Published in final edited form as:

Clin Pediatr (Phila). 2014 February ; 53(2): 145–150. doi:10.1177/0009922813505902.

Childhood infections, antibiotics, and resistance: what are parents saying now?

Jonathan A. Finkelstein, MD, MPH^{1,2}, Maya Dutta-Linn, MPH², Robert Meyer, MD³, and Roberta Goldman, PhD, MA^{4,5}

¹Division of General Pediatrics, Department of Medicine, Boston Children's Hospital, Boston, MA, USA

²Department of Population Medicine, Harvard Pilgrim Health Care Institute & Harvard Medical School, Boston, MA, USA

³Department of Pediatrics, Cambridge Health Alliance, Boston, MA, USA

⁴Department of Family Medicine, Warren Alpert Medical School of Brown University

⁵Department of Social and Behavioral Sciences, Harvard School of Public Health, Boston, MA, USA

Abstract

Parental misconceptions and even “demand” for unnecessary antibiotics were previously viewed as contributors to overuse of these agents. We conducted focus groups to explore the knowledge and attitudes surrounding common infections and antibiotic use in the current era of more judicious prescribing. Among diverse groups of parents, we found widespread use of home remedies and considerable concern regarding antibiotic resistance. Parents generally expressed the desire to use antibiotics only when necessary. There was appreciation of inherent error in the diagnosis of common infections, with most trust placed in providers with whom parents had longstanding relationships. While some parents had experience with “watchful waiting” for otitis media, there was little enthusiasm for this approach. While there may still be room for further education, it appears that parents have become more informed and sophisticated regarding appropriate uses of antibiotics. This has likely contributed to the declines seen in their use nationally.

Keywords

Antibiotic use; upper respiratory infection

Introduction

The steep decline in antibiotic use for children represents one of the most significant changes in pediatric practice over the past several decades. While antibiotic resistance

remains a major public health concern,¹ analyses of available national data have shown declines of 33% in antibiotic prescribing for young children with respiratory tract infections from 1995–2006.^{2,3} Regional population-based studies have shown similarly dramatic decreases.^{4,5} Underlying causes for these trends likely include increasing concern regarding resistance by professionals and the public alike, consistent with local, statewide, and national (Centers for Disease Control and Prevention) educational campaigns aimed at both parents and clinicians to promote more judicious antibiotic use.^{6–8} By whatever mechanism, compared to two decades ago, young children in the U.S. now receive care in an era of substantially different antibiotic use.

Focus groups in the Atlanta, Georgia area in the mid-1990s suggested, even then, that parents were concerned about antibiotic overuse and resistance,⁹ but other studies suggested substantial misconceptions about the need for treatment of upper respiratory infections.¹⁰ Later studies carefully assessed the complex relationships between parental beliefs and expectations and the perceptions by clinicians that antibiotics were being requested.^{11,12} Given the present context of much lower rates of antibiotic use, our study aimed to examine current beliefs about common infections and antibiotic use among parents of diverse backgrounds and educational levels. Our goal was to explore general knowledge regarding care for respiratory tract infections, appropriate antibiotic use and antibiotic resistance, and the durability of specific misconceptions that were identified in previous studies.^{9,13,14} To do so, we conducted focus groups to explore care seeking and use of home remedies for common infections, knowledge and attitudes regarding antibiotic use, and issues of trust in their medical providers.

Methods

We conducted five focus groups in May and June of 2011. Individuals were recruited both by distribution of flyers and directly by study staff in the waiting rooms of four pediatric practices (three urban and one suburban) in two health systems, Harvard Vanguard Medical Associates and Cambridge Health Alliance, both in Massachusetts. All parents having one or more children aged 6 years old or younger were eligible to participate. They were told that the focus groups sought their views on common childhood infections, but they were not told of the specific goals of the study. Informed consent procedures required by each of the health systems were followed.

