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Citation for final published version:

Brookes-Howell, L., Wood, Fiona Claire, Verheij, T., Prout, H., Cooper, L., Hood, K., Melbye, H., Torres, A., Godycki-Cwirko, M., Fernandez-Vandellos, P., Ystgaard, M. F., Falk Taksdal, T., Krawczyk, J. and Butler, Christopher Collett 2013. Trust, openness and continuity of care influence acceptance of antibiotics for children with respiratory tract infections: a four country qualitative study. *Family Practice* 31 (1) , pp. 102-110. 10.1093/fampra/cmt052 file

Publishers page: <http://dx.doi.org/10.1093/fampra/cmt052>  
<<http://dx.doi.org/10.1093/fampra/cmt052>>

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# Trust, openness and continuity of care influence acceptance of antibiotics for children with respiratory tract infections: a four country qualitative study

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Received February 5 2013; Revised July 16 2013; Accepted August 25 2013.

## Abstract

**Background.** Clinician–parent interaction and health system influences on parental acceptance of prescribing decisions for children with respiratory tract infections (RTIs) may be important determinants of antibiotic use.

**Objective.** To achieve a deeper understanding of parents' acceptance, or otherwise, of clinicians' antibiotic prescribing decisions for children with RTIs.

**Methods.** Qualitative interviews with parents of child patients who had recently consulted in primary care with a RTI in four European countries, with a five-stage analytic framework approach (familiarization, developing a thematic framework from interview questions and emerging themes, indexing, charting and interpretation).

**Results.** Fifty of 63 parents accepted clinicians' management decisions, irrespective of antibiotic prescription. There were no notable differences between networks. Parents ascribed their acceptance to a trusting and open clinician–patient relationship, enhanced through continuity of care, in which parents felt able to express their views. There was a lack of congruence about antibiotics between parents and clinicians in 13 instances, mostly when parents disagreed about clinicians' decision *to prescribe* (10 accounts) rather than objecting to withholding antibiotics (three accounts). All but one parent adhered to the prescribing decision, although some modified how the antibiotic was administered.

**Conclusions.** Parents from contrasting countries indicated that continuity of care, open communication in consultations and clinician–patient trust was important in acceptance of management of RTI in their children and in motivating adherence. Interventions to promote appropriate

antibiotic use in children should consider a focus on eliciting parents' perspectives and promoting and building on continuity of care within a trusting clinician–patient relationship.

**Key words:** Antibiotics, continuity of care, doctor–patient relationship, primary care, qualitative research/study, respiratory diseases.

## Introduction

Antibiotic resistance is a major threat to the public's health and is associated with antibiotic use in the community (1,2). A common indication for antibiotics is respiratory tract infection (RTI) in children presenting in primary care, and many of these prescriptions do not benefit patients (3–6). Public campaigns (7–9) and clinician-directed interventions (8–14) have helped to reduce antibiotic prescribing and use. Furthermore, previous research has indicated the importance of patients/public opinions and beliefs in shaping behaviour such as antibiotic adherence (15). Non-compliance with medication for chronic illnesses has been explained mostly by theories of doctor–patient interaction and patients' knowledge or beliefs about the treatment and the illness, (16) but more recently a meta-synthesis of qualitative research on medicine use, which focused mainly on chronic medication, concluded that the main reason why people do not take their medication as prescribed is because of concerns over the medicine itself rather than due to failings in patients or health professionals (17). However, little attention has been paid to the influence of the organization of health care delivery on antibiotic prescribing and adherence, and the specific concerns of parents of children regarding antibiotic prescribing.

