

Antibiotic Use for Emergency Department Patients With Upper Respiratory Infections: Prescribing Practices, Patient Expectations, and Patient Satisfaction

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Study objective: Physicians often prescribe antibiotics to patients even when there is no clear indication for their use. Previous studies examining antibiotic use in acute bronchitis and upper respiratory infections have been conducted in primary care settings. We evaluate the factors that physicians in the emergency department (ED) consider when prescribing antibiotics (eg, patient expectations) and the factors associated with patient satisfaction.

Methods: Ten academic EDs enrolled adults and children presenting with symptoms consistent with upper respiratory infection. Enrolled patients were interviewed before their physician encounter and were reinterviewed before discharge and 2 weeks later. Physicians were interviewed about factors that influenced their management decisions, including their perceptions of patients' expectations. Patients with a single diagnosis of uncomplicated acute bronchitis or upper respiratory infection were included for analysis.

Results: Of 272 patients enrolled, 68% of bronchitis patients and 9% of upper respiratory infection patients received antibiotics. Physicians were more likely to prescribe antibiotics when they believed that patients expected them (odds ratio [OR] 5.3; 95% confidence interval [CI] 2.9 to 9.6), although they were able to correctly identify only 27% of the patients who expected antibiotics. Satisfaction with the ED visit was reported by 87% of patients who received antibiotics and 89% of those not receiving antibiotics. Satisfaction with the visit was reported by 92% of patients who believed they had a better understanding of their illness but only by 72% of those who thought they had no better understanding (OR 4.4; 95% CI 2.0 to 8.4).

Conclusion: Physicians in our academic EDs prescribed antibiotics to 68% of acute bronchitis patients and to fewer than 10% of upper respiratory infection patients. Physicians were more likely to prescribe antibiotics to patients who they believed expected them, although they correctly identified only about 1 in 4 of those patients. Patient satisfaction was not related to receipt of antibiotics but was related to the belief they had a better understanding of their illness. [Ann Emerg Med. 2007;50:213-220.]

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INTRODUCTION

Background and Importance

Increases in antimicrobial resistance, related to antibiotic use and overuse, have been a growing concern.¹⁻⁶ Because

*All members are listed in the Appendix.

upper respiratory infections and acute bronchitis are among the most frequent source of antibiotic prescriptions and because antibiotics provide little if any benefit for these conditions, the Centers for Disease Control and Prevention (CDC) and others have published guidelines for appropriate antibiotic use.^{5,7-11} The guidelines have focused on medical

Editor's Capsule Summary*What is already known on this topic*

Primary care physicians commonly overprescribe antibiotics for acute bronchitis and upper respiratory infection, increasing drug resistance and adverse effects.

What question this study addressed

What is the antibiotic prescribing pattern of emergency physicians treating acute bronchitis and upper respiratory infections?

What this study adds to our knowledge

Emergency physicians prescribed antibiotics for about 2 patients of every 3 with acute bronchitis and about 1 patient of every 10 with upper respiratory infection. Patients who physicians believed expected antibiotics were more likely to receive them. However, physician assessment of patient expectation was correct in only about 1 patient of 4, and receipt of antibiotics was not associated with patient satisfaction.

How this might change clinical practice

If emergency physicians did not prescribe antibiotics for acute bronchitis or upper respiratory infections according to presumed patient expectation, antibiotic overuse could be reduced, without reduction in patient satisfaction.

appropriateness, but other factors may also affect the decision to prescribe antibiotics.

Physicians may prescribe antibiotics because the patient insists on them or because they believe the patient expects them.^{12,13} Patients with upper respiratory infection or bronchitis may insist on antibiotics because they believe that they are necessary for treatment, a perception that could be the result of previous experiences with similar illnesses or the misconception that antibiotics have a beneficial effect in viral illnesses.¹⁴⁻¹⁶ Physicians may believe that patient satisfaction depends on the receipt of an antibiotic prescription, but correction of patient misconceptions may be of value as well.

Previously published studies on antibiotic use in respiratory infections have been predominantly based in primary care settings,^{13,14,16-19} and so their findings may not necessarily apply to the emergency department (ED). Patients in the ED may be more ill, be less likely to have insurance, and lack access to good medical follow-up.

Goals of This Investigation

This study was designed to examine the antibiotic prescribing practices of physicians for ED patients and the effect of those practices on patient satisfaction. Surveys of patients and treating physicians were used to assess some of the clinical and nonclinical factors associated with the decision to prescribe antibiotics, such as patients' expectations. Other factors

contributing to patient satisfaction such as patient education and waiting times were also examined.

