Impact of Reducing Antibiotic Prescribing for Acute Bronchitis on Patient Satisfaction

ORIGINAL ARTICLE

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CONTEXT. Using a patient and clinician educational intervention, we successfully reduced antibiotic use for uncomplicated acute bronchitis. The impact of this intervention on patient satisfaction is not known.

OBJECTIVE. To evaluate whether a strategy for reducing antibiotic use in acute bronchitis affects satisfaction among adult patients.

DESIGN. Telephone survey administered 1 to 4 weeks after an office visit for acute bronchitis.

SETTING. Two outpatient clinics belonging to a group-model HMO in the Denver, Colorado, metropolitan area. The intervention clinic had received a patient and office-based educational intervention that successfully reduced antibiotic prescribing for acute bronchitis during the previous winter. The control clinic received only the office-based materials, an intervention that did not reduce antibiotic prescribing.

OUTCOME. Overall satisfaction with the episode of care.

RESULTS. Antibiotics were prescribed to 64% and 85% of survey respondents at the intervention (n =102) and control clinics (n =164), respectively (P <0.001). Patient satisfaction with the visit did not differ between intervention and control clinics (69% of intervention and 63% of control clinic patients reported very good or excellent satisfaction, P >0.2). After adjustment for patient age, sex, duration of illness before the visit, reason for visit, and clinician specialty, there was no difference between intervention and control clinics in the proportion of patients reporting very good or excellent satisfaction (adjusted relative risk for high satisfaction at the intervention clinic, 1.1 [95% CI, 0.81 to 1.3]).

CONCLUSION. A patient- and clinician-oriented educational intervention that reduces antibiotic treatment of adults with uncomplicated acute bronchitis does not appear to reduce satisfaction with care.

Decreasing unnecessary antibiotic use in ambulatory practice is an important component of strategies to combat the emergence and spread of community-acquired antibiotic-resistant bacterial pathogens, such as penicillin-resistant *Streptococcus pneumoniae*.[1,2] Specifically, colds, upper respiratory tract infections, and acute bronchitis have been identified as important targets for reducing unnecessary antibiotic use in ambulatory practice.[3–5] Antibiotic treatment does not change the clinical course of these conditions, yet antibiotics are frequently prescribed for these conditions in the United States.

Recently, we demonstrated in a controlled trial that an intervention strategy consisting of patient and clinician education was effective in reducing antibiotic use for uncomplicated acute bronchitis in adults.[6] The decrease in antibiotic use was not associated with shifts in diagnostic coding, increases in nonantibiotic prescriptions, or

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increases in rates of return visits for bronchitis or pneumonia. Although several studies have reported that patient satisfaction with care for acute respiratory infections is not related to receipt of an antibiotic,[7–9] the impact of decreasing antibiotic prescription for these infections on patient satisfaction is not known. All studies to date were performed in practice settings in which no attempt had been made to reduce antibiotic prescription for these conditions. One could hypothesize that patient satisfaction was not associated with receipt of an antibiotic in those settings because all patients who expected or demanded an antibiotic received one. We sought to determine whether patient satisfaction is adversely affected when antibiotic prescription for uncomplicated acute bronchitis is decreased.

Methods

Original Intervention

The original study was a controlled intervention trial involving four medical office practices in the Denver, Colorado, metropolitan area that belonged to Kaiser Permanente of Colorado, a large group-model managed care organization.[6] At the full-intervention practice, households were mailed educational packets that included refrigerator magnets outlining prevention, self-care, and when-to-seek-care strategies for acute respiratory illness; educational brochures on careful antibiotic use (developed by the Centers for Disease Control and Prevention) and proper handwashing techniques (developed by Bayer Pharmaceuticals, Inc.); and a letter from the practice director announcing a campaign to reduce excess antibiotic use for acute respiratory illnesses. Office-level patient education included examination room posters and fact sheets on appropriate management of acute bronchitis. Clinician education consisted of a 1-hour presentation during a scheduled educational session that covered the following areas: management of acute bronchitis, current rates of antibiotic treatment of acute bronchitis at that clinic, a description of the patient educational efforts, and practice tips on "how to say no" when patients request antibiotics. The limited-intervention practice received office-based educational materials only. Two additional practices that received no materials served as controls in the original study.