There are vast differences in rates of antibiotic prescribing across European countries with highest rates reported in France and lowest rates in the Netherlands (1). Given cultural and contextual differences (national antibiotic campaigns, ease of access to primary care and payment for antibiotics, point of care tests) issues important to patients and clinicians may also vary between countries. Previous qualitative research has indicated that primary care clinicians across Europe are aware of the problem of antibiotic resistance, but do not see it as something that affects them locally (18). Research from a number of European studies on patient and public attitudes to antibiotics has also indicated the importance of culture, particularly in relation to expectations for antibiotics (19–23). Gaining access to comparative, international perspectives is important as antibiotic resistance does not respect national boundaries and international approaches to contain resistance are likely to become more important. We therefore conducted a qualitative interview study in four contrasting European countries to achieve a deeper understanding of parents' perspectives of antibiotic prescribing for children with RTI presenting in primary care.

## Methods

### Setting and recruitment

We conducted semi-structured, face-to-face interviews with 63 parents in four primary care research networks across Europe based in the cities of Łódź ( $n = 16$ ), Cardiff ( $n = 15$ ), Tromsø ( $n = 12$ ) and Barcelona ( $n = 20$ ). Eighty-two parents initially consented to participate. Fourteen could not be contacted to arrange an interview time, withdrew or cancelled the interview multiple times, and five were ineligible. The four networks had a track record of conducting research and were selected from nine networks already established and participating in a qualitative study of the Genomics to combat Resistance Against Antibiotics in Community-acquired LRTI in Europe (GRACE) network of excellence study (<https://www.grace-lrti.org/portal/en-GB/About>). A number of factors were considered when selecting the networks for this study including health care organization and structure, primary care organization and structure (practice size, access, choice of doctor, fee for service, payment of clinician etc.), availability of near-patient tests, public awareness/campaigns and patient's access to antibiotics. The four networks were finally selected on the basis of maximum variation (being the most contrasting) were Tromsø, Barcelona, Łódź and Cardiff. They were selected for their contrasting health care systems (routine use of point of care tests to guide management for RTIs in Tromsø, ease of availability of antibiotics without consulting a doctor in Barcelona) and geographical settings Northern Europe (Tromsø), Eastern Europe (Łódź), Southern Europe (Barcelona) and Western Europe (Wales). We aimed to recruit between 15 and 20 parents in each of the four networks. The number of interviews was based on the need for a sample that allows for detailed analysis typical of qualitative data while also allowing for exploration of possible contrasting themes between networks. Our study design did not allow for us to check data saturation at the time of data collection as there was a necessary time delay between data collection and analysis while the interviews were transcribed then translated into English for analysis. However, this was taken into account when the sample was determined and we ensured a sufficiently large sample to capture a range of contrasting experiences (24,25). Interviews were conducted between June 2008 and April 2009.

Parents were eligible to participate if they were over 18 years old and had consulted within the last 3 months in general practice with a child aged between 6 months and 12 years who had

an illness where an acute or worsened cough, acute sore throat or inflammation of the middle ear was the main or dominant symptom, or a clinical presentation that suggested a RTI. Other eligibility criteria were that the child had been seen in normal consulting hours and had not previously participated in the GRACE qualitative study.

In the first instance, up to 100 of the most recent eligible parents to have consulted at the participating General Practice were identified in the General Practice Records by medical staff using appropriate diagnostic codes. For example, in the Cardiff network the codes used were productive cough with no other symptoms (NOS), sore throat NOS, otitis media NOS, infection ear, chest infection NOS, chest infection and RTI. Suitable equivalent codes were identified in the other three countries. Invitation packs were sent out in batches until the desired sample was reached. The total number of packs sent varied due to response rate.

### Data collection

An initial interview guide was developed following a literature review and consideration of the aims of the project. The interview guide was then further developed collaboratively with the interviewers during a half-day training session. Interviews were semi-structured and based on an interview topic guide made up of eight broad topic areas (Table 1). The broad topics in the interview guide were followed up with more detailed questions where appropriate. The interview guide was translated and back translated to ensure comparability between countries.

Interviews were conducted at a location of the parent's choice (often their home) by interviewers who had participated in a half-day training course. The interviewers kept close links with the central team that helped to maintain consistency of interviewing. Interviews were conducted in the local language, audio-recorded and transcribed by the interviewer or a research administrator. They were subsequently translated into English by the interviewer where possible, or an approved translator.