MATERIALS AND METHODS**Study Design**

This was a multicenter, prospective, observational cohort study. Study sites were 10 members of a collaboration of geographically diverse EDs whose participation in the study was supported by the CDC. A detailed description of the structure and administration of the study group has been published previously.²⁰ Patients were interviewed twice during the ED visit and received a telephone follow-up interview 2 weeks later. Treating physicians (residents or attending physicians) were interviewed as soon as possible after patient encounter. The study was approved by the institutional review board at each site and at the CDC.

Setting

All 10 study sites were located in urban areas and had a combined annual census of more than 800,000 ED visits. Each site supports an emergency medicine residency training program and is closely affiliated with a medical school.

Selection of Participants

Subjects were eligible for inclusion in the study if they were adult patients or guardians of children who presented to the triage area of the ED, with a chief complaint consistent with a respiratory infection (ie, cough, runny nose, nasal congestion, sore throat, trouble breathing) or if they stated that they had a cold or the flu. Patients with underlying respiratory conditions such as asthma and chronic obstructive pulmonary disease were excluded. Subjects were required to provide consent to undergo 2 brief interviews during the ED visit and a brief telephone follow-up interview 2 weeks later.

To reduce seasonal variation in practice patterns, two 2-week enrollment periods were conducted during the winter of 1999 to 2000 and the summer of 2000. Some sites performed continuous data collection for the entire study period, whereas other sites scheduled research associates only during high-volume hours. Using standardized videotapes, each participating ED trained a group of research associates to identify and screen patients, perform structured interviews, and obtain data. No on-duty medical staff performed interviews. Research associates approached the patient for consent while the patient was awaiting physician evaluation.

Data Collection and Processing

Research associates interviewed each patient before and immediately after the physician encounter. Data collected on the previsit questionnaire items included patient demographic characteristics, medical history, and characteristics of the present illness, including the duration of symptoms. Patients were asked about their expectations for medical care during the ED visit (eg, blood tests, radiographs, prescriptions for antibiotics, and

hospitalization). Patients were asked whether they believed that any medications would be important in shortening the duration of their present illness.

A second questionnaire was administered to patients after their physician encounter but before leaving the ED. The postvisit survey items included an estimate of the patient's waiting time and time spent with the treating physician. Patients were asked whether they had received an antibiotic prescription, whether they had a better understanding of their illness after the physician encounter, and whether they were "very satisfied," "satisfied," "uncertain," "dissatisfied," or "very dissatisfied" with their ED visit.

Each patient's treating physician was interviewed as soon as possible after the patient encounter, generally immediately after the research associate completed the postvisit patient interview. Physicians were told that the survey was intended to study factors related to patient care but were not given any details about the study goals and were not provided with any study information obtained from the patient. The physician was asked whether the patient seemed to expect medication for treatment of his or her illness and whether the patient requested any medication. If either response was affirmative, the physician was asked what type of medication was expected. The physician was asked the patient's final diagnosis ("sinusitis," "otitis media," "pharyngitis or tonsillitis," "acute bronchitis," "acute exacerbation of chronic bronchitis," "viral upper respiratory infection, eg, common cold," "viral lower respiratory illness, eg, respiratory syncytial virus," "pneumonia," "asthma, allergies, hay fever . . .," or "other") and to provide his or her impression of the cause of the patient's respiratory illness (bacterial, viral, or equally likely to be either bacterial or viral), if relevant. The physician was asked whether an antibiotic was prescribed and to describe (without prompting) the factors related to the decision to prescribe an antibiotic. The physician was next asked to state the importance of a number of specific factors in his or her decision to prescribe an antibiotic, including indicators of disease severity, underlying patient characteristics, and results of any tests performed in the ED. Because physicians were not asked to provide informed consent for their participation in the study, interview data were gathered anonymously, and analyses clustered by physician were not performed.

The survey instrument was developed by using the nominal group technique. A group of authors (D.A.T., G.J.M., S.O., M.J.K., and W.R.J.) developed the study questions after a detailed review of previous studies of antibiotic use in primary care settings and expert guidelines for appropriate use of antimicrobials in bronchitis and upper respiratory illnesses. The survey questions were discussed during meetings of all study group members, and revisions were made to the data collection instrument. The instrument then underwent pilot testing at a single study site, and questions were further modified as necessary to address ambiguities. Data from the testing phase were not included in the analysis.

