ANTIBIOTIC STEWARDSHIP FOR ACUTE BRONCHITIS: A MULTI- YEAR QUALITY IMPROVEMENT STUDY IN UNIVERSITY HEALTHCARE.

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Element 1: Purpose

- Acute bronchitis is a leading cause of ambulatory care visits within the United States. Despite its well-established viral etiology, over-prescribing of antibiotics persists. This prescribing pattern is concerning because of the potential for microbial antibiotic resistance and adverse drug reactions.
- There are approximately 20 million college students nationally, and 5-6% are estimated to have an episode of acute bronchitis each year. College health has the same over prescribing pattern for this condition (see Figure 1) as in the general medical population (i.e., Del la Sierra, 2014; 60-80% received antibiotics for acute bronchitis).
- Therefore, we initiated a quality improvement (QI) study to drive antibiotic stewardship for acute uncomplicated bronchitis (AUB) within a university-based healthcare setting.

Element 2: Performance Goal

- The objective of the QI study was to have an antibiotic prescription rate for AUB at a level of 10% or less (i.e., at least 90% compliance).
- We chose a 90% performance goal because research shows that AUB has a viral etiology in the vast majority (>90%) of cases (Albert, 2010).

Element 3: Data Collection Plan

- We conducted a chart review to determine if antibiotics were prescribed, and whether treatment was appropriate per American College Health Association (ACHA) 2014 clinical benchmark guidelines (see Element 4).

Element 4: Data Collection Plan

- A committee composed of physicians, physician assistants, and advanced practice registered nurses conducted a peer/chart review process.
- The time period sampled for the peer/chart review each academic year was from October-March.
- A report was run on all medical charts during the indicated time frame where a diagnosis of acute bronchitis, bronchitis NOS, chronic bronchitis NOS, or cough were entered by the provider.
- Clinicians were assigned these charts in order to assess clinician compliance with previously determined ACHA 2014 clinical benchmark guidelines related to AUB.

➢ Cases with the following characteristics were excluded from chart review:

- Evidence of underlying pulmonary, cardiac, renal, immunological disorder.
- Have symptoms more than 3 weeks.
- Have abnormal exam findings consistent with pneumonia.

Element 5: Data Analysis & Findings

- ACHA performed a national survey in 2014, with 66 university health centers participating, including Princeton University.
- The ACHA study found many students (i.e., ~56% nationally) inappropriately received antibiotics for their acute bronchitis (see Figure 1).
- The baseline data (in 2013-2014) showed 80% of our bronchitis cases (n = 25 random charts with AUB) were inappropriately prescribed antibiotics, indicating only a 20% treatment compliance for Princeton University Health Center (see Figures 1 & 2).

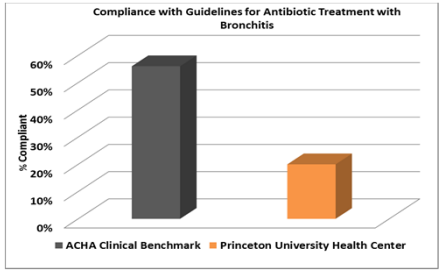

Figure 1: Initial Findings from ACHA (2014) Benchmarking Study

Element 6: Comparison with Goals

- Princeton University Health Center was significantly below the performance goal of having an antibiotic prescription rate for AUB at a level of 10% or less (i.e., at least 90% compliance).
- The Quality Improvement Committee (QIC) reviewed the baseline data within the context of the **Institute of Medicine's (IOM) six dimensions of Performance.**
- Several **IOM deficiencies** were noted (see Table 1), and a decision was made by the QIC (with full support from UHS governing body) to charter a formal QI study.

Potential IOM Deficiencies:

- **Safety:** nausea, vomiting, diarrhea, anaphylaxis, and antibiotic resistance.
- **Effectiveness:** antibiotics may only reduce duration of symptoms by just 1 day.
- **Efficiency:** cost of treatment.

➢ **Decision: Charter Formal QI Study.**

Table I: IOM Deficiencies from overprescribing Antibiotics for AUB.

