The Effect of Parental Expectations on Treatment of Children with a Cough: A Report from ASPN

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Background. A previous retrospective study of children with cough raised questions about how physicians diagnose acute bronchitis. We hypothesized that if the physician perceives a parental expectation that an antibiotic is needed, it is more likely that a child with a cough will be diagnosed as having bronchitis and treated with an antibiotic.

Methods. Data were collected prospectively in 44 primary care practices in the Ambulatory Sentinel Practice Network. Variables examined included elements of the patient's history and physical examination, diagnoses made, and treatments prescribed.

Results. Data regarding 1398 patients were collected. A parental expectation that a prescription for an antibiotic would be given was associated with an increased likelihood of a diagnosis of bronchitis (relative risk 2.04, 95% confidence limits, 1.76 to 2.35, $P < .001$), and was second only to the physical finding of rales in the magnitude of its association with that diagnosis. The only other diagnosis associated with parental expectation of an antibiotic was viral upper respiratory tract infection, where parental expectation of treatment with an antibiotic was associated with a 49% reduction in the probability of that diagnosis.

Conclusions. The expectations of parents of children with a cough appear to influence physician decision making.

Key words. Bronchitis; child; parents; decision making; antibiotics.
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There are many articles in the medical literature that address how medical decisions are made. Most articles deal with complex clinical situations or problems involving difficult ethical decisions in which physicians seek to understand what the patient or his or her family want done. Physicians gather clinical data from the patient by taking a history, performing a physical examination, and ordering laboratory tests, and then convey that information along with their recommendations to the patient and the family. The ultimate decision regarding treatment is viewed as rightfully belonging to the patient. The physician's responsibility is to assist the patient in making that decision. Analyses of such decisions are increasingly supported by mathematical models that often include factors that express the patient's perception of benefits and risks. Because of their complexity, such models are usually only applied to difficult clinical predicaments where the diagnosis is known but therapeutic alternatives are fraught with hazard. Pauker and Kassirer[1] comment that decision analysis, a frequently used model, "is often impractical in the hectic arena of clinical practice." Yet it is in that arena that the clinician is confronted daily with most medical decisions.

In more routine clinical situations, physicians probe for information, but generally do not consult the patient before making a diagnosis or prescribing therapy. Both patients and physicians consider those to be the physician's responsibilities. Physicians generally have not been taught to consider the patient's perception of the prob-

ASPN denotes Ambulatory Sentinel Practice Network, an office-based research network of primary care practices. For a list of participating practices, see Acknowledgments.

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lem or his or her expectations for treatment in these ordinary encounters.

Several authors, however, have suggested that communication between physician and patient be improved,[2–5] with emphasis on the physician listening to what the patient thinks is wrong and what should be done about it. As Press noted in 1984,[6] patients approach their physicians with fully developed "explanatory models" of their illness, complete with diagnosis and treatment. Press suggested that physicians "develop a sensitivity" to patients' explanatory models. The extent to which physicians should allow those models to influence their diagnostic and therapeutic decisions, however, is uncertain.

In a previous retrospective study,[7] we examined how physicians diagnose bronchitis in a child with a cough. A history of sputum production, the finding of rales or rhonchi on examination, and a past history of lower respiratory tract illness were associated with a diagnosis of bronchitis. However, none of these symptoms were found in 24 of the 54 children diagnosed with bronchitis in that study. Because a diagnosis of bronchitis was closely associated with the use of an antibiotic, even among the 24 children without sputum production or rales, we speculated that the diagnostic label may, in some cases, follow the decision to treat instead of leading to it. If this is true, then factors influencing the decision to treat, such as parental expectations for an antibiotic, may affect the diagnosis of bronchitis.

