

Understanding variation in primary medical care: a nine-country qualitative study of clinicians' accounts of the non-clinical factors that shape antibiotic prescribing decisions for lower respiratory tract infection

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ABSTRACT

Objectives: There is a wide variation between European countries in antibiotic prescribing for patients in primary care with lower respiratory tract infection (LRTI) that is not explained by case mix and clinical factors alone. Variation in antibiotic prescribing that is not warranted by differences in illness and clinical presentation may increase selection of resistant organisms, contributing to the problem of antibiotic resistance. This study aimed to investigate clinicians' accounts of non-clinical factors that influence their antibiotic prescribing decision for patients with LRTI, to understand variation and identify opportunities for addressing possible unhelpful variation.

Design: Multicountry qualitative semistructured interview study, with data subjected to a five-stage analytic framework approach (familiarisation, developing a thematic framework from interview questions and emerging themes, indexing, charting and interpretation), and with interviewers commenting on preliminary analytic themes.

Setting: Primary care.

Participants: Eighty primary care clinicians randomly selected from primary care research networks based in nine European cities.

Results: Clinicians' accounts identified non-clinical factors imposed by the healthcare system operating within specific regional primary care research networks, including patient access to antibiotics before consulting a doctor (Barcelona and Milan), systems to reduce patient expectations for antibiotics (Southampton and Antwerp) and lack of consistent treatment guidelines (Balatonfüred and Łódź). Secondly, accounts revealed factors related to specific characteristics of clinicians regardless of network (professional ethos, self-belief in decision-making and commitment to shared decision-making).

Conclusions: Addressing healthcare system factors (eg, limiting patients' self-management with antibiotics

ARTICLE SUMMARY

Article focus

- Clinicians' accounts of non-clinical factors that influence antibiotic prescribing decision for patients with lower respiratory tract infection.
- Understanding variation in the primary medical care of an acute, common condition and identifying opportunities for addressing possible unhelpful variation.

Key messages

- Clinicians in specific primary care networks in Europe report that their prescribing decisions are influenced by factors imposed by the healthcare system (direct patient access to antibiotics, for example in Barcelona and Milan, systems to reduce patient expectations for antibiotics in Southampton and Antwerp, and lack of consistent treatment guidelines in Balatonfüred and Łódź).
- Prescribing decisions are also influenced by specific characteristics of clinicians regardless of network (professional ethos, self-belief in decision-making and commitment to shared decision-making).
- Interventions to address unhelpful variation in prescribing should allow for local flexibility and consider addressing healthcare system factors (limiting self-management of antibiotics, increased public awareness and consistent guidelines) and clinician characteristics (promoting clinicians' receptivity to change, confidence in decision-making and readiness to invest in explaining prescribing decisions).

before consulting in primary care, increased public awareness and provision of more consistent guidelines) may assist in reducing unhelpful variation

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ARTICLE SUMMARY

Strengths and limitations

- ▶ This is the first study of prescribing for an acute condition to use a semistructured interview method to generate themes important to clinicians themselves and capture views on lower respiratory tract infection management across a broad range of contrasting European countries.
- ▶ The clinicians who participated were affiliated to a research network so may not have been representative of all general physicians in their country.
- ▶ Qualitative interviews gather reports of behaviour and attitude, rather than describing actual behaviour, but by allowing clinicians to introduce and elaborate on themes spontaneously, we were able to gain an impression of the themes that held most prominence to the clinicians themselves.

in antibiotic prescribing. Promoting clinicians' receptivity to change, confidence in decision-making and readiness to invest in explaining prescribing decisions may also be beneficial. As factors were emphasised differently between networks, local flexibility in interventions is likely to maximise effectiveness.

