Delirium 	<ul style="list-style-type: none"> 1) CXR with infiltrate/ PNA 2) At least 1: <ul style="list-style-type: none"> - RR >25 breaths/minute - New/worsening cough - New/ increased sputum - O2 <94% on room air/ 3% baseline decrease - Change in lung exam - Pleuritic CP 3) At least 1: <ul style="list-style-type: none"> - Fever - Change in Mental Status - Acute functional decline - Neutrophilia (>14K WBC or left shift)

Skin and Soft Tissue Infections

At least one of the following:

- 1) Purulent drainage
- 2) New or increasing presence of at least 4 of the following:
 - Warmth, Redness, Swelling, Tenderness, AND/OR Serous drainage to the infected site, AND/OR One of the following:
 - Fever, Leukocytosis, Delirium, Acute functional decline

Empiric Tx:

Suppurative Cellulitis- TMP/SMX DS 1tab po Q12H; Doxycycline 100mg po Q12H; Clindamycin 300mg po Q8H
Non-suppurative Cellulitis- Augmentin 875mg po Q12H; Cephalexin 500mg po Q6H; **Severe PCN allergy:** Clindamycin 300mg po Q8H ****adjust dosing for renal insufficiency**

Duration: 5-7 days

Cutaneous Abscess- Primary Tx is Incision and Drainage (I&D)