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Germs are Germs, and Why Not Take a Risk?: Patients' Expectations for Prescribing Antibiotics in an Inner City Emergency Department

David A. Broniatowski, Ph.D.[1,*], **Eili Y. Klein, Ph.D.**[2], and **Valerie F. Reyna, Ph.D.**[3]

[1]Department of Engineering Management and Systems Engineering, George Washington University.

[2]Center for Advanced Modeling in the Social Behavioral and Health Sciences, Department of Emergency Medicine, Johns Hopkins University

[3]Departments of Human Development and Psychology, Center for Behavioral Economics and Decision Research and Human Neuroscience Institute, Cornell University

Abstract

Background—Extensive use of unnecessary antibiotics has driven the emergence of resistant bacterial strains, posing a threat to public health. Physicians are more likely to prescribe antibiotics when they believe that patients expect them. Current attempts to change these expectations highlight the distinction between viruses and bacteria ("Germs are Germs"). Fuzzy Trace Theory further predicts that patients expect antibiotics because they make decisions based on categorical gist, producing strategies that encourage risk taking when the status quo is bad (i.e., "Why Not Take a Risk?"). We investigate both hypotheses.

Methods—We surveyed patients visiting the emergency department of a large urban hospital (72, 64%, were African-American) using 17 Likert-scale questions and two free-response questions regarding patient expectations for antibiotics.

Results—After the clinical encounter, 113 patients completed the survey. 54 (48%) patients agreed with items that assess the "Germs are Germs" hypothesis, whereas 86 (76%) agreed with items that assess the "Why Not Take a Risk?" hypothesis. "Why Not Take a Risk?" captures significant unique variance in a factor analysis, and is neither explained by "Germs are Germs," nor by patients' lack of knowledge regarding side effects. Of the 81 patients who rejected the "Germs are Germs" hypothesis, 61 (75%) still indicated agreement with the "Why Not Take a Risk?" hypothesis. Several other misconceptions were also investigated.

Conclusions—Our findings suggest that recent public health campaigns that have focused on educating patients about the differences between viruses and bacteria omit a key motivation for why patients expect antibiotics, supporting Fuzzy Trace Theory's predictions about categorical gist. The implications for public health and emergency medicine are discussed.

[*]Corresponding author: Department of Engineering Management and Systems Engineering, George Washington University, 1776 G St. NW, Washington, DC 20052, USA. Tel: + 1 617 852 5006, broniatowski@gwu.edu.

Antibiotic resistance has become a major threat to the public and patient health. Despite the magnitude of the problem, antibiotics are over-prescribed, due in large part to patients' expectations for antibiotic therapy. Studies show that physicians often prescribe antibiotics based on their beliefs about what patients expect (1-3), even though available data suggest that physicians have difficulty divining patients' expectations (3). When expectations are clear, physicians can address those expectations directly with patients, resulting in more accurate diagnoses and more satisfied patients (4). However, there is a lack of understanding of how patients' expectations regarding antibiotics are formed. For example, Butler et al. (3) hypothesized that patients may conflate antibiotics with treatment in general. In addition, Stearns et al. (5) hypothesized several reasons for why patients might expect antibiotics, including that receiving antibiotics provides them with a retroactive justification for taking the time and effort to visit the hospital, and because it is a signal that the physician takes their illness seriously. Such patients might expect antibiotics as a natural outcome of visiting a physician, even if their illness is not bacterial or does not require such therapy.

The issue of how patients understand the meaning of antibiotics is central to any patient-centered educational intervention that attempts to address inappropriate antibiotic prescribing. Thus, we examined patients' expectations regarding antibiotic therapy using Fuzzy Trace Theory (FTT), a theory of medical decision-making that helps explain how people form judgments and make decisions based on the meanings that they derive from the information they are given (e.g., 6). FTT therefore highlights the importance of understanding the meaning of "antibiotics" to patients.

FTT posits that individuals encode at least two mental representations of information, called verbatim traces and gist traces. Verbatim traces are precise representations of the surface form of information ("If I take antibiotics, there is a 0.1% chance of negative side effects"), whereas gist traces are qualitative representations of the meaning of information ("If I take antibiotics, mostly nothing bad will happen," i.e., its bottom-line meaning). Although people process both types of information, evidence suggests that they generally rely on gist, rather than verbatim, representations (6-10).