According to analysis of administrative data, the full intervention decreased antibiotic prescription for uncomplicated acute bronchitis from 74% to 48% of visits during the winter of 1997–1998, whereas antibiotic prescription decreased only modestly at the limited intervention (82% to 77% of visits) and control practices (78% to 76% of visits) in the first year. During the subsequent winter (1998–1999, the period of the present study), there was minimal reinforcement of the intervention. Reinforcement included publicizing the results of the intervention system-wide through provider newsletters and a 1-hour continuing medical education videoconference and disseminating office posters and fact sheets to all medical office practices. Only the full-intervention and limited-intervention clinics are included in the present study. In this report, the full-intervention clinic is referred to as the intervention clinic and the limited-intervention clinic is referred to as the control clinic.

Patient Enrollment

Between January 1 and April 30, 1999, consecutive adult patients in whom acute bronchitis was diagnosed at family practice or internal medicine departments were eligible for study. Administrative data are usually not completed soon enough to use for identification of office visits with a given diagnosis. Therefore, electronic medical records were reviewed weekly to identify eligible patients. We attempted to telephone all eligible patients within 4 weeks after their index office visit. We identified 510 eligible patients and successfully contacted 416 (89 could not be reached by telephone after three attempts, and 5 declined to participate) (**Figure 1**). After patients gave informed consent, professional telephone survey personnel administered a 15-item questionnaire.

Contacted patients were excluded from analysis if no administrative data coincided with the visit date or if outcome data were missing or invalid (n =79), if the patient had underlying lung disease or other respiratory illness diagnoses for which antibiotic treatment might be indicated (n =31), or if the duration of illness was more than 21 days (no longer qualifying as "acute bronchitis") (n =40). This left a final sample of 102 intervention patients and 164 control clinic patients. Each clinic had similar proportions of patients who could not be contacted, declined to participate, or met exclusion criteria. A comparison of nonresponders (those who were not reachable by telephone or who declined to participate) with patients included in our analysis revealed no differences in antibiotic prescription rates by clinic site (data not shown).

Data Collection

Overall satisfaction was the principal outcome measure for satisfaction with the office visit. Patients were asked to rate satisfaction with care as poor, fair, good, very good, or excellent by completing this sentence: "My overall satisfaction with my visit was..." This satisfaction question was developed by the Health Outcomes Institute and has been independently shown to be valid and reliable for measuring visit-specific patient satisfaction and acceptability of care.[10] Other questions asked about illness characteristics before seeking care (duration of illness, amount of work or school loss, and impact on daily activities), reason for seeking care, illness outcomes after the office visit (current state of illness at time of interview, amount of