**Table 1.** Interview broad topic areas

1. Reflections on child's recent RTI consultation: thoughts and behaviour before the consultation, about the consultation and treatment
2. Reflections on own RTI illness experience as an adult (comparing with behaviour for child when ill)
3. Knowledge about RTI and infections generally
4. Knowledge and attitudes about antibiotics
5. Knowledge and attitudes about alternative (non-antibiotic) management
6. Knowledge and attitudes about antibiotic resistance
7. Raising awareness about antibiotics and antibiotic resistance
8. Knowledge and attitudes about near-patient tests

### Analysis

Transcripts were analysed in Cardiff by LBH, LC, HP, and FW using a framework approach (26). This five-stage approach allows themes to be explored in relation to research questions and for new themes to emerge from the data. The first three stages 'familiarization' with the data, 'identification of a thematic framework' and 'indexing' (or coding) of data are similar to thematic analysis. The fourth stage 'charting' involves retrieving the coded data and creating summaries of each interviewee's talk on each theme. The final stage 'mapping and interpretation' of data involves the research team using the charts to interpret the data set as a whole and connect with research objectives.

LBH, LC and HP developed a thematic framework on the basis of research objectives, the literature and emerging themes. The framework was revised after being applied to more transcripts. Transcripts were double coded until consensus was reached through regular discussions. A full coding book was developed, which provided a full definition of each code and examples of what kinds of data were included and excluded from each of the codes. NVivo8 qualitative data analysis software was used to code data and facilitate analysis (27). Interviewers made fieldnotes after each interview, providing contextual detail for the research team and were referred to during preliminary analysis. These fieldnotes provided 'analytical hunches' or early interpretations about the data that the main analysts could incorporate into the framework. The interviewers from each network (LC, JK, MFY and PF) were also asked to comment on the charted data for their network and summaries of the lead analyst's interpretations of the data for their network as a means of data validation.

### Ethical considerations

Ethics Committees for each country approved the study. Information packs and consent forms were posted to parents and they returned a signed consent form to allow them to be contacted by the interviewer and then provided written, informed consent for the interview. Interviews were anonymized during transcribing.

### Results

Fifty-six of the interviewees described themselves as the mother of the child patient, one as the foster mother and four as the father, and one interviewee did not state the relationship with the child patient; one interview included both mother and father. The average age of interviewee was approximately 35 years. Parents' education level and occupational status varied by network, with educational attainment being highest in Tromsø and lowest in Cardiff (see Table 2).

In four interviews, the parent talked about the recent illness episode of two, rather than one child, as both were ill around the same time and both were taken to the doctor. The gender of child patients was balanced. Thirty interviews involved male child

patients, 29 female child patients, and four interviews involved discussions of both male and female child patients equally. The average approximate age of child was 4 years.

Parental acceptance of the clinicians' decision about whether or not to prescribe antibiotics focussed on four main areas; parental agreement regarding management; parental disagreement regarding management; trust and familiarity in the decision-making process and adherence to antibiotic advice. Representative quotes are followed with a code that refers to the network and the parents' unique study number.

**Table 2.** Highest educational attainment and occupation of primary household earner by network

	Barcelona	Cardiff	Łódź	Tromsø
University degree (completed)	11	4	10	10
University degree (not completed)	5	0	1	0
Professional training (completed)	0	3	3	2
Professional training (uncompleted)	0	1	0	0
High School (completed)	1	7	2	0
High School (uncompleted)	2	0	0	0
Never attended high school	1	0	0	0
TOTAL	20	15	16	12
High level executive, major professional	3	2	2	5
Administrative personnel, minor professional, owner of small business	11	4	8	2
Sales, technician, farmer	2	3	0	0
Skilled manual employee	2	2	4	3
Unskilled employee	1	0	0	1
Student	0	0	0	0
Homemaker	1	4	1	0
Unemployed	0	0	0	1
Disabled	0	0	1	0
Retired	0	0	0	0
TOTAL	20	15	16	12