Project Summary: Annual QI Interventions and Data (See Elements 7-9)

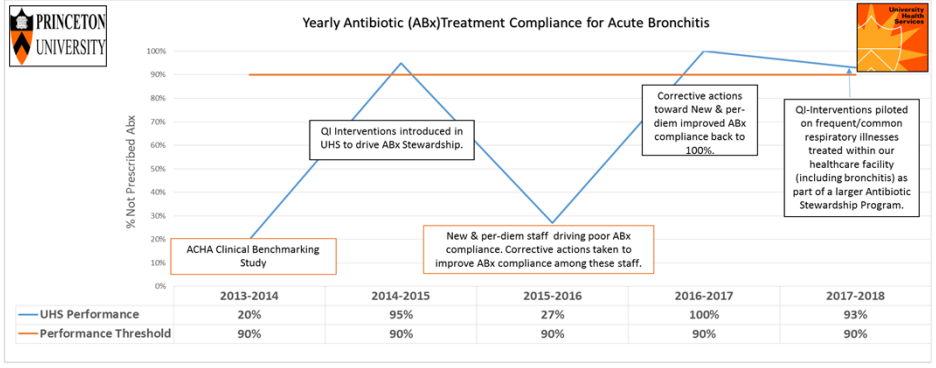

Figure 2: Summary of QI Study Data per Year

QI Strategies/Interventions	2014-2015	2015-2016	2016-2017	2017-2018
Patient Education [a, b]	A, B	A, B	A, B	A, B
Diagnostic Relabeling [c]	C	C	C	C
Provider Education [d, g]	D	D,G	D, G	G
Provider Accountability [e, f]	E	E, F	E, F	E, F

Table 2: Summary of QI Strategies/Interventions Implemented each Year (See Element 7)

Element 7: Corrective Action(s)

- The following corrective actions were implemented to address the four multimodal QI strategies listed in Table 2:

A. CDC leaflets/materials were utilized to communicate with students which common illnesses are usually viral or bacterial, and when antibiotic treatment is necessary.
B. Symptom relief for viral illness prescription pad was provided as a care plan to all patients presenting with bronchitis. This tool is a checklist for healthcare professionals to describe symptomatic relief for a viral illness diagnosis.
C. Clinicians employed the terms "chest-cold" and "post nasal drip" for conditions that previously would have been labeled acute bronchitis in the absence of criteria indicating bacterial infection.
D. The Director of Medical Services reviewed the recommendations for the diagnosis and treatment of acute uncomplicated bronchitis with medical providers (Rattinger et al., 2012; see Table 3).

Condition	Diagnostic Criteria	Antibiotic Treatment Criteria
Acute Bronchitis	1. Acute Cough (productive or not) 2. Duration < 21 days	Antibiotics not warranted

Table 3: Acute Bronchitis Diagnostic/Treatment Criteria.

E. Medical providers were informed that their antibiotic prescribing rate would be part of our medical peer review process to drive provider accountability, education, and feedback.
F. Positive feedback provided to medical group when benchmarks achieved.
G. Discussions with individual clinicians about antibiotic prescribing (either if requested or if concern from peer/chart review).

Element 8: Re-Measurement

- The QI interventions significantly reduced our antibiotic prescription rate from a baseline of 80% (20% treatment compliance; see Figure 1) to a level of 5% (5 out of 91 charts; 95% treatment compliance) for the 2014-2015 medical peer review (see Figure 2), Chi-square (1) = 4.07, $p < .05$.

Element 9 : Additional Corrective Action(s) & Re-Measurement

- We educated all new and per-diem staff on the appropriate treatment guidelines for AUB in 2016-2017 (see Figure 2), and replicated our interventions (see Figure & Table 2).
- We initiated a general antibiotic stewardship program by applying our interventions (see Figure & Table 2) toward frequent/common respiratory illnesses treated within our healthcare facility during the 2017-2018 academic year.

Element 10 : Communication of Findings

- The results of this QI study were shared with outpatient medical staff, the quality improvement committee, and our governing body.
- We presented a portion of this study at the 22nd Annual Scientific symposium on Improving the Quality and Value of Healthcare, December 5th, 2016.
- The QI study was published as an abstract in the BMJ Quality & Safety Journal (2016: 25 [12]; 994- 995).