BACKGROUND

Antibiotic resistance is a growing problem that is increasingly impacting on human health.¹ There is a wide variation between European countries in antibiotic prescribing for patients in primary care with respiratory tract infection (RTI).²⁻⁴ In the Genomics to combat Resistance against Antibiotics in Community-acquired lower respiratory tract infection in Europe (LRTI-GRACE-01) observational study of variation in antibiotic prescribing for acute cough, patients included in networks based around the cities of Bratislava, Milan, Balatonfüred, Łódź and Cardiff were twice as likely to be prescribed antibiotics than the overall mean while patients in the Tromsø, Antwerp and Jönköping networks were four times less likely to be prescribed antibiotics.⁴ Trial evidence suggests that most antibiotic prescriptions do not help these patients get better any quicker.⁵⁻⁷ Variation in prescribing that does not improve patients' outcomes can increase selection of resistant organisms contributing to the problem of antibiotic resistance.⁸ Most likely, variation in clinical presentation and assessment of clinical factors (eg, aspects of the medical history, clinical signs and investigations) do not give sufficient insights into the reason for this variation.^{2-4 9 10} Therefore, there is a need to consider alternative, non-clinical factors that might increase understanding of variation in antibiotic prescribing.^{11 12}

Previous qualitative research found that antibiotic prescribing is influenced by doctors' attitude towards the doctor-patient relationship,^{11 13 14} perceived patient expectations,¹⁵ doctors' personal characteristics,¹⁴ patients' social context,¹⁶ a sense of social responsibility¹⁷

and a balancing act between what is 'clinically best' against perceived patient expectations.^{17 18} However, these studies were largely within single regions within one country and therefore tended to take a microerspective. There have been no large-scale, qualitative European studies that explore non-clinical factors influencing antibiotic prescribing across multiple countries. We therefore aimed to explore clinicians' accounts of non-clinical factors which impact on their decision of whether or not to prescribe antibiotics. We focused on lower respiratory tract infection (LRTI) and carried out a large-scale, multicentre qualitative interview study to contrast clinicians' views across Europe in the hope that this would provide a deeper understanding of the factors contributing to variation in antibiotic prescribing between countries, thereby informing local and Europe-wide interventions to improve the quality of decision-making with regard to antibiotic prescribing.

METHODS

Setting and recruitment

We conducted semistructured, face-to-face interviews with 80 primary care clinicians in nine primary care research networks based in the following European cities: Antwerp (n=10), Balatonfüred (n=10), Barcelona (n=10), Cardiff (n=8), Łódź (n=10), Milan (n=9), Southampton (n=6), Tromsø (n=7) and Utrecht (n=10). The nine networks had a track record of conducting research. These nine networks were selected from the 14 networks that participated in the clinical platform of the GRACE Network of Excellence study on the presentation, management and outcome of acute cough in Europe (www.grace-lrti.org) to achieve a geographical spread. Primary care clinicians were randomly selected from healthcare practices participating in the GRACE-01 observational study to generate a maximum target of 10 clinicians per network and were approached via face-to-face or telephone contact. Non-participation was generally low. However, exact rates are not available as recruitment logs were not returned for all networks. As recruitment was carried out locally by facilitators within each network, and individual clinician characteristics (such as age and gender) were not available to the Cardiff research team prior to consent, it was not possible to purposefully sample clinicians according to specific criteria. We therefore felt that random sampling was less likely to bias findings than convenience sampling. Our study design did not allow us to check data saturation at the time of data collection, as there was an unavoidable delay between data collection and analysis due to interview translation into English and translation checking. However, this was taken into account when the sample size was determined, and based on our previous research in this area we considered that our sample would be adequate for capturing a range of contrasting experiences.¹³ A national network facilitator (NNF) oversaw recruitment, interviews, transcription and

translation of the interview transcripts. Recruitment took place between January 2007 and February 2008. Informed written consent was taken at the point of recruitment.

Data collection

The interview guide was developed collaboratively with interviewers from each network after literature review and consideration of the aims of the project. Interviewers were given face-to-face training in research procedures and interviewing, and carried out video-recorded practice interviews with peer and expert feedback. The interview guide was revised in the light of feedback from these practice interviews. Study documents (including consent form and participant information sheet) required by ethics committees were translated and back translated to ensure accuracy.

Interviews were conducted in a place selected by the participant, usually the clinician's surgery, by the trained interviewer in the interviewee's chosen language and were audio-recorded. Interviews were semistructured and consisted of four broad topic areas broken down into subsections (box 1).