Hypotheses

Germs are Germs

Perhaps the most prominent hypothesis regarding why patients expect antibiotics is that they do not know the difference between bacteria and viruses, and will therefore assume that antibiotic treatment is effective against viral illness. We call this hypothesis "Germs are Germs" because it captures the gist of many peoples' conceptualizations of disease-causing microorganisms, as shown in prior FTT research on sexually transmitted infections (6, 7). If this hypothesis is correct, then it should be remedied by patient education that explains the differences between viral and bacterial illnesses, such as the U.S. Centers for Disease Control and Prevention's (CDC) Get Smart program (11), but not by experience with antibiotics alone, because patients are often unable to distinguish the disease courses of bacterial and viral infections.

Why Not Take a Risk?

We propose an alternative hypothesis, based on FTT, that patients draw a categorical contrast between possibly effective treatment and certainly remaining sick (cf. 16). Patients who make such categorical distinctions should seek antibiotic therapy if there is a non-negligible possibility that their symptoms are caused by a bacterial pathogen and could improve with antibiotics. This strategy would be especially likely if antibiotics are perceived to be essentially without risk – i.e., if taking antibiotics is perceived as basically harmless to the individual.

Therefore, we constructed several items to assess this strategic risk hypothesis, drawing on prior research (12-14) that used such items as "Better safe than sorry" (e.g., "Antibiotics might not make me better, but it is better to be safe than sorry so I should take them"), and adding new items, such as "I don't know if an antibiotic can make me better, but it can't hurt to take them" and "Antibiotics might not make me better, but I should take them just in case." We also included items to tease apart this strategic approach to risk from lack of knowledge and a variety of misconceptions identified in prior literature and in our interviews with physicians who are experts on the use of antibiotics (sources are shown in Table 1).

Methods

Selection and Description of Participants

Patients were administered a paper survey between January and April 2013 in the emergency department (ED) of a large urban hospital. The hospital is a level-one trauma center and the ED serves as a primary source of emergency care for the surrounding, predominately African-American, community. Research staff approached patients presenting to the ED after they were seen by the ED physician (some were still awaiting medical supplies or test results), prior to discharge. Surveys were completed anonymously. Patients 18 years and older were eligible. English literacy was not an explicit criterion; experienced research staff enrolled available patients who were capable of responding to questioning (e.g., were lucid, could understand English etc.). No incentives were offered. The protocol was approved by the Johns Hopkins University (JHU) School of Medicine Institutional Review Board (IRB-X #NA_00081478).

Technical Information

The survey consisted of 17 Likert-scale items (see Table 1), followed by two free-response questions, demographic information including age, race/ethnicity and level of education, and, last, reason for the visit. Each question about antibiotics was based on the published literature or expert physician interviews. The questions were directed at attitudes towards antibiotics in general rather than to the specific visit. Responses were recorded using a 1-5 Likert scale, ranging from Strongly Disagree to Strongly Agree. In order to ensure that question wording did not bias responses, each question was presented in either a forward- or reverse-coded version. For example, patients who strongly agree (5) that antibiotics work against bacteria should strongly disagree (1) with the statement that antibiotics don't work against bacteria. A computer generated individual surveys that were administered by staff

such that the order of questions and the direction in which they were asked were randomized. The free-response questions were “Why should someone take antibiotics?” and “What is the difference between viruses and bacteria?”

Statistics

Because patients were randomly assigned to different versions of questions, total responses for each question varied slightly (see Table 1). Correlations of item agreement with age and education were conducted to determine whether these characteristics were related to antibiotics knowledge, misconceptions, and risk strategies. An exploratory factor analysis (EFA) was also conducted to find clusters of questions that had been answered similarly across participants. These clusters (or dimensions) were inspected to identify gist themes underlying responses. There was no forced extraction of components. The oblimin rotation method was used with maximum likelihood extraction. Three factors were retained based upon standard (15) goodness-of-fit criteria (root mean square error of approximation [RMSEA] = 0.01, 95% upper confidence bound = 0.05; examination of parallel analysis scree plot; Tucker-Lewis Index [TLI] = 1.10). Results were robust across multiple different analysis methodologies (Technical Appendix, Tables 3, 4, & 5). EFA was conducted using version 3.0.2 of the R Project for Statistical Computing.

Role of Funding Source

The funding source had no role in study design or implementation.