Outcome Measures

The primary outcome measure was receipt of antibiotics among patients with a single diagnosis of acute bronchitis or viral upper respiratory infection. Secondary outcomes of interest included patient expectation, physician-perceived patient expectation, and patient satisfaction. In our a priori theoretic model, we anticipated that receipt of antibiotics would be associated with patients' symptoms, signs, expectations, and satisfaction.

Primary Data Analysis

Descriptive data reported as continuous variables are expressed as medians with interquartile ranges. Univariate associations are expressed as unadjusted odds ratios (ORs) with 95% confidence intervals (CIs). Patient satisfaction reports are dichotomized as "satisfied" (including "very satisfied" or "satisfied" responses) and "not satisfied" (including "uncertain," "dissatisfied," and "very dissatisfied" responses).

RESULTS

During the study periods, 875 patients were approached for participation in the study. Twenty-one patients were excluded because of incomplete previsit interviews, 107 because of incomplete postvisit interviews, and 17 because of incomplete physician interviews. Patients with asthma (111), pneumonia (85), sinusitis (78), otitis media (48), chronic obstructive pulmonary disease (19), or multiple diagnoses were excluded from further analyses. Patients with other diagnoses necessitating antibiotic use such as cystitis were also excluded. Data from the 272 patients who had a single diagnosis of either bronchitis or viral upper respiratory infection were included in the following analyses (Figure).

The median age was 33 years; 54 patients were younger than 18 years (20%); 10 patients were older than 65 years (3%).

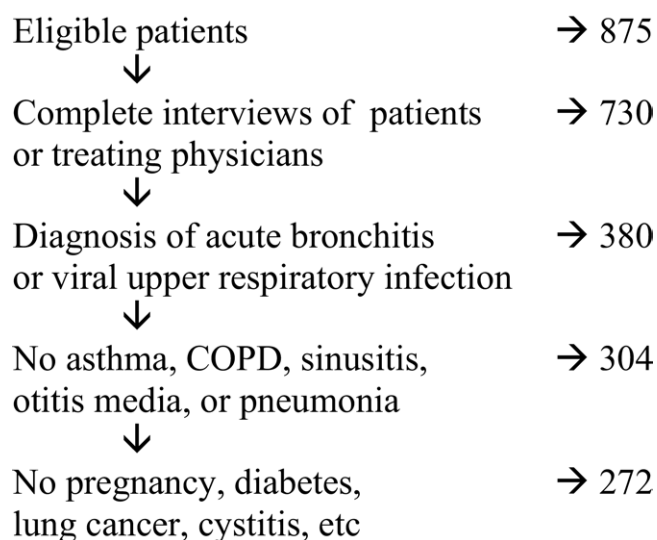


Figure. Subject flow diagram. COPD, Chronic obstructive pulmonary disease.

The median duration of illness before the ED visit was 5 days (interquartile range 2 to 10 days) in bronchitis patients and 4 days (interquartile range 2 to 7 days) in viral upper respiratory infection patients. Thirty-five patients (13%) had presented to another health care provider during the course of their illness; 11 (4%) had received antibiotics, and 15 (6%) received antipyretics or other cold medicines.

Before their medical evaluation, 98 patients (36%) expected to receive blood tests or radiographs during their ED evaluation. Twenty-nine patients (11%) expected only an antibiotic prescription, 101 (37%) expected an antibiotic and another medication prescription, 71 (26%) expected only a nonantibiotic prescription, and 71 (26%) did not expect to receive a prescription. Thirteen patients (5%) expected to be hospitalized. Two hundred eight patients (76%) believed that antibiotics were necessary to successfully treat their illness. Patients expected to spend a median of 15 minutes with the physician (interquartile range 10 to 20 minutes).

Eighty-one patients (30%) reported having a similar illness in the past that was treated with antibiotics. These patients were more likely to expect antibiotics (OR 2.2; 95% CI 1.3 to 3.7) and to believe that antibiotics were necessary for their current illness (OR 3.8; 95% CI 1.7 to 8.3) compared with patients who had never received antibiotics for similar illnesses.

Two hundred forty-two patients (89%) knew that antibiotics are effective against bacteria, but 188 (69%) believed that antibiotics are effective against viruses.