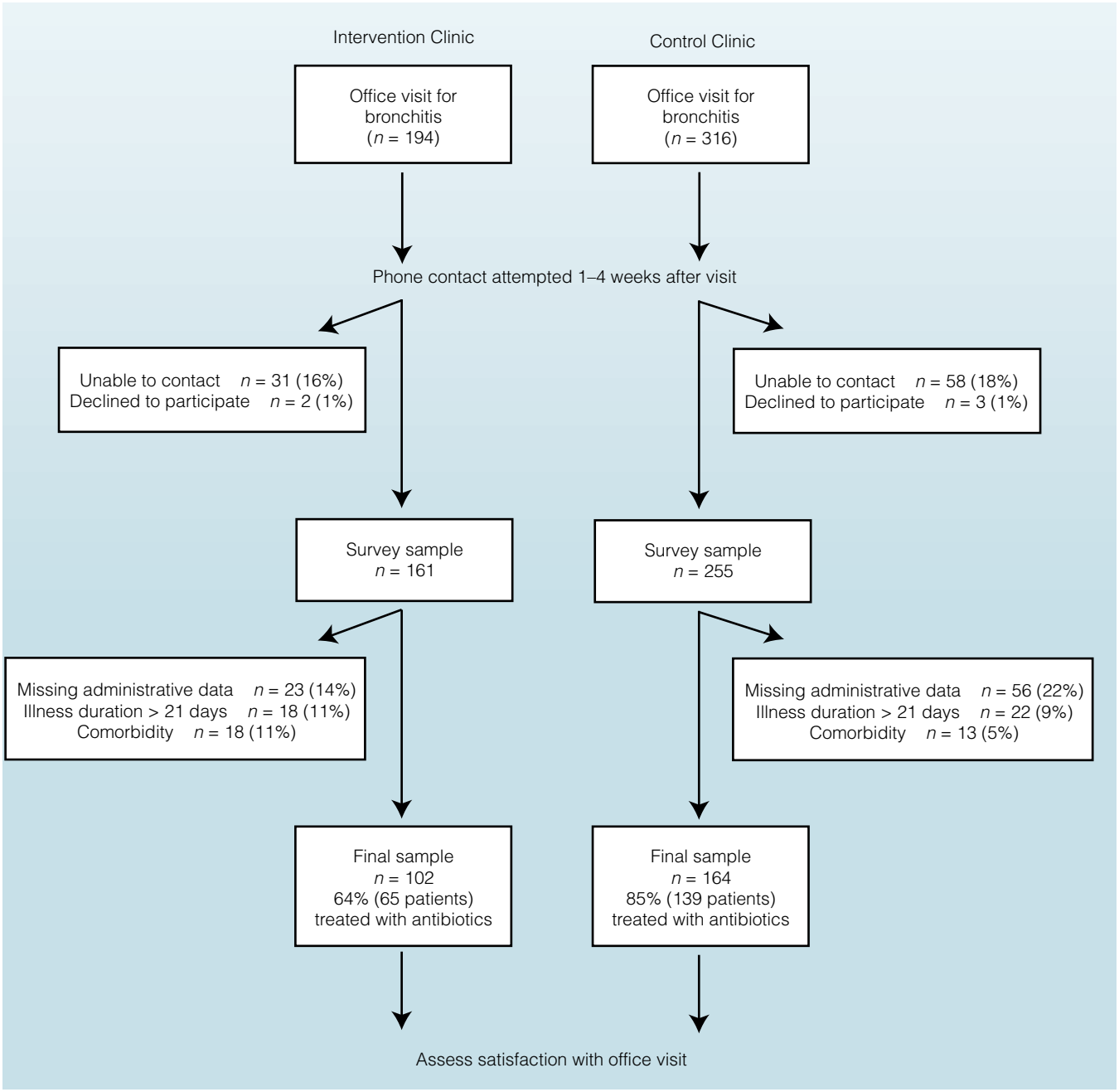

FIGURE 1. Study design.

work or school loss, and impact on daily activities), use of nonprescription therapies, history of similar illness, general overall health, and provider characteristics (time spent with patient, explanation of treatment, and manner of treatment). Questionnaire data were merged with administrative data to obtain information on patient age, coexistent diagnoses, antibiotic treatment, and clinician specialty (family medicine or internal medicine).

Statistical Analysis

The principal hypothesis was that patient satisfaction would be lower at the intervention clinic than the control clinic. The sample size was designed to have 80% power to detect a 15% difference in satisfaction rates between clinic sites. We used the Wilcoxon rank-sum test to compare overall satisfaction responses between clinics. Multivariate logistic regression was used to compare high and low patient-reported satisfaction (rating of "very good" or "excellent" vs. "good," "fair," or "poor") between clinic sites while adjusting for patient-reported duration of illness before the office visit, previous illness experience, most important reason for visit (illness severity vs. to get an antibiotic vs. other), age, sex, and clinician specialty. Odds ratios

were converted to risk ratios by using the method of Zhang and Yu.[11] A mixed-effects model was also used to analyze the association between clinic sites and patient satisfaction, adjusting for the covariates listed above and including individual providers as a random effect. A mixed-effects model allows one to control for clustering of providers by clinic site. All statistical analyses were performed by using SAS statistical software, version 6.12 (SAS Institute, Inc., Cary, North Carolina).