Results

Sample Characteristics

Data were collected for 113 patients. The majority of our sample was African-American with at most a high school education (Table 2). Sample characteristics were broadly representative of the JHU annual ED population (Technical Appendix, Table 6). Controlling for multiple tests, there was no significant difference in survey responses between patients whose presenting complaints indicated that they were likely to expect antibiotics (e.g., presenting with flu-like symptoms) and those who were unlikely to expect antibiotics (e.g., presenting with trauma).

Patients’ Knowledge and Misconceptions Regarding Antibiotics

Mean responses for each question asked are shown in Table 1. Most patients (84; 75%) displayed some correct knowledge, agreeing that antibiotics work against bacteria (or disagreeing that antibiotics don’t work against bacteria). However, many patients also had misconceptions. For example, 48 (42%) patients agreed that antibiotics work against viruses (or disagreed that antibiotics don’t work against viruses). When asked about the difference between viruses and bacteria in free-response questions, 45 (40%) patients stated that they were unsure or did not know. Furthermore, 33 (29%) patients spontaneously reported misconceptions that were factually inaccurate. Specifically, 11 (10%) responses related to misconceptions concerning the mechanism of transmission (e.g., that viruses were airborne whereas bacteria were found on dirty surfaces), 10 responses (9%) indicated that one sort of infection is external “gets in your body” whereas the other is internal “grows in your body,”

5 responses (4%) indicated that either bacteria or viruses were more dangerous or contagious, one patient said viruses but not bacteria can be cured, and 3 responses (3%) indicated that there was no difference between viruses and bacteria; 11 (10%) patients did not answer.

Why Not Take a Risk?

A majority of patients (86; 76%) agreed with at least one item (or disagreed with a reverse-coded variant) supporting the "Why Not Take a Risk?" gist. In addition, EFA results showed that the "Why Not Take a Risk?" gist captured a significant amount of unique variance (Technical Appendix; Table 3). Both item-pairs loading on this dimension highlight the perception of possible gain, but negligible downside risk associated with taking antibiotics.

Germs are Germs

In contrast to the "Why Not Take a Risk?" gist, less than half of patients (54; 48%) agreed with at least one item supporting the "Germs are Germs" gist. More educated patients were less likely to agree with the items in this gist theme that referred specifically to viruses (Technical Appendix; Table 7). "Germs are Germs" is only weakly correlated with other dimensions in the EFA (r=0.16 with "Why Not Take a Risk?" and r=0.09 with "Antibiotics Might Have Side Effects"). Of the 81 (72%) patients who disagreed with "Germs are Germs," a majority (61; 75%) still agreed with at least one item supporting "Why Not Take a Risk?"

Side Effects are Related to, but Distinct From, "Why Not Take a Risk?"—Of the 75 patients who agreed that antibiotics might have side effects, a majority (52; 69%) agreed with at least one item indexing the "Why Not Take a Risk?" gist. Nevertheless, these two concepts are distinct because they load on separate dimensions of the EFA and are only weakly correlated (r=0.12). More educated patients were less likely to agree with individual items that emphasize the absence of downside risk such as "It can't hurt," and "ABX don't have side effects" but not with their reverse coded variants that explicitly mention the words "side effects."

Discussion

Our findings suggest that the conventional approach taken by the CDC's Get Smart program, which seeks to educate patients about the differences between viruses and bacteria (i.e., "Germs are Germs"), is targeting an important misconception, reflected in both our survey and open-ended responses. This misconception – that bacterial and viral diseases can be lumped together and are both curable with antibiotics – has been used to explain risk judgments for sexually transmitted infections (6,7) and has been the target of successful interventions to reduce risk (14). However, fewer than half of patients in this study agreed with the misconception that antibiotics work against viruses. As predicted by Fuzzy Trace Theory, our data indicate that many patients endorse a distinct strategy, grounded in treating risk categorically, that promotes antibiotic use. That is, most patients agreed with items expressing the "Why Not Take a Risk?" gist – i.e., that antibiotic use boils down essentially to a choice between (a) Don't take antibiotics and stay sick for sure versus (b) Take

antibiotics and maybe stay sick but maybe get better. This gist representation is consistent with Fuzzy Trace Theory, which predicts that option b will be chosen because getting better is superior to staying sick. A majority of patients who rejected “Germs are Germs” still endorsed a gist strategy of “Why Not Take a Risk?”