Two hundred seventy-two physician interviews were evaluable. Overall, 83 patients (31%) received an antibiotic prescription and 136 patients (50%) received a nonantibiotic prescription. Among the patients with acute bronchitis, 67 patients (68%) received an antibiotic prescription, whereas 25 patients (26%) received a nonantibiotic prescription. In the upper respiratory infection patients, 16 patients (9%) received an antibiotic prescription, whereas 111 patients (64%) received a nonantibiotic prescription. Antibiotic prescription rates for the sole diagnosis of otitis media were 100% (14/14), for sinusitis 82% (31/38), for pharyngitis 70% (37/53), for chronic obstructive pulmonary disease 69% (9/13), and for asthma 5% (3/58).

Physicians believed the cause of acute bronchitis was most likely bacterial in 22 patients (22%), 20 of whom received (91%) an antibiotic prescription. One of the 2 patients who did not receive an antibiotic prescription was already taking antibiotics. Thirty-two bronchitis patients (33%) were deemed to have an equal likelihood of bacterial or viral infection, 29 (91%) of whom were treated with antibiotics. One of the 3 patients who did not receive an antibiotic prescription was already taking antibiotics. A probable viral cause was the clinical determination in 41 (42%) acute bronchitis patients, of whom 17 (41%) were prescribed antibiotics. The 2 bronchitis patients (2%) who were judged to have a noninfectious cause did not receive antibiotic prescriptions. Overall, physicians were far more likely to prescribe

Table. Frequency of antibiotic prescriptions according to subject characteristics.*

Characteristic	Patients With Characteristic and Prescribed Antibiotics, No. (%)	Patients Without Characteristic and Prescribed Antibiotics, No. (%)	OR
Insurance	26/121 (21)	56/146 (38)	0.4 (0.3–0.7)
History of fever	33/115 (29)	50/157 (32)	0.9 (0.5–1.5)
Runny nose	27/105 (26)	56/167 (34)	0.7 (0.4–1.2)
Sinus pain	19/41 (46)	64/232 (28)	2.4 (1.2–4.7)
Ear pain	13/30 (43)	70/242 (29)	1.9 (0.9–4.1)
Sore throat	31/101 (31)	52/171 (30)	1.0 (0.6–1.7)
Cough	70/214 (33)	13/58 (22)	1.7 (0.9–3.3)
Green or bloody phlegm	30/82 (37)	53/190 (28)	2.6 (1.4–4.8)
Trouble breathing	36/86 (42)	47/186 (25)	2.1 (1.2–3.6)
Not improving	10/33 (30)	73/239 (31)	1.0 (0.4–2.2)
Temperature >38.4°C in ED	6/25 (24)	69/161 (43)	0.7 (0.3–1.9)
O ₂ saturation <92%	8/26 (31)	38/97 (39)	0.7 (0.3–1.7)
Respiratory rate >24 breaths/min	3/18 (17)	66/216 (31)	0.4 (0.1–1.5)
Sinus tenderness	10/20 (50)	73/252 (29)	2.5 (1.0–6.1)
Abnormal lung examination result	44/72 (61)	39/200 (20)	6.5 (3.6–12)

*Total patient numbers for some characteristics are less than 272 because of incomplete data.

antibiotics when they believed the cause to be bacterial (OR 15; 95% CI 3.0 to 74).

The specific disease characteristics and examination findings associated with prescription of antibiotics are presented in the [Table](#). Insured patients were less likely to receive antibiotics than uninsured patients (OR 0.4; 95% CI 0.3 to 0.7). Green or bloody phlegm, complaints of trouble breathing, sinus pain, and sinus tenderness were associated with increased antibiotic use, but fever, oxygen saturation less than 92%, and tachypnea were not. Physicians were more likely to believe a bacterial infection was involved when there was an abnormal examination result (OR 5.0; 95% CI 2.1 to 12).

Among patients prescribed antibiotics, physicians reported the following factors most frequently in their decision to initiate antibiotic therapy: probable bacterial cause (46 [55%]), green or bloody phlegm (41 [49%]), possibility of bacterial superinfection (27 [33%]), prolonged duration of symptoms (25 [30%]), wheezes on physical examination (21 [25%]), smoking status (21 [25%]), concern about poor follow-up (17 [20%]), the ill appearance of the patient (11 [13%]), and patient insistence (8 [10%]).

Attending emergency physicians prescribed antibiotics to 21 of the 57 patients (37%) they evaluated, whereas physicians in training gave antibiotics to 52 of 192 (27%) patients, a difference that did not reach statistical significance (OR 1.6;

95% CI 0.8 to 2.9). Emergency physicians (ie, attending physicians and residents) prescribed antibiotics to 49 of 183 patients (27%), whereas non-emergency physicians gave antibiotics to 28 of 76 (37%) patients, a difference that also did not reach statistical significance (OR 0.6; 95% CI 0.4 to 1.1).