### Parental agreement regarding management

Parental views on whether or not antibiotics were necessary for their child matched the prescribing decision made by the clinician in 50 of the 63 accounts. There were no notable exceptions at the network level. There were a number of reasons why parents agreed with the GP that their child *should* have antibiotics (Table 3). Reasons included the presence and duration of specific symptoms such as raised temperature, cough or pain (Extract 1), as well as the lack of improvement in the child when home remedies had already been tried (Extract 2). Parents also agreed that antibiotics were appropriate if they had worked for similar infections in the past (Extract 3).

Parents gave many reasons for agreeing with the GP that their child should *not* have antibiotics. These included the severity or absence of specific symptoms (Extract 4).

Other reasons given for agreeing with the clinician included previous experience of not needing antibiotics for a similar infection (Extract 5), the belief that antibiotics do not work for

**Table 3.** Parental agreement regarding management

Extract number	Theme	Extract
Parents agreed with GP that child <i>should</i> have antibiotics		
1	Presence and duration of specific symptoms	<i>I think so, because he had pus in his throat and a fever. I think the doctor did the right thing by prescribing the antibiotic</i> (Barcelona 1)
2	Lack of improvement when home remedies had been tried	<i>He needed extra help, 'cause he wasn't getting better on his own, you know by keeping warm, extra pillow and medicine</i> (Cardiff 6)
3	Antibiotics worked in the past	<i>My child used to fall ill a lot when he was in the nursery and in the kindergarten. Because of that, he had many different kinds of infections which always recovered with an antibiotic</i> (Łódź 13)
Parents agreed with the GP that child should <i>not</i> have antibiotics		
4	Absence of specific symptoms	<i>An antibiotic is not needed because she isn't coughing, as it was this summer, we were on the holidays and she was not coughing and I knew that it was only a throat infection</i> (Łódź 1)
5	Previous experience of not needing antibiotic	<i>Because it was not the first infection and all the previous ones were treated without antibiotics</i> (Łódź 3)
6	Belief that antibiotics do not work for viral infections	<i>Obviously he didn't say antibiotic because it was a virus</i> (Barcelona 5)
7	Belief that antibiotics are last resort	<i>I think that antibiotics should only be given, um, when needed, I don't think they should just be given out 'willy-nilly'</i> (Cardiff 18)

viral infections (Extract 6) and that antibiotics should only be used as 'a last resort' due to a perception that antibiotics are already generally overused (Extract 7).

### Parental disagreement regarding management

However, 13 parents disagreed with their clinician on whether their child should have antibiotics. These were spread across all four networks but included more in Tromsø and fewer in Cardiff, although the reasons for the slight differences are unclear from the data. There were a number of reasons why parents disagreed with their clinician (Table 4).

One parent disagreed with the clinician's decision to prescribe antibiotics because of concerns relating to antibiotic resistance (Extract 8). However, the concern related to a perceived risk that the child might develop immunity to the antibiotic (the child becomes resistant) rather than the bacteria developing resistance.

Others disagreed with the clinician prescribing the antibiotics because of the absence of certain symptoms (Extract 9) and the fact that the child usually got better without medication (Extract 10). Lastly, one parent told the clinician that she preferred to use homeopathic treatment rather than antibiotics.

Another parent, from the Tromsø network, stated that laboratory tests should first be carried out before prescribing antibiotics to ensure that a bacterial infection was really present (Extract 11).

Ten of the 13 cases of discordance between clinicians' antibiotic prescribing decisions and parents' views of these decisions

occurred when the clinician *had* prescribed antibiotics and the parent thought they were unnecessary. Only three parents reported that they felt that the clinician should have prescribed antibiotics but did not do so. Reasons included a disagreement with the clinician who said that one child had a viral infection when her other two children had been given antibiotics for a similar illness (Extract 12). A second parent was worried that her child could get worse if he did not have antibiotics (Extract 13). The third parent who disagreed with his clinician preferred to trust his father who was a clinician and said that the child did need antibiotics (Extract 14). It should be noted however that in spite of the parents who disagreed with the clinician on their prescribing decision, only one did not actually follow the clinician's advice.