Focus groups were conducted in conference rooms within the health centers of the participating practices and lasted approximately 90 minutes. Groups were facilitated by experienced, non-physician moderators using a semi-structured guide with open-ended questions developed for this study. Use of the moderator's guide ensured that a core set of questions and anticipated follow-ups were asked in all groups, in addition to spontaneous probes to seek clarification or to follow new lines of inquiry raised by participants. Groups were audiotaped and professionally transcribed. While study investigators were present during the focus group sessions to take notes, they did not participate in the focus group discussion.

Analysis

We conducted content analysis of the focus group transcripts, incorporating principles of the immersion/crystallization method.¹⁵ This process entailed project analysis team members reading the transcripts in their entirety to keep the data from each transcript embedded within the context of the complete focus groups. They individually wrote analytical notes for each transcript regarding focus group discussion content and salient themes, and repeatedly met to discuss the transcripts and individual analyses as a group. To achieve validity and credibility,^{16,17} analytical discussions continued until no new major themes emerged, and the team reached agreement on interpretation of the data.

Results

Participants

A total of 31 parents participated in five focus groups ranging in size from 5 to 8 individuals. The parents were from 20 to 43 years old, and the majority of participants were mothers (only four fathers participated). Five parents had no education beyond high school, 13 had “some college” or an Associates degree, and the remaining 12 who responded had Bachelors (4) or graduate (8?) degrees. 14 of the 29 self-reporting their race identified as Black; 2 identified as Asian; 13 as White. Seven self-identified as of Latino ethnicity, and 4 reported speaking a language other than English at home (3 Spanish, 1 Portuguese). All participants had at least some personal experience with common infections in their children. However, this ranged from first-time parents of very young children to parents who had already raised a number of children to adulthood.

Home remedies for colds or minor respiratory illness—Virtually all parents reported using symptomatic treatment of some kind before seeking medical care. Antipyretics such as acetaminophen and ibuprofen were commonly mentioned, as were fluids, steam (shower or humidifier) and “fresh air.” Other oral over-the-counter cold medicines were rarely mentioned, though rubs (e.g. “baby Vicks”) were commonly used. A wide range of non-pharmaceutical or alternative treatments were mentioned, varying with the cultural background of the participants. In all groups, there was significant discussion of the use of measures to prevent spread of infections within families including hand washing and use of hand sanitizers while a family member was ill (Table 1). For example, one mother said, “I really do try to wash my hands, and also wash his hands more often” and another said “we have the [hand sanitizer] wipes in every single room in the house.”

Triggers to seek medical care—The height of fever (“namely the high fever, because that’s something I really don’t like to play with”) or duration of fever were commonly cited as triggers for calling the medical office for advice or an appointment, but thresholds to seek care varied markedly among participants. Other reasons included prolonged cough, vomiting, or ear-specific symptoms. However, most participants reported that their reason for seeking care was difficult to characterize or quantify. As one said, “I feel like you can kind of usually tell how severe – not severe, but how sick a child really is by kind of their attitude, how they are.” Although not common, particular illness characteristics that have been previously reported as common misconceptions were also raised.¹⁴ For example, the

color of nasal discharge¹³ was mentioned by several participants (“If it’s yellow and it’s bad or greenish. Green is real bad. Green means go [to the doctor]”).

Perceptions of the role of antibiotics to treat illness and risk of antibiotic resistance—In every group participants correctly stated that antibiotics do not treat viruses and are only effective for bacterial infections, and this was quickly endorsed by others. Participants made many statements indicating a reluctance to over-use antibiotics, including that antibiotics should be reserved for when they are absolutely needed.

As one parent said, “I believe if you don’t need it, then don’t use it.” The primary rationale offered for parents’ reluctance to use antibiotics related to development of resistance (Table 2). However, many parents had misconceptions or admitted that they were confused about how antibiotic resistance actually occurs. Some parents thought that the child could become permanently resistant to the antibiotic: “I personally have that fear, that if I’m ever giving my child antibiotics, that he’s going to build up some kind of resistance to it, and when he really needs it, it’s not going to do anything for him.”