Results

Table 1 shows patient characteristics in the final study population at the intervention or control clinic. Compared with patients at the control clinics, patients at the intervention clinic were younger, more frequently reported a previous similar illness, more frequently reported severity of illness as the most important reason for seeking care, were less frequently evaluated by an internist, and were less frequently prescribed antibiotics. Patients at the intervention and control clinics did not differ substantially in duration of illness before the office visit, illness outcome, or overall satisfaction with the visit. When patients reported that getting an antibiotic was the most important reason for seeking care, 73% (8 of 11) of patients at the intervention clinic and 95% (20 of 21) at the control clinic received antibiotics ($P = 0.1$, Fisher exact test).

The distribution of overall satisfaction responses from patients at the intervention and control clinics did not differ significantly ($P = 0.15$, Wilcoxon rank-sum test) (**Figure 2**). Overall, 69% of intervention patients and 63% of control clinic patients reported "very good" or "excellent" satisfaction. After adjustment for patient-reported duration of illness before the office visit, previous illness experience, reason for seeking care, age, sex,

TABLE 1
Patient Characteristics

CHARACTERISTIC	INTERVENTION CLINIC (*n* = 102)	CONTROL CLINIC (*n* = 164)
Female	59%	60%
Age*		
18 to 44 yr	41%	31%
45 to 64 yr	37%	37%
>64 yr	22%	32%
Health status rated as "poor" or "fair"*	21%	14%
Previous similar illness*	65%	52%
Primary reason for visit*		
Severity of illness	61%	52%
Duration of illness	17%	21%
To obtain antibiotics	11%	13%
Serious illness concern	8%	7%
Other	4%	6%
Duration of illness before visit		
<4 d	37%	32%
4 to 7 d	34%	35%
>7 d	28%	34%
Evaluated by an internist*	38%	82%
Treated with an antibiotic*	64%	85%
Illness outcome rated as "better" or "normal"	93%	93%
High satisfaction		
"My overall satisfaction with my visit was 'very good' or 'excellent'"	69%	63%

*$P < 0.05$.

FIGURE 2. Satisfaction with the office visit among intervention and control participants.

and clinician specialty, there was still no association between treatment at the intervention clinic (i.e., the site with lower rates of antibiotic prescription for acute bronchitis) and high patient satisfaction (adjusted relative risk, 1.1; 95% CI, 0.81 to 1.3) (**Table 2**). Antibiotic prescription was not associated with satisfaction (unadjusted relative risk, 1.0; CI, 0.79 to 1.2). Patients who sought care to get an antibiotic or because of great perceived illness severity were also no less satisfied with care than were those who sought care for other reasons. Multivariate analysis using a mixed-effects model that included "provider" as a random effect also showed no difference in satisfaction between clinic sites ($P > 0.2$).

Discussion

Physicians are being implored to reduce excessive antibiotic treatment for acute respiratory infections in ambulatory practice.[2, 12, 13] Patients frequently expect antibiotic treatment for acute respiratory illnesses, and physicians report that patient expectations and demands for antibiotics are a major reason for prescribing antibiotics for conditions in which these agents are unlikely to produce benefit. One component of strategies to reduce excessive antibiotic use for these conditions has been to convince physicians that patient satisfaction is not dependent on receipt of an antibiotic. Studies have shown that patient satisfaction with care for respiratory illness is not dependent on receiving an antibiotic prescription.[7–9] However, none of these studies were conducted in practice settings in which attempts had been made to reduce antibiotic prescription. Our findings suggest that a patient and physician educational intervention that reduces antibiotic treatment of uncomplicated acute bronchitis does not affect patient satisfaction.

The most important reason for seeking care, reported by more than 50% of patients with acute bronchitis, was illness severity. Of note, the adjusted relative risk for reporting high levels of satisfaction with the visit in this group was 0.84 (95% CI, 0.61 to 1.1). Although the confidence interval includes 1.0, this finding suggests that high satisfaction with care may be less common among patients seeking care with more severe illness features. Illness severity is unlikely to be a surrogate for poor illness outcomes, since most patients (93%) reported that their illness was better or that they felt completely normal at the time of the interview (although this method of measuring illness outcomes may be inadequate to detect a true difference). Future studies should evaluate whether the variation in satisfaction related to severity of illness can be explained by other characteristics of the office visit, such as nonantibiotic treatments or provider characteristics.