### Trust and familiarity in decision-making about antibiotic management

Parents from all four networks indicated that they generally trusted their clinician's decisions on whether or not antibiotics were necessary (Table 5). Accounts revealed that parents valued continuity of care and saw this as the basis of development of trust. Parents pointed out that they often knew their clinician, were familiar with them and tried not to see a different clinician each time they consulted. Therefore, respondents perceived that clinicians knew the parents' own expectations and requirements. Parents also felt that the clinicians knew when their child was not their usual self. Indeed, one parent pointed out that it is difficult for clinicians to treat a child when they are not the child's usual clinician (Extract 15).

**Table 4.** Parental disagreement regarding management

Extract number	Theme	Extract
Parental disagreement with decision that child <i>should</i> have antibiotics		
8	Concern about antibiotic resistance	<i>Unfortunately, he took an antibiotic and I disagreed with him [the clinician] about antibiotics because I am afraid of immunity and I am afraid that it will cease to work at one point (Łódź 5)</i>
9	Absence of specific symptoms	<i>Well, I doubted basically because the antibiotic is related to the infections and to the temperature and he didn't have temperature symptoms (Barcelona 10)</i>
10	Child usually gets better without medication	<i>The other two times I wasn't given any [antibiotics] and the truth is that the girl got well (Barcelona 13)</i>
11	Laboratory tests needed	<i>You should be very restrictive about using antibiotics for otitis media. Ideally there should be growing certain bacteria and stuff, so that you know that it works. So I didn't expect to just be handed the prescription and just be told to go home and take it (Tromsø 5)</i>
Parental disagreement with decision that child should <i>not</i> have antibiotics		
12	Siblings given antibiotics for similar infection	<i>they'd all had tonsillitis and all three of them went to the doctor's, two had tonsillitis but one ((child's name)) never (Cardiff 14)</i>
13	Concern that child would deteriorate	<i>it was a Friday and I have a feeling that on the next day you cannot visit the doctor in the health centre, so I think that an antibiotic should be prescribed prophylactically, just in case (Lodz 15)</i>
14	Advice from clinician family member	<i>I don't have any idea about medicine but my father well let's say he usually likes giving Amoxicillin to treat these illnesses, not other antibiotics, just Amoxicillin (Barcelona 18)</i>

**Table 5.** Trust and familiarity in decision-making about antibiotic management

Extract number	Quote
15	<i>The thing is that I also believe that the doctor who doesn't usually treat the child, it's more difficult for him to know the needs (Barcelona 7)</i>
16	<i>I trust the doctor completely. I have everything explained because she knows I am inquisitive and I am asking about everything and I feel comfortable to call her any time in the health centre and in case of emergency to her home (Łódź 2)</i>
17	<i>I think it's an agreement between doctor and parents. I know better my son and he knows the science. We put it in common and then we decide (Barcelona 14)</i>
18	<i>I think I'd wait like 24 or 48 hours to see how the disease evolves and then if I still think the doctor was wrong then I'd come back to see him (Barcelona 19)</i>
19	<i>Stand my ground if a GP said, oh I don't think there's anything wrong with her, or whatever, I would say, well no, she's doing this, this and this (Cardiff 19)</i>

'Knowing' a clinician could also affect whether patients felt comfortable suggesting a diagnosis, challenging the clinician's management decision or, perhaps, more generally taking part in the decision-making process (Extract 16). Therefore, this overarching concept of trust is linked with familiarity and an established parent-clinician relationship.

Some parents pointed out that decision-making was a joint process between the clinician and the parent (Extract 17). On the other hand, several parents said that they would accept the decision of the clinician but would go back if the child did not get any better (Extract 18).