While these focus groups occurred at a single point in time, we asked participants about their perceptions of the change over time in the frequency of antibiotic prescribing for children. Among some of the older parents, or those who remembered treatments from their own childhoods, there was a general sense that antibiotics are now prescribed less frequently than in the past. “When they [their children] were younger, they’d [doctors] prescribe it anytime. They [children] would pull [at their ear], and there was a little bit, and (snaps fingers) we got antibiotics. Over the years it’s becoming a lot more difficult to have it prescribed. [Doctors] want to make sure it has strep or it’s an actual ear infection or it’s something that they’re going to treat.” One parent stated that current pressures on healthcare costs might be a reason that clinicians prescribe less frequently.

Most parents in these groups believed that antibiotics were needed to treat otitis media. Some had heard of, or had experience with, a “watchful waiting” approach. Several mentioned experience with explicit shared decision-making regarding antibiotic treatment. For example, “They look in the ear. If it’s very severe, then they say that he should absolutely have antibiotics. But other times, it’s more of a mild case and the doctor leaves it up to me to decide.” Other mothers explained how waiting can be difficult: “Let’s say he or she suggested that we wait two or three days, whatever. I don’t know if I’d want to put my child through that for two or three days of being miserable. I remember ear infections as a kid. It’s horrible.” And another stated, “Can you imagine the excruciating pain? When kids are screaming and you’re getting fevers, I wouldn’t feel comfortable for my doctors to tell me, ‘Let it play its course.’ I think I’d flip.”

Some parents expressed understanding of the probabilistic nature of the benefit of antibiotic treatment. One mother explained, “If they’re tugging at their ear and you’re not treating it, you know, as a mother, that’s pretty painful to watch. And then, you know, I guess I’d want to know what’s the likelihood of its getting better on its own? Is it 50–50? Are we talking 75–25?” Another recalled her doctor saying “ ‘It looks kind of puffy, but let’s just watch it. Call me in two or three days and let me know,’ and it was a 50/50 chance. But I guess it was

better, because then that's half the time she didn't have to receive antibiotics. Then the other half I was like, 'Why didn't you just give her medicine? She's a baby! She's walking into walls, she can't go to school!'"

Parents' perceptions of the common cold versus influenza—Most parents clearly differentiated influenza from common viral respiratory illnesses, and many expressed quite significant fears about its severity or consequences. "[With a] cold, I think my kids could still function—you know, nose is running—but flu, it really brings it to another level." Most understood that antibiotics are not indicated for influenza, but there were varying understandings about the availability and usefulness of antiviral agents (e.g. oseltamivir). When asked whether, in the case of limited supply of effective antiviral agents, they would approve of health care providers making these drugs available to high risk patients and not to children without risk factors for more severe disease, responses varied. However, most agreed with this sort of rationing of a limited resource. One parent expressed this as "whoever needs it first should get it first, you know. If an elderly lady needed it and I needed it, I would rather it go to the elderly lady." However, on this and other topics, participants repeatedly expressed that if they believed their child needed something they would do whatever was necessary to obtain it. For example, "If you think they really need it, you'll just find somebody who will give it to them."

Discussion

We conducted a series of focus groups of primarily mothers of diverse cultural, ethnic, and educational backgrounds to explore the range of current beliefs regarding antibiotic use and common infections in childhood. We were particularly interested in what parents of young children believed in the current era which has seen dramatic decreases in the rate of prescribing of these agents.²⁻⁵ In general, we found that parents were both relatively knowledgeable and sophisticated regarding issues of antibiotic resistance and the need for judicious prescribing. In fact, some parents had a higher level of concern than might be warranted. We cannot ascertain from these groups whether the use of alternative therapies has increased over the decades or not, but the diversity and frequency of comments about home remedies were notable. The results of these focus groups reinforce the need for clinicians to understand what parents are doing, themselves, to try to ameliorate symptoms at home, and what brings them in for care.