Newer macrolides and azalides (clarithromycin and azithromycin) were the most frequently prescribed antibiotics, accounting for 29% of the antibiotic prescriptions, followed by erythromycin (20%), trimethoprim/sulfamethoxazole (17%), and amoxicillin (10%). The specific antibiotic prescribed was not documented in 16% of cases.

Physicians believed that 112 of 270 patients (41%) expected a prescription (64 for antibiotics, 29 for other medications, and the remainder could not specify). Of the 112 patients believed to expect a prescription, physicians reported that 43 (38%) explicitly requested a prescription. Of the 130 patients who expected antibiotics, physicians correctly identified 35 of them (27%). Of the 136 patients who stated they did not expect antibiotics, physicians correctly identified 109 (80%). Overall, physicians correctly identified the antibiotic expectations of 144 of 266 patients (54%). The receipt of an antibiotic prescription was associated with the physician's perception of the patient's expectations (OR 5.3; 95% CI 2.9 to 9.6) but was not associated with the patient's actual expectation of antibiotics (OR 1.4; 95% CI 0.8 to 2.2).

Of 270 patients with complete interviews, 239 (89%) were satisfied with their care in the ED. Seventy-two of the 83 patients (87%) receiving antibiotic prescriptions were satisfied with their care, whereas 167 of 187 patients (89%) not receiving antibiotics were satisfied (OR 0.8; 95% CI 0.4 to 1.5). Seventy-six of the 83 patients (92%) receiving antibiotic prescriptions were satisfied with the care by their treating physician, whereas 168 of 187 patients (90%) not receiving antibiotics were satisfied with their physician (OR 2.0; 95% CI 0.4 to 8.4).

Of the 219 patients who received any kind of prescription, 193 (88%) were satisfied with their care compared with 46 of 53 (87%) receiving no prescription (OR 1.0; 95% CI 0.4 to 1.8). There was no difference in satisfaction between patients receiving an antibiotic prescription and those receiving a nonantibiotic prescription (OR 0.8; 95% CI 0.4 to 1.5).

Patients who believed that they had a better understanding of their illness after their ED visit were more likely to be satisfied with their care (OR 4.4; 95% CI 2.0 to 8.4). After the ED visit, 72 patients (26%) still believed that antibiotics are active against viruses, an improvement from the original 188 (69%).

Overall satisfaction with the ED was not significantly associated with the amount of time spent with the physician (OR 1.6; 95% CI 0.7 to 3.1). Satisfaction with the physician was, however, associated with the amount of time spent with the patient: 105 of the 110 patients (95%) who reported that their physician spent at least 15 minutes with them were satisfied, whereas 135 of the 157 patients (86%) who reported less physician time were satisfied (OR 3.4; 95% CI 1.3 to 8.6).

One hundred eighteen of the 125 patients (93%) who reported waiting times of less than 60 minutes were satisfied with their ED visit compared with 121 of 145 (83%) who reported wait times of 60 minutes or more (OR 2.6; 95% CI 1.2 to 5.7).

One hundred fifty-one patients (56%) were available for telephone interviews 2 weeks after their ED visit. The association between continued satisfaction 2 weeks after their ED visit and the receipt of antibiotics did not reach statistical significance: 37 of 39 patients (95%) given antibiotics were satisfied, whereas 94 of 112 (84%) not given antibiotics were satisfied (OR 3.5; 95% CI 0.8 to 15.1). Four of the 39 patients (10%) who received antibiotics sought additional medical care, a proportion not significantly different from the 21 (19%) who did not receive antibiotics and also sought further care (OR 0.5; 95% CI 0.2 to 1.5). Thirty-six of the 38 patients (95%) who received antibiotics wanted them again for future similar illnesses, significantly more than the 71 of 104 (68%) who did not get antibiotics (OR 8.4; 95% CI 1.9 to 35.9).

Symptoms persisted for a median of 3 days after the ED visit (interquartile range 2 to 7 days), and the median number of days to return to regular activity was 3 days (interquartile range 2 to 5 days). Twenty-five of the 39 patients (64%) who received antibiotic prescriptions reported being back to normal or much better at the 2-week follow-up, comparable to the 77 of 112 (69%) who were not given antibiotics (OR 0.8; 95% CI 0.4 to 1.7). Among acute bronchitis patients given antibiotics, 20 of the 32 patients (63%) were back to normal or much better, comparable also to the 12 of 18 (67%) not receiving antibiotics (OR 0.8; 95% CI 0.2 to 2.3).