Whether antibiotics should be used to treat acute bronchitis in children is open to debate. Most reviewers,[8,9] citing careful studies of etiologic agents that indicate that viruses are the predominant causes of acute bronchitis,[10,11] assert that antibiotic treatment is of little or no value, but they cite no controlled clinical trials of antibiotic treatment for bronchitis in children. Others suggest that there are times when antibiotic therapy might be appropriate[12]; furthermore, antibiotics are commonly prescribed, not only in the United States,[7] but also in Norway[13] and the Netherlands.[14]

The present study does not address the question of whether antibiotics should be used to treat children with acute bronchitis. Rather, it assesses the extent to which physicians incorporate parents' expectations into their medical decision making in ordinary outpatient practice. Specifically, if a physician perceives a parental expectation that an antibiotic will be prescribed, how does that affect the probability that a diagnosis of acute bronchitis will be made in a child with a cough?

Methods

The Ambulatory Sentinel Practice Network (ASPN) is an office-based research network of primary care practices in the United States and Canada.[15] Forty-four practices participated in this study. Data were collected prospectively from October 22, 1990, to January 20, 1991. All children, newborn to 14 years of age, visiting an ASPN practice with a chief complaint of cough of up to 1 month's duration were eligible.

Data were reported by clinicians on standard data cards[15] after the office visit. Data collected included the patient's sex, age, and duration of the illness (in days). Dichotomous variables summarized the patient's history and physical findings, including a history of fever, sputum production, presence of a smoker in the household, enrollment in day care, a history of allergies, a finding of rales on examination, a finding of wheezes, and whether a chest radiograph was obtained. Physicians recorded diagnosis and treatment by checking one or more boxes on the form, and indicated follow-up plans using an ordinal scale ranging from 0 ("well; no follow-up needed") to 4 ("hospitalized").

The clinicians were also instructed, "Indicate [on the data card] whether you sense an expectation by the patient's parent or guardian to prescribe an antibiotic." The study protocol did not specify how the physician was to "sense" that expectation. The physician's perception may have come from an explicit statement by the parent or from some nonverbal cue. An assessment of the origins of the clinicians' perceptions was not done because of the concern that such an assessment might alter the perceptions themselves or the reporting of them. The study did not require the physicians to make any changes in their usual clinical protocol. Clinicians made their diagnoses and treatment decisions in their usual manner.

Since the variables used in this study were dichotomous, ordinal, or skewed, chi-square and Mann-Whitney *U* tests were used for univariate comparisons. Where a measure of effect size was desired, the relative risk (RR) and its 95% confidence interval (CI) were calculated. Logistic regression, used for multivariate analysis, provides odds ratios that, because of the high prevalence of bronchitis within this study, do not accurately estimate RRs. Adjusted odds ratios, however, differed very little from the unadjusted values; therefore, only the unadjusted RRs are reported.

Results

A total of 1398 patients were entered in the study by 44 practices; 47% were girls and 53% were boys. The chil-

Table 1. Effects of Clinical Findings on the Likelihood of a Subsequent Diagnosis of Bronchitis

Clinical Finding	Relative Risk	95% Confidence Interval
Rales	2.93	2.57–3.34
Parental expectation that an antibiotic would be prescribed	2.04	1.76–2.35
Wheezes on examination	1.86	1.60–2.18
History of sputum	1.58	1.34–1.85
Enrollment in day care	1.24	1.04–1.48
History of fever	1.22	1.04–1.42

dren ranged in age from infancy to almost 15 years, with an average of 4.8 years (standard deviation [SD] 3.9 years). The age distribution was skewed toward younger children, the mode being 1-year-olds.

Most patients were not seriously ill. Only 12 (0.9%) were hospitalized and 46 (3.3%) were asked to return to the office within 2 days; 869 (62.2%) were believed to require no scheduled follow-up visit. Three fourths of the children had been coughing for a week or less; the mean duration was 6.8 days (SD 6.2 days), with a skewed distribution and a mode of 2 days.

A diagnosis of bronchitis was made in 465 children (33%), a viral upper respiratory tract infection (URTI) in 494 (35%), a bacterial infection (such as otitis media) in 379 (27%), asthma in 129 (9%), other allergic diseases in 52 (4%), pneumonia in 78 (6%), and croup in 30 (2%). More than one diagnosis was made for 268 children (19%). The most common combinations were bronchitis with bacterial URTIs (70 children), viral and bacterial URTIs (41), and asthma with bronchitis (38). Of the 20 patients with three diagnoses, 19 had a diagnosis of bronchitis.