This study extends those done 10 to 20 years ago which informed a generation of intervention activities to decrease unnecessary antibiotic use in primary care practice.^{6,8,18,19} In many ways, the themes have not changed. Even then, some parents expressed concern about resistance. While some of the same misconceptions were raised in our groups (for example considering the color of nasal discharge an indication for antibiotic treatment) we found them to be less prominent among the parents we talked with recently. Parents in earlier focus groups, like today, expressed trust in their clinicians to decide when antibiotics were needed and generally denied putting pressure on clinicians to prescribe.⁹ However, a second series of focus groups commissioned by the CDC in 2002 revealed more confusion among participants about whether colds and coughs were bacterial or viral, and whether antibiotics were helpful for these illness. (Barden, personal communication) Both of these

focus group studies were conducted in a different geographic region than our study, and the participants likely differed in many other ways. Regardless of whether parental expectations for antibiotics has changed over time, substantial research has shown that clinicians are not at all accurate in perceiving whether patients (or parents) expect or desire antibiotic treatment.^{12,20} In our focus groups, we heard little that suggested unreasonable expectations or demands by parents, but repeatedly heard stories about, from the parents' perspective, the fallibility of clinicians and the need for parents to remain vigilant and proactive in getting treatment they believed their children need.

Focus groups are a rich source of data on the range of beliefs that exist in communities. However, they are not designed to be representative and the frequency of expressed opinions does not reflect the proportion of individuals in the larger population who hold these beliefs. We noted that in several of the groups, a single individual was (or at least put themselves forward as) knowledgeable about common infections, antibiotic use, and resistance. "Establishing oneself as experienced and knowledgeable" has been described as a common interactive process observed in focus groups.²¹ Though others in the groups generally expressed agreement with the views of these self-proclaimed experts, it is unclear whether the process might have stifled expression of misconceptions or alternative views held by other participants. In addition, while these groups were drawn from multiple practice sites, they were all recruited from within two large health systems in the Boston area. Other opinions may have been uncovered if these had been conducted in other parts of the country.

The decision to prescribe antibiotics to a child with respiratory tract symptoms is the end result of a complex interplay of care seeking by parents, their expressed and perceived desires,^{11,20} and a process of shared decision making with a clinician. In this clinical situation, patient centered care may in one case be helping a parent to understand the usefulness of antibiotics for a child the physician believes has a high likelihood of a bacterial illness; another case might call for a physician to help parents understand the risks of taking these medicines when the likelihood of a treatable bacterial infection is low. In all cases, physicians must be open to parents valuing the consequences of treatment differently (for example ear pain vs. risk of resistance), and arriving at different decisions. Shared decision-making is often discussed in the context of clinically complex decisions with serious medical consequences. In the case of antibiotics for common respiratory tract infections, the stakes are often much lower for any individual decision. These decisions, therefore, may be the best for using a shared decision-making approach and honing clinicians' and patients' abilities to do this well. Choosing among treatment options (including "watchful waiting") for otitis media has emerged as a particularly interesting example of shared decision making under such conditions.²²

The judicious use of antibiotics continues to be an important issue from the perspectives of clinical care and public health. There appears to have been substantial progress over the past decades not only in the rates of use of these agents but in the sophistication of parents. Larger-scale survey-based work will be necessary to determine the prevalence of enduring misconceptions and to guide the next generation of educational interventions and individual counseling strategies by office-based clinicians and those engaged in public health interventions.

Acknowledgments

We thank Benjamin Kruskal, MD, for his assistance with this project, and the staffs of Harvard Vanguard Medical Associates and Cambridge Health Alliance for their help in recruiting participants.