About a third of parents (22 of the 63) stated that they felt comfortable to either challenge the clinician in the consultation or seek a second opinion if they disagreed about an antibiotic prescribing decision for their child (Extract 19).

### Adherence with antibiotic advice

All of the respondents across the four networks stated that they had followed the clinicians' advice to *give* their child antibiotics when they had been prescribed, even if they disagreed with the decision. Two parents agreed with their clinician's advice to give their child antibiotics after a few days if symptoms persisted (a delayed prescription), although only one of these parents later gave their child the antibiotics.

All but one of the parents across the networks said that they had followed the clinicians' advice if it were *not to give* antibiotics. This parent (Barcelona 18) consulted his father (a medical practitioner) who prescribed the child antibiotics because he trusted and was influenced by his father (Extract 14).

There was a small group of parents who reported that they made slight alterations to how they administered the child's antibiotic independent of advice from the clinician. Alterations included making the antibiotic more palatable by altering the form [*they actually gave her tablets, and then I told them that I thought she would get liquid antibiotics because that was much easier to give her. So I had to go through a lot of trouble ... to get a new prescription*] (Tromsø 2)], or improving the taste, by adding sugar, sweet drinks or snacks [*I get some lemonade or squash quick so she down it and she doesn't vomit*] (Cardiff 9)].

## Discussion

### Principal findings

There was a high level of agreement across all networks in the clinicians' management decisions, regardless of whether antibiotics were prescribed. Parents generally reported feeling comfortable to express disagreement about a management decision, should it arise, with their clinicians. The few cases of disagreement tended to occur when the clinician *had* prescribed antibiotics and the parent thought they were unnecessary. However, despite this, only one parent did not adhere to their clinician's advice to not give their child antibiotics and obtained antibiotics elsewhere. In all four countries, trust in the clinician and continuity of care played an important part in the concordance in decision-making about antibiotic management or, where there was disagreement, in the parents feeling able to express their views in the consultation and/or following the clinicians' management plan regardless of their remaining concerns.

### Comparison with literature

The extent of adherence to clinicians' advice, despite parental disagreement with the need for an antibiotic, is noteworthy in our study. Hawkings et al., in their typology of antibiotic user behaviour, identified a group of mostly parents of young children, who limited antibiotic use due to concerns about their harmful effects (15). While such a reservation about antibiotics might explain our finding that disagreement tended to occur when antibiotics *were* prescribed, in addition, we found that parents tended to adhere to antibiotic use despite their own reservations. This is in contrast to parents in the study of Hawkings et al. who reported often making deliberate decisions to minimize antibiotic use by shortening the course or avoiding taking antibiotics altogether. This difference would not appear to be explained by cultural differences, as we found the trend to adhere across all four networks (one of which—Cardiff—consisted of a similar population group as that in the study of Hawkings et al.). One possible explanation is offered by the concerns of Hawkings et al., namely '*perceptions of adherence to medical advice as a moral prerequisite*

of good parenting'. It is possible that the parents in our sample were highly motivated to adhere to medical advice, given their parental role and responsibilities to return their child to health.

Parents' accounts, in our study, revealed that a trusting and open relationship with the clinician, in which parents felt comfortable to ask questions, challenge and discuss decisions, led them to generally feel satisfied with consultations and accept clinicians' prescribing decisions. Some parents talked about 'knowing' their clinician within an established parent-clinician relationship. This finding links to literature that highlights the importance of the clinician and patient relationship (28–30). Both Ridd et al. (31) and Frederkisen et al. (32) describe trust as a dynamic process constructed through positive consultation experiences with a specific doctor and continuity of care. Trust in a specific doctor is rooted in shared experience (28) and based on openness, honesty (31) and being taken seriously and 'recognized', i.e. respected and remembered (32). Stewart pointed out that studies that found only a moderate effect of patient-clinician relationship on improved patient health outcomes tended to focus on communication skills whilst neglecting 'dimensions such as trust, caring, feeling, power and purpose' (29). Pandhi and Saultz reported that although not all patients valued continuity of care, a majority of people did so, including parents of young children (33). Our findings add to these previous studies but provide an additional multi-country dimension.