One might think that educating patients about the side effects and adverse events associated with antibiotic therapy would be sufficient to change their behaviors, since “Why Not Take a Risk?” is premised on a perception of nil additional downside risk. Indeed, our results suggest that, as patients’ perceptions of downside risk increase, they are less likely to behave strategically. We may therefore conclude that “Why Not Take a Risk?” contains two subtly different interpretations, one focusing on the absence of downside risk (i.e., “Antibiotics don’t have side effects” and “It can’t hurt;”), and the other focusing on the presence of potential upside gain (i.e., “Better safe than sorry,” and “Take ABX just in case”).

Implications for Educational Interventions

This study suggests that educational interventions that focus on microbial distinctions may be insufficient to reduce patients’ expectations for antibiotics. For example, conveying that viruses are smaller than bacteria or that viruses cannot survive outside of the body (11), are unlikely to be perceived as relevant to patients’ decisions about antibiotic use. Indeed, studies have found that explanations regarding antibiotics’ lack of effectiveness against viral infections were not well understood (4), and there is some reason to believe that this would be especially true for the least educated patients – in our sample, most patients had, at most, a high school education. When interpreted in light of other FTT research on risk-taking (16), this study’s results suggest that conventional strategies aimed at educating patients regarding potential side effects and other downside risks must communicate that such risks are both qualitatively worse than the status quo of being sick (e.g., 17-24), and that there is virtually no upside potential to inappropriate antibiotic use. Communications that explicitly focus on communicating that antibiotics are harmful – rather than providing verbatim data – may shift patient preferences (4, 25). Most effective would be an approach that communicates that antibiotics will not help – i.e., will not improve upon the status quo – while simultaneously emphasizing that they can have side effects that are more serious than the symptoms currently encountered by the patient. This will simultaneously address the perception of upside gain and the absence of downside risk that is implied by the “Why Not Take a Risk?” gist.

These results suggest that FTT might profitably apply to other clinical questions. For example, decisions to seek cancer-screening, escalate care (e.g., take riskier medications), or adhere to preventive medication may also be governed by patients’ perceptions of simple qualitative contrasts between the “status quo” of being “okay” (i.e., without apparent disease) versus the categorical possibilities of being either okay or not okay by taking action (e.g., 4, 6, 9). Because being okay is preferred over not being okay, the risky option of taking action would not be a preferred decision for such patients. In contrast, when the status quo changes such that the patient is now “sick” or has a finding, treatment will be preferred, even if it may not be warranted. Targeted educational interventions that directly address these gists are more likely to succeed than those that only address verbatim facts (e.g., 26,

27). Appropriate gist representations are also predicted to more reliably cue relevant social and moral values.

Limitations and Directions for Future Work

Although our study is representative of an urban, low socio-economic status ED patient population, it is not nationally representative and so might not generalize to other populations. In addition, the sickest patients, and those experiencing the most pain, were less likely to be responsive and therefore more likely to be excluded from our sample for practical reasons. In addition, we did not limit our analysis to those patients who are the most likely to expect antibiotics – i.e., those experiencing cold- and flu-like symptoms – rather, we surveyed all patients regardless of their reported ailment. Most expressed some level of support for antibiotic use in general, regardless of their current complaints. Finally, we did not measure changes in patient behavior. Responses to our survey were beliefs and attitudes, which are known to predict behavior, but future studies should link these responses to patient requests for antibiotics in the context of clinical care.

Conclusions

Patient educational interventions may be more effective if they explicitly address the strategic gist (i.e., Why Not Take a Risk?) that patients employ in understanding and choosing antibiotics.

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Technical Appendix

Table 3

Item Loadings Based on an Exploratory Factor Analysis with Oblimin Rotation For 17 Survey Items

	1 (8%)	2 (8%)	3 (7%)
Correct Knowledge			
Yes against bacteria / No against bacteria	−0.41		
Germs are Germs			
Yes against viruses / No against viruses	0.60		
Yes against germs / No against germs			
Why Not Take a Risk?			
Better safe than sorry / Better not to take ABX			0.43
Take ABX just in case / Don't take ABX if they don't make me better			0.53
It can't hurt / It might hurt			
Antibiotics Might Have Side Effects			