Funding:

This work was supported by the National Institute Child Health and Human Development under Award Number K24HD060786 to JAF. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

1. Spellberg BB, JG, Gilbert DN. The future of antibiotics and resistance. *N Engl J Med*. 2013; 368(4): 299–302. [PubMed: 23343059]
2. Grijalva CG, Nuorti JP, Griffin MR. Antibiotic prescription rates for acute respiratory tract infections in US ambulatory settings. *Journal of the American Medical Association*. 2009; 302(7): 758–766. [PubMed: 19690308]
3. McCaig LFHLAR, RM, Fairlie TA. Office-related antibiotic prescribing for persons aged 14 years- United States, 1993–1994 to 2007–2008. *MMWR*. Sep 2; 2011 60(34):1–4. 2011.
4. Finkelstein JA, Stille C, Nordin J, et al. Reduction in antibiotic use among US children, 1996–2000. *Pediatrics*. 2003; 112:620–627. [PubMed: 12949293]
5. Greene SK, Rifas-Shiman SL, Hinrichsen VL, Lee GM, Huang SS, Finkelstein JA. Antibiotic use among Massachusetts children: Is the downward trend over? Abstract presented at: Pediatric Academic Societies 2009 Annual Meeting. 2009
6. Belongia EA, Knobloch MJ, Kieke BA, Davis JP, Janette C, Besser RE. Impact of statewide program to promote appropriate antimicrobial drug use. *Emerging infectious diseases*. 2005; 11(6): 912–920. [PubMed: 15963287]
7. Kiang KM, Kieke BA, Como-Sabetti K, Lynfield R, Besser RE, Belongia EA. Clinician knowledge and beliefs after statewide program to promote appropriate antimicrobial drug use. *Emerging infectious diseases*. 2005; 11(6):904–911. [PubMed: 15963286]
8. Finkelstein JA, Huang SS, Kleinman K, et al. Impact of a 16-community trial to promote judicious antibiotic use in Massachusetts. *Pediatrics*. 2008; 121(1):e15–e23. [PubMed: 18166533]
9. Barden LS, Dowell SF, Schwartz B, Lackey C. Current attitudes regarding use of antimicrobial agents: results from physicians' and parents' focus groups. *Clinical Pediatrics*. 1998; 37:665–671. [PubMed: 9825210]
10. Mainous AG, Zoorob RJ, Oler MJ, Haynes DM. Patient knowledge of upper respiratory infections: implications for antibiotic expectations and unnecessary utilization. *Journal of Family Practice*. 1997; 45:75–83. [PubMed: 9228917]
11. Mangione-Smith R, McGlynn EA, Elliott MN. Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Archives of Pediatrics and Adolescent Medicine*. 2001; 155:800–806. [PubMed: 11434847]
12. Mangione-Smith R, McGlynn EA, Elliott MN, Krogstad P, Brook RH. The relationship between perceived parental expectations and pediatrician antimicrobial prescribing behavior. *Pediatrics*. Nov.1999 103:711–718. [PubMed: 10103291]
13. Mainous AG, Hueston WJ, Eberlein C. Colour of respiratory of discharge and antibiotics use. *Lancet*. 1997; 350:1077. [PubMed: 10213556]
14. Kuzujanakis M, Kleinman K, Rifas-Shiman SL, Finkelstein JA. Correlates of parental antibiotic knowledge, demand, and reported use. *Ambulatory Pediatrics*. 2003; 3:203–210. [PubMed: 12882598]
15. Borkan, JM. Immersion/Crystallization. In: Crabtree, W Miller, editor. *Doing Qualitative Research*. Vol. 2. Sage Publications; 2009. p. 179-194.
16. Altheide, DL.; Johnson, JM. Criterion for assessing interpretive validity in qualitative research. In: Denzin, NK.; Lincoln, YS., editors. *Handbook of Qualitative Research*. Thousand Oaks: Sage Publications; 2009. p. 485-499.