LIMITATIONS

We performed simple univariate analyses without performing multivariate adjustments. Because we did not adjust for confounding or interaction, we may have overestimated or underestimated some associations. Some sites used convenience samples, which may have subjected the results to some selection bias. Our study was based in urban, academic EDs so that prescribing practices in other ED settings may differ. We did perform a pilot study of the survey instrument but did not perform any formal assessment of the survey's validity or reliability. Although the purported focus of the study was patient satisfaction, it is possible that participating physicians discovered that antibiotic use was under scrutiny and thus restricted antibiotic use accordingly.

DISCUSSION

Inappropriate antibiotic use by physicians is ubiquitous and has far-reaching consequences. The emergence of drug resistance has been closely linked to antibiotic use.^{1,3,4,6,21,22} The significant incidence of adverse effects in patients given antibiotics inappropriately is also an important consideration.^{19,23} Financial considerations are a further concern as more expensive, broad-spectrum agents are used and because overuse may also result in future unnecessary

medical visits.^{14,24,25} Interventions to reduce antibiotic use have met with some success,²⁶⁻³¹ although success has not been universal.^{32,33} There have nonetheless been some data to suggest some recent improvement in antibiotic use in the pediatric population.³⁴

Previous studies in primary care settings, both in the United States and abroad, have found that up to 75% of patients with acute bronchitis receive antibiotics^{17,18,35,36} despite evidence of little if any benefit.^{10,37} The 68% antibiotic prescription rate for patients with acute bronchitis in our ED is consistent with those earlier findings. We had expected that antibiotic use in our academic EDs would be more judicious. Previous studies have also found antibiotic prescription rates of up to 60% for patients with upper respiratory infections or colds^{12,38,39} that are presumed to be viral and for which antibiotics have not been shown to improve outcomes. Performance in upper respiratory infection was better, with only a 9% antibiotic prescription rate.

Physicians frequently cited green or bloody phlegm as a factor in the decision to prescribe antibiotics despite the lack of evidence that this finding suggests a bacterial cause,¹⁰ presenting an opportunity for educational intervention. Other more concerning signs of illness such as tachypnea and a low oxygen saturation did not result in greater antibiotic use.

Previous studies have also shown that physicians will overprescribe antibiotics to patients who they believe expect them, even when they are not indicated.^{36,40-42} We similarly found that physician perception of patient expectation was strongly associated with antibiotic use, although physician perception frequently did not correspond to actual patient expectation. In addition, some patients even believe that physicians overprescribe antibiotics.⁴² Informing physicians about how often they are incorrect about patient expectations may be worthwhile to decrease antibiotic use.

Misconceptions among patients about the effectiveness of antibiotics in viral illness have been documented, resulting in both self-medication and unnecessary medical visits.¹⁴ Physicians may even contribute to these misconceptions by prescribing antibiotics and creating expectations for patients in the future, as we found in our study. Educational interventions directed toward patients have demonstrated some ability to reduce unnecessary antibiotic use.^{26,27} Correction of that misconception during an ED visit may even have the immediate benefit of higher patient satisfaction, as in the case of our study, because patients who think they have a better understanding are more satisfied.

Other nonmedical factors appear to play a role in the decisionmaking process, which in turn affects adherence to practice guidelines. Unlike in primary care settings, we found that more than half our patients were uninsured, and this was associated with more frequent antibiotic usage. Concern about inadequate medical follow-up, which is less likely a concern in primary care settings, was cited as a factor in 1 of 5 patients who received antibiotics in our study.

Previous studies have found that attending physicians prescribe antibiotics more frequently than physicians in training.^{38,39} Our study saw a similar trend, but it did not achieve statistical significance. We also found a trend toward lower prescribing rates among emergency physicians than other specialty physicians who rotated through the ED, which includes pediatricians and internists. Pediatricians and internists have been found to prescribe at lower rates than general or family physicians.^{12,43}

We conclude that physicians in academic EDs prescribe antibiotics to about 68% of patients with acute bronchitis and to fewer than 10% of patients with viral upper respiratory infections. Physicians' assessment of patients' expectation for antibiotics therapy was associated with antibiotic use, although they were inaccurate in assessing these expectations. Efforts to correct this disparity in physician perception and actual patient expectation may lower antibiotic usage. Unique to the ED setting is the concern for lack of reliable follow-up. Patient satisfaction was generally high and not associated with the receipt of antibiotics but was associated with patients' belief that they had a better understanding of their illness.

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APPENDIX

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