	1 (8%)	2 (8%)	3 (7%)
ABX have side effects / ABX don't have side effects		0.99	
I Need Antibiotics to Get Better			
My symptoms need ABX/ My symptoms don't need ABX			
Will get better without ABX / Won't get better without ABX			
Antibiotics Will Make Me Better			
ABX will make me better / ABX will keep me sick			
ABX always cure / ABX don't always cure			
Doctors Are Supposed to Give Antibiotics			
Dr. takes me seriously so gives ABX / Dr. takes me seriously regardless of ABX			
Dr. may not give ABX even if s/he believes me / Dr. doesn't believe me			
Dr. knows best / Doctor doesn't know			
I Visit the Doctor for an Antibiotic			
I trust Dr. to give ABX when I'm sick / I trust Dr. to give ABX only when needed			
ABX are worth seeing Dr. / Seeing Dr. worth it without ABX			
Dr. gives ABX if I feel bad / Feeling bad doesn't mean Dr. gives ABX	0.54		

Note. Factor loadings >0.40 are shown.

Table 4

Item Loadings Based on a Principal Component Analysis with Varimax Rotation For 17 Survey Items.

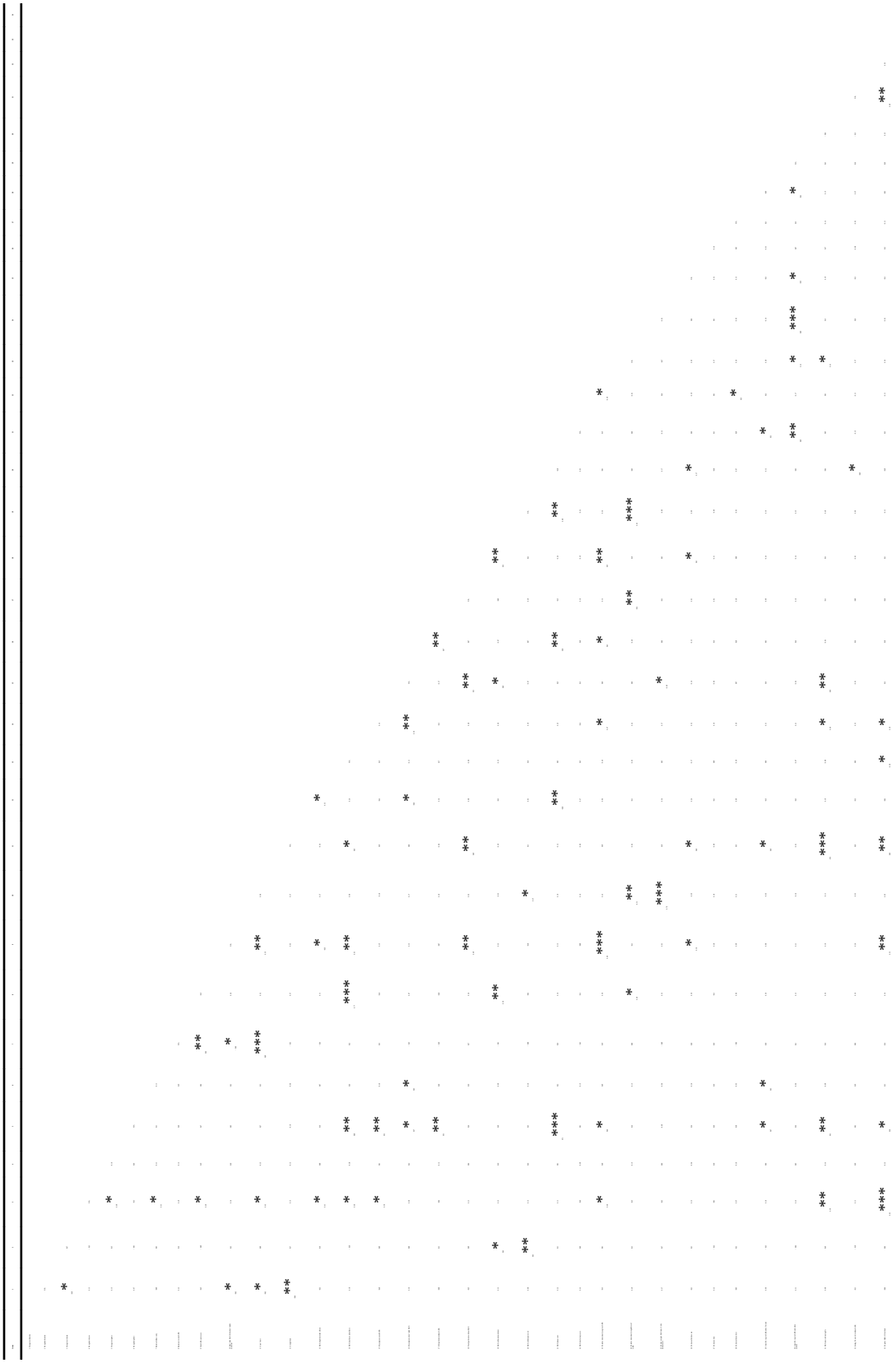
	1 (10%)	2 (10%)	3 (9%)	4 (9%)	5 (9%)	6 (8%)	7 (8%)
Correct Knowledge							
Yes against bacteria / No against bacteria				0.77			
Germs are Germs							
Yes against viruses / No against viruses	0.61						
Yes against germs / No against germs	0.76						
Why Not Take a Risk?							
Better safe than sorry / Better not to take ABX		0.77					
Take ABX just in case / Don't take ABX if they don't make me better		0.66					
It can't hurt / It might hurt		0.47					
Antibiotics Might Have Side Effects							
ABX have side effects / ABX don't have side		0.80					