We did not find notable differences between networks in parents' agreement of the GPs' antibiotic decision. This is despite marked differences in the health care system in the four networks. For example, Tromsø is the only network in our sample where the C-reactive protein near-patient test is regularly used in primary care consultations. Tromsø was also the network where most parents disagreed with the GP prescribing decision. However, despite this, all parents in Tromsø still adhered to the clinicians' advice to give antibiotics or not (albeit in a delayed format for one parent). The lack of notable differences in parental agreement between networks would suggest that trust and the doctor-parent relationship override health care system differences.

### Strengths and limitations

Qualitative research methods were used to gain detailed, relevant insights from the perspective of parents based on their lived experiences, rather than quantifying responses to questions conceived by others. This is the first study to use semi-structured qualitative interviews specifically to ask parents to reflect on a recent RTI consultation for their child and examine parents' adherence and trust in antibiotic prescribing decision across European countries.

While the overall sample was large for qualitative studies of this kind, we interviewed relatively small numbers of parents in

each network. Therefore, it is difficult to make clear inferences about important differences between the networks. However, qualitative research does not aim to produce data that are generalizable but instead commits to a detailed, in-depth exploration of subjects' experiences. Parents with stronger and/or more favourable views may have been more motivated to participate in interviews, so it is possible that this group of parents may have been over-represented. A group of parents with strong views might still include both those in favour of and those who prefer to avoid antibiotics, and therefore a balanced view would have been achieved.

The process of translating data from one language to another may have resulted in some of the original meaning being lost, altered or misinterpreted. We attempted to address this through a number of measures. The interview guide was discussed at length at the training session with the interviewers from the four networks to ensure that there was shared understanding of the purpose of the questions being asked, and whether there were any cultural differences in how concepts were understood. Interviewers were also asked to back translate (34) the interview guide as they had first-hand experience of the data and the cultural context. After the data had been translated, the interviewers from each of the networks checked the meaning of the data extracts on which the main analysis was based. It was decided that the translations should not be edited for grammatical 'correctness' and should remain as translated in order to maintain authenticity. However, if the meaning of an individual quote was unclear, then the interviewer was contacted to confirm the true meaning and the translated quote was altered accordingly.

### Conclusion and implications

Parents of children who had recently consulted in primary care with a RTI from the contrasting European networks based in Barcelona, Cardiff, Łódź and Tromsø indicated that continuity of care, open communication in consultations (for example feeling comfortable in taking part in the decision-making process, to ask questions, and challenge decisions) and clinician-patient trust were important in their acceptance of management of their children. This finding was apparent whether clinicians prescribed or did not prescribe antibiotics. This open and trusting relationship with the clinician also reportedly helped to motivate parents to adhere to antibiotic treatment.

These findings suggest that interventions to promote appropriate antibiotic use might include a focus on advanced clinician communication skills and a health care organization that promotes continuity of care within a trusting clinician-patient relationship. Interventions that solely rely upon public campaigns to reduce expectations for antibiotics by parents may therefore miss an important area of potential influence.

## Acknowledgements

Interviews were conducted by: PF-V (Barcelona), LC and HP (Cardiff), JK (Łódź) and MFY, and TFT (Tromsø). We are very grateful to the patients and clinicians who participated in this research and those who transcribed and translated the data. Additional support was from the Wales School of Primary Care Research.

## Declaration

Funding: this work was supported by the 6th Framework Programme of the European Commission (SP5A-CT-2007-044317). The South East Wales Trials Unit is funded by the National Institute for Health and Social Care Research. The funders have no involvement in the authors' work. We confirm that none of the authors have a commercial or other association that might pose a conflict of interest.

Ethical approval: ethical review committees in each of the European countries in which it was undertaken.

Conflict of interest: none.

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