Limitations of our study include its cross-sectional design. It is possible that the intervention clinic originally had higher patient satisfaction than the control clinic and that the intervention decreased the level of satisfaction at the intervention clinic to that of the control clinic. However, patient satisfaction surveys conducted semiannually as part of provider performance review show little difference between clinic sites in overall satisfaction scores (data not shown).

Were it measured at the time of the office visit, satisfaction could have differed between clinic sites as a function of antibiotic treatment, and over time, regression to the mean could have occurred. However, Hamm and colleagues[14] reported a high correlation between satisfaction at the initial office visit for acute respiratory

TABLE 2

Predictors of High Patient Satisfaction* with an Office Visit for Acute Bronchitis

PREDICTOR	UNADJUSTED RELATIVE RISK (95% CI)	ADJUSTED RELATIVE RISK (95% CI)†
Treatment at intervention clinic	1.1 (0.89–1.2)	1.1 (0.81–1.3)
Age		
18 to 44 yr	Referent	Referent
45 to 64 yr	1.1 (0.92–1.3)	1.2 (0.93–1.3)
>64 yrs	1.2 (0.96–1.3)	1.2 (1.0–1.4)
Female	1.0 (0.80–1.2)	0.97 (0.76–1.2)
Internist	0.92 (0.71–1.1)	0.85 (0.59–1.1)
Duration of illness before visit		
<4 d	Referent	Referent
4 to 7 d	0.99 (0.76–1.2)	0.96 (0.71–1.2)
>7 d	1.1 (0.82–1.3)	1.0 (0.74–1.2)
Previous similar illness	1.1 (0.96–1.3)	1.1 (0.96–1.3)
Reason for visit		
Other	Referent	Referent
To obtain antibiotics	0.96 (0.62–1.2)	1.0 (0.66–1.3)
Severity of illness	0.84 (0.61–1.1)	0.84 (0.61–1.1)

**Defined as patient reporting "very good" or "excellent" satisfaction.*
†Adjusted for patient-reported duration of illness before the office visit, previous illness experience, reason for seeking care, age, sex, and clinician specialty.

illness and satisfaction 7 to 10 days after the visit. Measuring patient satisfaction at the time of the office visit would be expected to provide the most accurate appraisal of patient satisfaction with the "visit episode" (reflecting interactions between patients and staff, waiting room, and physicians). However, this does not accurately assess patient satisfaction with an "illness episode," which must take into account subsequent contacts with the health care delivery system in addition to illness outcome.

Finally, our findings may not be generalizable to other practice settings or to situations in which antibiotic use is reduced more dramatically. It is possible that the reduction in antibiotic use that we observed corresponded to the proportion of patients with little or no expectations about antibiotic prescription and that most patients who expected antibiotics still received them. At least among patients whose primary reason for seeking care was to "get an antibiotic," we found no difference in satisfaction rates.

We also caution that comparisons between the absolute rates of antibiotic prescription reported in our survey sample and those reported previously, which were derived from administrative data, may not be valid.[6] The survey participants were defined by using chart-based criteria rather than administrative ICD-9 codes, and we excluded patients with illness duration

Take-Home Points

- The emergence of antibiotic-resistant bacteria provides strong motivation to reduce antibiotic prescription for upper respiratory infection and acute bronchitis, predominantly viral conditions that do not benefit from antibiotic treatment.
- Because patient expectations have a strong influence on prescription practices, physicians may be unwilling to decrease antibiotic prescription for fear of patient dissatisfaction.
- After an educational intervention successfully reduced antibiotic use in an intervention clinic, patient satisfaction with clinic visits for bronchitis was measured.
- Despite lower rates of antibiotic prescription (64% vs. 85% of visits), no difference in patient satisfaction was observed.
- Physicians can be confident that reducing antibiotic prescription need not adversely affect patient satisfaction.

greater than 21 days. These limitations notwithstanding, our results should further motivate ambulatory care physicians to decrease use of antibiotics for conditions in which patients are unlikely to benefit.

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