Asymptomatic Bacteriuria, Antibiotic Use, and Suspected Urinary Tract Infections in Twelve Nursing Homes

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Introduction

♦ Urinary tract infections (UTI) are the most commonly treated infection among nursing home residents.

♦ Even in the absence of specific (e.g., dysuria) or non-specific (e.g., fever) signs or symptoms, residents frequently receive an antibiotic for a suspected infection.

Research Objectives

To investigate the use of a communication and decision tool to assist nurses and prescribing clinicians to make better decisions around initiating antibiotics for suspected urinary tract infections (UTIs).

Specific research questions included:

1. Did the tool decrease the use of antibiotics for asymptomatic individuals with suspected bacteriuria?

2. What factors affected the likelihood that a resident receiving an antibiotic for a suspected UTI was asymptomatic?

Methods

Study design:

♦ Intervention: A communication tool, completed by a nurse and faxed to a clinician, with an algorithm emphasizing appropriate symptoms where antibiotics are apt to treat a suspected UTI.

♦ 12 NHs, selected to balance facility characteristics among groups, were divided equally among 3 intervention conditions:

  ♦ A comparison group.

  ♦ A "high intensity group" that received two trainings, the communication tool, and received additional proactive support on a monthly basis.

  ♦ A "low intensity" group that received a single training, the communication tool, and a phone number to call if support was needed.

♦ Obtained quantitative data on use of the form, antibiotic use, symptoms, and resident characteristics over six months from medical record, MDS, and infection log.

♦ Obtained qualitative data from staff and clinicians regarding the facilitators and barriers to implementing the communication tool and current practices to determine if a resident has a UTI.

Population studied: Four populations are included: nursing homes, residents, staff (administrators and nurses), and prescribing clinicians.

Results

Exhibit 1. Ranges of facility characteristics in the study groups

Characteristic	Comparison homes (N = 4)	Lower intensity intervention (N = 4)	Higher intensity intervention (N = 4)
Total number of beds	78–120	88–120	103–120
Number of bed days/month	1550–3096	1144–3019	1603–3026
Average rate of antibiotic prescription per 1,000 resident bed days per month	4.33–10.69	3.95–13.43	3.78–12.92
Number of attending physicians	3–8	1–15	2–12
Ownership arrangement	Not-for-profit – corp. (1) For-profit – corp. (3)	For-profit – corp. (3) For-profit – part. (1)	Not-for-profit – corp. (1) For-profit – corp. (2) For-profit – part. (1)

Exhibit 2. Prescriptions Ordered for UTIs (Unadjusted Frequencies)

		Results Unadjusted by Covariates			
Samples		Pre-intervention		Post-intervention	
		Asymptomatic	Symptomatic	Asymptomatic	Symptomatic
N (residents)		251	104	201	113
Level of fidelity					
Implemented (n=4 homes)	N	79	29	38	39
	%	73.15	26.85	49.35	50.65
Not Implemented (n=8 homes)	N	172	75	163	74
	%	69.64	30.36	68.78	31.22

Note: Symptomatic is defined as the presence of at least one symptom consistent with a UTI—fever, pain on urinating, etc.

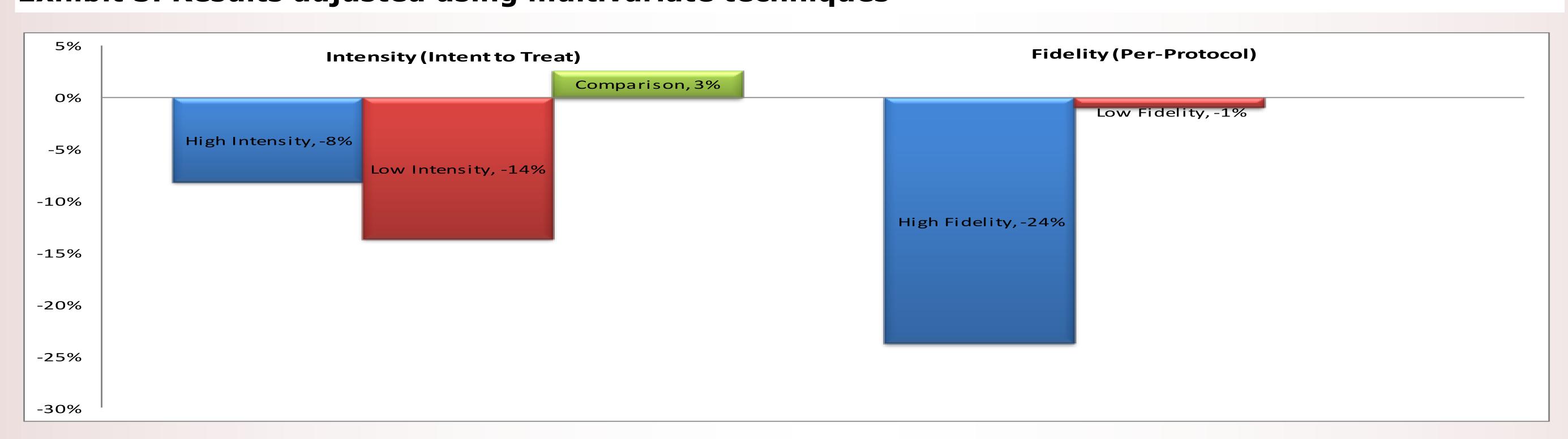### Exhibit 3. Results adjusted using multivariate techniques

Exhibit 4. Percent Change in Antibiotic Prescription Rates for Asymptomatic UTIs

Results adjusted using multivariate techniques		
	Odd-ratios	p (t) =
Pre/post period	1.05	0.81
Implemented intervention	1.14	0.75
Change from pre-intervention likelihood if intervention implemented	0.35	0.01

Findings

♦ In the intent to treat (ITT) model, the low and high intensity homes saw a 14% and an 8% reduction in the likelihood that an antibiotic would be prescribed for an asymptomatic UTI respectively.

♦ However, NH's adherence to protocol varied. The team evaluated fidelity to the protocol based on input from data abstracters/trainers and qualitative interviews with NH staff. The team then re-coded the intervention NHs according to their fidelity to the protocol.

♦ In the per-protocol model, the high fidelity NHs saw 24% reduction in the likelihood that an antibiotic would be prescribed for an asymptomatic UTI.

♦ After controlling for differences in resident characteristics, the likelihood of a prescription being written for suspected ASB decreased significantly in the homes that implemented the intervention with fidelity (OR = 0.35, 95% CI = 0.16–0.76)

Discussion

♦ In the ITT model, high intensity and low intensity intervention groups performed better than the comparison group but did not differ from each other. Using the per-protocol model, the high fidelity group performed much better than both the low fidelity and the comparison groups. Therefore, when it is used as intended, the intervention appears to work very well.

• Although the intervention reduced unnecessary antibiotic use during the study, in the real world of nursing home operations, this intervention did not become embedded in the everyday operations of the study nursing homes and thus the favorable impact of the intervention on antibiotic stewardship was not sustained beyond the first 3 months following introduction of the intervention

Limitations

♦ Quasi-experimental design.

♦ Because the sample is prescriptions and not residents, it does not include residents who had ASB and did not receive a prescription, nor does it include residents with the symptoms of a UTI who did not receive a prescription

♦ Small number of NHs.