	1 (10%)	2 (10%)	3 (9%)	4 (9%)	5 (9%)	6 (8%)	7 (8%)
effects							
I Need Antibiotics to Get Better							
My symptoms need ABX/ My symptoms don't need ABX					0.48		
Will get better without ABX / Won't get better without ABX					−0.85		
Antibiotics Will Make Me Better							
ABX will make me better / ABX will keep me sick						0.69	
ABX always cure / ABX don't always cure						0.79	
Doctors Are Supposed to Give Antibiotics							
Dr. takes me seriously so gives ABX / Dr. takes me seriously regardless of ABX							0.73
Dr. may not give ABX even if s/he believes me / Dr. doesn't believe me		0.49					
Dr. knows best / Doctor doesn't know			0.67				
I trust Dr. to give ABX when I'm sick / I trust Dr. to give ABX only when needed							
I Visit the Doctor for an Antibiotic							
ABX are worth seeing Dr. / Seeing Dr. worth it without ABX	0.67						
Dr. gives ABX if I feel bad / Feeling bad doesn't mean Dr. gives ABX	0.43			0.44			

Note. Factor loadings >0.40 are shown. Each component with an eigenvalue larger than one was retained. Additional components extracted in the PCA, but not retained in the EFA, suggested other gists held by patients. The fifth factor could be characterized as "I won't get better unless I take antibiotics". The sixth factor could be characterized as "Antibiotics will make me better". The seventh factor may be understood as "Doctors are supposed to give antibiotics".

Table 5

Survey Item Bivariate Correlations



Note. * = significant at the $p<0.05$ level;

** = significant at the $p<0.01$ level;

*** = significant at the $p<0.001$ level. Entries marked “N/A” cannot be compared because no patients answered both survey items.

Table 6

Annual ED Population Statistics

Category	Characteristic	N (% of visits)	URI Visits (%)
Volume	Visits	61,840	7,638 (12%)
	Patients	53,557	6,347 (12%)
Gender	Female	32,038 (52%)	4,383 (57%)
Ethnicity	African-American	43,886 (71%)	6,041 (79%)
	White	14,385 (23%)	1,296 (17%)
	Hispanic	433 (1%)	32 (0%)
	Other	3,136 (5%)	269 (4%)
Age	18-40	26,607 (43%)	3,475 (45%)
	40-65	28,207 (46%)	3,295 (43%)
	>65	7,026 (11%)	868 (11%)
Insurance Status	Uninsured	10,636 (17%)	1,638 (21%)
	Medicaid	25,045 (40%)	2,987 (39%)
	Medicare	11,379 (18%)	1,469 (19%)
	Commercial	12,430 (20%)	1,199 (16%)
	Other	2,350 (4%)	345 (5%)