17. Sandelowski M. The problem of rigor in qualitative research. *ANS Adv Nurs Sci.* 1986; 8(3):27–37. [PubMed: 3083765]
18. Finkelstein JA, Davis RL, Dowell SF, et al. Reducing antibiotic use in children: a randomized trial in 12 practices. *Pediatrics.* 2001; 108:1–7. [PubMed: 11433046]
19. Hennessy TW, Petersen KM, Druden D, et al. Changes in antibiotic-prescribing practices and carriage of penicillin-resistant streptococcus pneumoniae: a controlled intervention trial in rural Alaska. *Clinical Infectious Diseases.* 2002; 34:1543–1550. [PubMed: 12032887]
20. Stivers T, Mangione-Smith R, Elliott MN, McDonald L, Heritage J. Why do physicians think parents expect antibiotics? What parents report vs what physicians believe. *J Fam Pract.* 2003; 52(2):140–148. [PubMed: 12585992]
21. Lehoux PP, B, Daudelin G. Focus group research and “the patient’s view”. *Social Science in Medicine.* 2006; 63:2091–2104. 2006.
22. Siegel RM. Acute otitis media guidelines, antibiotic use, and shared decision making. *Pediatrics.* 2010; 125:384–385. [PubMed: 20100752]

Table 1

Home remedies for respiratory tract infections mentioned by parents of young children.

"Soft candle" (cream/rub) with menthol or eucalyptus oil
Baby Vicks
Garlic applied to the back of the feet
Olive (or palm) oil instilled in ear canal
Garlic tea
Castor oil
Lemon and honey
Lime juice and salt
Steam, showers

Table 2

Participant statements supporting common themes among focus group participants.

Theme	Supporting statements
Parents have widely varying thresholds of fever, duration, or particular symptoms for seeking care	<p><i>"His temperature hit 102.9 and I'm like, this is it. So I called them right away and... they said bring—I was in there so fast."</i></p> <p><i>"If your child has a fever of like 105, 106, and it's not going down, if you try things, then you need the doctor because you don't know."</i></p> <p><i>"I've got a 3-day rule, 4-day rule [for fever], give or take..."</i></p> <p><i>"[When it's] been a week and he still has this yellow color coming out and it's not going away, or this green colored mucus, then I'll call."</i></p> <p><i>"Once it starts turning kind of greenish, that starts to worry us because it could be some sort of infection or something."</i></p>
Thresholds for care change with parenting experience	<p><i>"In the beginning, we definitely [called] for every little thing...But after calling them a number of times, you kind of get an idea of what they're going to tell you to do...so you find yourself doing those things first."</i></p>
Priority on prevention of spread within families	<p><i>"Handwashing in my house is big...I teach them how to cough like this [into crook of arm], you know, like 'cover your cough.'"</i></p> <p><i>"[I use] the hand sanitizer, washing your hands. Just trying to clean after the kids. The Clorox wipes with all of the toys. Just basically everything, you know?"</i></p>
Antibiotics should be reserved for only when necessary	<p><i>"I'm not a fan of it unless you're going to tell me that she has an ear infection or an upper respiratory infection, or strep throat [otherwise] I don't think it's a good idea."</i></p> <p><i>"I personally have that fear, that if I'm ever giving my child antibiotics that he's going to build up some kind of resistance to it, and when he really needs it, it's not going to do anything for him."</i></p>
Trust in advice from clinicians, in general, but balanced by parental beliefs and health system issues (e.g. co-pays).	<p><i>"Sometimes I leave with medicine, sometimes I don't. And when I don't leave with medicine, you know, at least I know he's been looked at."</i></p> <p><i>"I come in knowing he has the bronchitis or the pneumonia, and they won't want to do the x-ray or give him an antibiotic; they'll just say 'Keep giving the albuterol'. And, I'll insist on getting the x-ray... and we get the pneumonia."</i></p> <p><i>"You know, although I trust my doctor, they do make mistakes, and sometimes you have to push and advocate."</i></p> <p><i>"They did give me one [antibiotic for otitis] here because I made it a point where if I have to come back, it's another \$20."</i></p>
Shared decision making regarding antibiotics for otitis media	<p><i>"They look in the ear. If it's very severe, then they say that he should absolutely have antibiotics, but other times, it's more of a mild case and the doctor leaves it up to me to decide."</i></p> <p><i>"Some doctors kind of don't mention that there's a choice, and some doctors say, well, you don't have to, but you can if you want."</i></p> <p><i>"Let's say he or she suggested that we wait two or three days. I don't know if I'd want to put my child through that for two or three days being miserable."</i></p>