The physician sensed that the parent expected an antibiotic in 215 cases (15.4%); 30 of the 44 practices reported at least one such instance. Of the 14 practices enrolling 30 or more children, 12 reported at least one instance of the physician perceiving that the parent expected an antibiotic prescription.

If the physician perceived that the parent expected a prescription for an antibiotic, the likelihood that a diagnosis of bronchitis would be made doubled. Practitioners sensed this parental expectation during office visits with 126 of 465 children in whom bronchitis was diagnosed (27.1%), but in only 89 of 933 children in whom it was not (9.5%). Only the finding of rales on physical examination was more strongly correlated with the diagnosis of bronchitis (Table 1). A history of sputum production, wheezes on examination, a history of fever, and enrollment in day care were also statistically associated with a diagnosis of bronchitis; for each of these findings, the relative risk of making a diagnosis of bronchitis, when that factor is present, is given in Table 1. Children diagnosed with bronchitis had been coughing longer, but the difference was small (7.3 vs 6.5 days, $P = .03$). The effect of parental expectations on the diagnosis of bronchitis was essentially unchanged when the influence of other variables was controlled for by logistic regression.

Of the other diagnoses studied, physician perception of a parental expectation for an antibiotic prescription was associated only with viral URTIs, reducing the likelihood of that diagnosis by one half (Table 2). Diagnoses of bacterial URTIs, including otitis media and sinusitis, were unaffected by parental expectations. Parental expectation increased the probability of a diagnosis of sinusitis, made in 35 children, but the effect was not statistically significant (RR = 1.89, 95% CI, 0.9 to 4.0). Parental expectations had no effect on the physician making a diagnosis of pneumonia.

Parental expectation that an antibiotic prescription would be given increased the probability of this occurring (RR = 1.43, 95% CI, 1.33 to 1.55). Controlling for the other variables in the history and physical examination (fever, rales, and sputum) that were associated with a prescription for an antibiotic, the parent's expectation was second only to the finding of rales in its apparent influence in the prescribing decision.

Certain features of the child's history were associ-

Table 2. Association of Diagnosis with Parental Expectations and Antibiotic Therapy

Diagnosis	Number of Patients	Parents Who Expected that an Antibiotic Would Be Prescribed, %	Relative Risk (95% CI)*	Treated with an Antibiotic, %
Viral URTI	494	8.5	0.51 (0.38–0.67)	23.3
Bronchitis	465	27.1	2.04 (1.76–2.35)	88.4
Bronchitis without other diagnosis	297	27.0	2.17 (1.79–2.62)	89.2
Bacterial URTI	379	17.2	1.13 (0.91–1.42)	94.7
Asthma	129	17.1	1.15 (0.75–1.78)	52.7
Pneumonia	78	15.4	0.99 (0.55–1.80)	96.2
Croup	30	0	—	46.7

**Relative risk of this diagnosis being made, relative to all other patients, if the physician perceived that the parent(s) expected that an antiotic would be prescribed.*
CI denotes confidence interval; URTI, upper respiratory tract infection.

Table 3. Features of the Child's History That Were Associated with Parental Expectation for an Antibiotic Prescription

Variables	Relative Risk	95% Confidence Interval
History of allergies	1.81	1.35–2.45
Enrollment in day care	1.57	1.21–2.04
Exposure to cigarette smoke at home	1.32	1.02–1.70

ated with a parental expectation that an antibiotic would be prescribed (Table 3), but there was no difference in parental expectation due to the sex of the child (RR = 0.996), age (5.2 years among those with that expectation, 4.7 among those without), or duration of the cough (6.7 vs 6.9 days).

Whether the clinician sensed an expectation for an antibiotic had no effect on whether a chest radiograph was done. Likewise, there was no association between the perception of a parental desire that an antibiotic be prescribed and the timing of clinical follow-up, either among children diagnosed as having bronchitis or those treated with an antibiotic.