Note. URI = Upper Respiratory-tract Infection

Table 7

Correlations of Item Agreement with Age and Education

Item	Correlation with Education	Correlation with Age
Correct Knowledge		
Yes against bacteria	0.28*	0.08
No against bacteria	−0.22	0.29
Germs are Germs		
Yes against viruses	−0.39**	0.06
No against viruses	0.43***	0.18
Yes against germs	−0.26	−0.07
No against germs	0.00	0.12
Why Not Take a Risk?		
Better safe than sorry	−0.18	−0.23
Better not to take ABX	0.20	0.13
Take ABX just in case	−0.21	0.07
Don’t take ABX if they don’t make me better	0.18	0.16
It can’t hurt	−0.37**	−0.04
It might hurt	−0.08	0.24
Antibiotics Might Have Side Effects		

Item	Correlation with Education	Correlation with Age
ABX might have side effects	0.08	0.03
ABX don't have side effects	−0.35*	0.04
I Need Antibiotics to Get Better		
My symptoms need ABX	−0.15	0.01
My symptoms don't need ABX	0.14	0.04
Will get better without ABX	−0.08	−0.02
Won't get better without ABX	−0.36**	0.18
Antibiotics Will Make Me Better		
ABX will make me better	−0.35**	0.01
ABX will keep me sick	−0.12	−0.12
ABX always cure	0.07	−0.05
ABX don't always cure	0.33**	0.14
Doctors Are Supposed to Give Antibiotics		
Dr. takes me seriously so gives ABX	−0.28*	−0.05
Dr. takes me seriously regardless of ABX	−0.38**	−0.10
Dr. may not give ABX even if s/he believes me	0.31*	0.05
Dr. doesn't believe me	−0.33**	−0.19
Dr. knows best	0.25	−0.31*
Dr. doesn't know best	−0.04	−0.03
I trust Dr. to give ABX when I'm sick	−0.13	−0.12
I trust Dr. to give ABX only when needed	−0.09	−0.13
I Visit the Doctor for an Antibiotic		
ABX are worth seeing Dr.	−0.32*	0.00
Seeing Dr. worth it without ABX	−0.20	0.26
Dr. gives ABX if I feel bad	−0.50***	0.16
Feeling bad doesn't mean Dr. gives ABX	0.24	−0.30*

Note. Age options were: 1) <24; 2) 25-29; 3) 30-39; 4) 40-49; 5) 50-64; 6) 65+. Education options were: 1) Did not complete high school; 2) High school (or equivalent); 3) Some college (1-4 years, no degree); 4) Associate's degree (including occupational or academic degrees); 5) Bachelor's degree (BA, BS AB, etc.); 6) Master's degree (MA, MS, MENG, MSW, etc.); 7) Professional school degree (MD, DDC, JD, etc.); 8) Doctorate degree (PhD, EdD, etc.).

* significant at the p<0.05 level;

** significant at the p<0.01 level;

*** significant at the p<0.001 level. There was no significant overall correlation between age and level of education

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Table 1

Mean Agreement for Positive (+) or Disagreement for Negative (−) Items Describing the Gist of Antibiotics Expectations by Hypothesis

Item short form	Code	Item full text	N	Mean (SD)
Correct Knowledge (11)				
Yes against bacteria	+	Antibiotics work against bacteria.	66	3.89 (0.70)
No against bacteria	−	Antibiotics don't work against bacteria.	46	3.59 (0.82)
Germs are Germs (11)				
Yes against viruses	+	Antibiotics work against viruses.	57	3.07 (1.01)
No against viruses	−	Antibiotics don't work against viruses.	56	2.96 (1.07)
Yes against germs	+	Antibiotics work against all germs.	56	2.64 (0.91)
No against germs	−	Antibiotics only work against some germs.	57	2.35 (0.85)
Why Not Take a Risk? (4)				
Better safe than sorry	+	Antibiotics might not make me better, but it is better to be safe than sorry so I should take them	61	3.43 (1.03)
Better not to take ABX	−	Antibiotics might not make me better, so I shouldn't take them	52	3.44 (1.05)
Take ABX just in case	+	Antibiotics might not make me better, but I should take them just in case	57	3.17 (0.95)
Don't take ABX if they don't make me better	−	I shouldn't take antibiotics if they might not make me better	55	2.85 (1.09)
It can't hurt	+	I don't know if an antibiotic can make me better, but it can't hurt to take them	55	3.15 (1.05)
It might hurt	−	I don't know if an antibiotic can make me better, but there might be side effects if I take them	58	2.41 (0.77)
Antibiotics Might Have Side Effects (4)				
ABX might have side effects	+	Antibiotics might have side effects, so I should only take them when I know they will work	69	3.71 (0.96)
ABX don't have side effects	−	Antibiotics are not harmful, so I should take them even if they might not work	44	3.23 (1.02)
I Need Antibiotics to Get Better (3)				
My symptoms need ABX	+	My symptoms will only go away with antibiotics	52	2.98 (0.99)
My symptoms don't need ABX	−	My symptoms will go away without antibiotics	61	3.18 (1.00)
Will get better without ABX	+	I will get better even if I don't take antibiotics	54	2.80 (0.97)
Won't get better without ABX	−	I won't get better unless I take antibiotics	59	3.24 (1.06)
Antibiotics Will Make Me Better (Expert Physician Interview)				
ABX will make me better	+	If I take antibiotics I will get better.	58	3.41 (0.97)
ABX will keep me sick	−	If I take antibiotics I won't get better	55	3.56 (0.91)