To determine if these findings were consistent among network practice sites, separate analyses were carried out for the 14 practices that contributed 30 or more patients (1113 patients, 340 with bronchitis). When each site was analyzed separately, a statistically significant association between a parental expectation that an antibiotic would be prescribed and the diagnosis of bronchitis was found in only two sites, largely because of small sample sizes in the other 12 sites. However, with these two sites excluded and considering only the other 12, there was still a statistically significant association between a parental expectation and the diagnosis of bronchitis ($P < .001$ by χ^2), suggesting that the association was not limited to a few practice sites.

Discussion

The findings of this prospective network study are consistent with our hypothesis that if a clinician perceives that the parents of a child with a cough expect the physician to prescribe an antibiotic, a diagnosis of bronchitis and a prescription for an antibiotic are more likely. The association persisted even when controlling for other variables. Its magnitude was clinically significant; for example, its influence appeared to be more substantial than a history of sputum production or fever.

There are, however, three other possible explanations for the association between parental expectation and a diagnosis of bronchitis. First, it is possible that the physician diagnosed bronchitis and *then* the parent expressed a desire for an antibiotic. However, the perception of a parental expectation that an antibiotic would be prescribed was not associated with other diagnoses commonly treated with antibiotics, such as otitis media, sinusitis, and pneumonia. This finding suggests that there was something unique about the process of diagnosing bronchitis in these children.

Second, the perception of parental expectation that an antibiotic would be given may have been a proxy indicator for some symptom or sign within the child's illness. Although clinicians were asked to note the presence or absence of several key variables (such as fever and rales), other variables were omitted (such as the sound of the cough) that might have prompted parents to expect that an antibiotic would be prescribed and that physicians might have used in making clinical judgments. However, it seems unlikely that such a variable—something relatively obscure, but intrinsic to the disease—would be more strongly associated with the diagnosis of bronchitis than any other clinical finding except rales.

Third, the perception of a parental expectation may have been a proxy indicator for something else, not within the child or from the parent, but coming from within the physician. The clinician may have diagnosed bronchitis and prescribed an antibiotic, and then retrospectively and incorrectly sensed that the parents expected an antibiotic. A number of such physician variables could be postulated, such as concerns about the severity of the child's illness. But in this case, one would expect to see some association between a perception of parental expectation and the scheduling of a follow-up visit or obtaining a chest radiograph. Neither association was found. Furthermore, assuming that some physician variable explains the association found in this study raises two other issues: why such a purported variable should affect only the diagnoses of bronchitis and viral URTI, and why it would be projected onto the parent rather than onto the child's disease. It seems more reasonable to make a simpler assumption, that physicians were accurately discerning (and responding to) perceptions of parental expectations. But the possibility remains that some factor that was not measured in this study is associated with both a diagnosis of bronchitis and a prescription for an antibiotic, on the one hand, and, on the other, a physician perception of a parental expectation that an antibiotic will be given.

Our findings suggest that there is a group of children whose diagnosis is unclear and for whom treatment with antibiotics is of uncertain value. Perhaps for these children, if the parents expect that an antibiotic will be prescribed, the physician may be more inclined to make a diagnosis of bronchitis and prescribe an antibiotic.

Given a similar situation, in which the diagnosis is uncertain but the parent does not convey an expectation that an antibiotic will be prescribed, the physician may be more inclined to make a diagnosis of a viral URTI and not to prescribe an antibiotic. It may be within this gray zone of clinical decision making that parental expectations are more likely to influence the physician's diagnosis and treatment.

Whether the association between parental expectations and medical decisions represents a desirable or undesirable medical practice cannot be determined by this study. Are physicians simply acquiescing to parental expectations, allowing their clinical judgment to be subverted? Or are they allowing parents an appropriate role in clinical decision making? More data, both qualitative and quantitative, are needed to address these questions. As Delbanco[5] has recently suggested, there are many potential benefits of more systematically incorporating the patient's perspective into clinical encounters.

Are there other illnesses in which physicians' decision making is affected by the patient's or parents' expectations? The findings in this study are intriguing, and may shed light on ordinary, everyday medical decision making and on ways in which physicians let patients subtly guide that decision making.

Acknowledgments

Ambulatory Sentinel Practice Network (ASPN)
Participating Practices

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