Item short form	Code	Item full text	N	Mean (SD)
ABX always cure	+	Antibiotics always cure my symptoms	48	2.94 (0.99)
ABX don't always cure	−	Antibiotics don't always cure my symptoms	65	2.66 (1.00)
Doctors Are Supposed to Give Antibiotics (5)				
Dr. takes me seriously so gives ABX	+	If a doctor takes my illness seriously, they will give me an antibiotic	61	3.48 (0.74)
Dr. takes me seriously regardless of ABX	−	A doctor who takes my illness seriously will only give me an antibiotic if I need it	63	4.02 (0.74)
Dr. may not give ABX even if s/he believes me	+	A doctor will not always give me an antibiotic, even if they believe that I am really sick	50	2.98 (1.09)
Dr. doesn't believe me	−	If a doctor doesn't give me an antibiotic, the doctor doesn't believe that I am really sick	63	3.71 (0.88)
Dr. knows best	+	A good doctor knows best when antibiotics are needed	54	4.22 (0.60)
Dr. doesn't know best	−	Even a good doctor doesn't always know best when antibiotics are needed	59	2.95 (1.05)
I trust Dr. to give ABX when I'm sick	+	I trust the doctor will give me an antibiotic if I am sick	55	3.64 (0.98)
I trust Dr. to give ABX only when needed	−	I trust the doctor will only give me an antibiotic if I need it	58	3.96 (0.64)
I Visit the Doctor for an Antibiotic (5)				
ABX are worth seeing Dr.	+	It is worth it to go to the doctor/emergency room because I will get an antibiotic	64	2.92 (0.96)
Seeing Dr. worth it without ABX	−	Going to the doctor/emergency room is worth it even if I do not get an antibiotic	49	2.31 (0.93)
Dr. gives ABX if I feel bad	+	I feel bad enough to have come to the doctor/emergency room so I should get an antibiotic	63	2.86 (1.12)
Feeling bad doesn't mean Dr. gives ABX	−	Just because I feel bad enough to come to the doctor/emergency room, doesn't mean I need an antibiotic	50	2.14 (0.80)

Note. Each survey contained either the forward (+) or reverse-coded (−) version (randomly assigned) of each question. Agreement was scored from 1 (strongly disagree) to 5 (strongly agree). Mean values reported for reverse-coded items above indicate disagreement, for ease of comparison to forward-coded items. A source reference for each gist is given in parentheses.

Table 2

Statistics for 113 patients in our sample

Category	Characteristic	N (%)
Race/Ethnicity	African-American	72 (64%)
	White non-Hispanic	34 (30%)
	Hispanic	3 (3%)
	Asian	2 (2%)
	Native American	1 (1%)
	No response	1 (1%)
Age	<24	10 (9%)
	25-29	20 (18%)
	30-39	17 (15%)
	40-49	18 (16%)
	50-64	27 (24%)
	>65	20 (18%)
	No response	1 (1%)
Educational attainment	Did not complete high school	23 (20%)
	High school or equivalent	50 (44%)
	Some college	21 (19%)
	Associates' degree	6 (5%)
	Bachelors' degree	9 (8%)
	Masters' degree	1 (1%)
	Doctorate degree	2 (2%)
	No response	1 (1%)
Patients' Presenting Complaints	Likely to expect antibiotics	21 (19%)
	Unlikely to expect antibiotics	70 (62%)
	Indeterminate	21 (19%)
	No response	1 (1%)