The guide was sufficiently detailed to provide assistance for interviewers with varying levels of experience and to ensure the same topics were covered across all networks. However, the guide was used flexibly. During training, interviewers were shown how to alter the wording and order of questions to take into account individuals' responses, and to pursue emerging issues. Open questions were used when possible and prompts were offered in the case of patients' limited response. In order to encourage clinicians to think experientially, each clinician was also given a typical scenario to reflect upon—an adult patient in their early 40s with productive cough, fever and increased heart rate—and asked what they would normally do to diagnose the patient and decide on treatment. The same scenario was used by all interviewers to provide consistency and allow comparison and contrast in clinicians' responses across the different European settings. All interviews were transcribed. Translators were asked to translate the speech verbatim and not as 'corrected' speech. This was in order to capture the most 'pure' meaning as intended by the interviewee, and to avoid any preliminary revisions before the analysis team received the data. The interview transcripts were translated into English by the interviewer in four of the networks. Where this was not possible—due to time constraints or limited proficiency in English—a professional translator was hired. The interviewers, or a representative from each of the networks, checked the meaning of the data extracts on which the main analysis was based at a workshop validating analytic themes. 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 NNF/interviewer was

Box 1 Examples of interview questions

- ▶ **Typical management scenario**
I would like to start off very generally by asking you about the standard procedure you follow for the management of adult patients with lower respiratory tract infections. To make things easier, I would like to describe a patient case to you and ask you how you would manage the case: an adult patient aged in their early 40s comes to see you with productive cough, fever and increased heart rate. What would you normally do to diagnose the patient and decide treatment? Follow-up: What diagnoses come to mind? What examination would you do? What tests would do? What treatment would you suggest?
- ▶ **Prescribing practice**
Perceptions of own antibiotic prescribing practice: clinical factors: How do you view your own antibiotic prescribing patterns in relation to others? Do you think your prescribing practices have changed over time? How do you decide exactly which type of antibiotic to prescribe? How do you feel about the evidence base available to support your prescribing decisions? If you decide not to prescribe antibiotics what are the alternatives you suggest?
Perceptions of own antibiotic prescribing practice: other factors: In addition to the clinical factors we have just discussed, what other factors have an effect on your antibiotic prescribing decisions? Prompts: Patient expectations, policy, practice factors, financial and pharmaceutical market.
Communication about management/prescribing: Can you think of an example when a patient wanted antibiotics but you felt they were unnecessary? When you prescribe antibiotics for lower respiratory tract infection (LRTI) do you explain your decision to the patient? On the contrary, if you decide not to prescribe antibiotics for LRTI do you explain why? Do the expectations of the patient have an influence on your decision to prescribe antibiotics?
- ▶ **Antibiotics**
Information sources on antibiotics: How do you keep up-to-date on new information about antibiotics? Do you use guidelines? Is continuing education on antibiotics available? What form does this take?
Antibiotic resistance: Have you ever come across cases where antibiotics have not been effective in treating patients with probable bacterial infections? Do you think antibiotic resistance is a problem in your practice? Can you tell me more about this? Do you think antibiotic resistance is a problem for the country as a whole? How do you see the problem in time to come?
- ▶ **Future management**
Near patient tests: Do you have access to 'near patient' tests for LRTI in your practice (such as C reactive protein or procalcitonin tests)? Do you think such near patient tests are useful for the management of LRTI? What are the disadvantages of such tests do you think? How do you think assessment strategies for LRTI could be improved in the future?
Interventions: Do you think that the number of patients attending for LRTIs should be reduced? If yes, how could this be achieved? Do you think that the amount of antibiotics patients are taking should be reduced? If yes, how could this be achieved? Are you satisfied with the way you manage LRTI?
- ▶ **Any other issues**

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contacted to confirm the true meaning and the translated quote was altered accordingly.

Analysis

Transcripts were analysed in Cardiff using a framework approach.¹⁹ This five-stage approach allows themes to be explored in relation to the prior research objectives and for new themes to emerge from the data. The first three stages, ‘familiarisation’, ‘identifying a thematic framework’ and ‘indexing’, are common to other forms of qualitative data analysis. The fourth stage, ‘charting’, involves retrieving the coded data and producing summaries of interviewees’ talk produced on each theme, for each individual participant, and visually arranging it in a table to build an overall picture of the whole data set. This allowed easier comparisons across networks to identify variation and similarities in the final stage of interpretation of data. The fifth stage, ‘mapping’, involves the research team using the charts to map and interpret the data set as a whole and connect with the original research objectives.

LB-H and LC developed a thematic framework on the basis of research objectives and emerging themes, which was revised after discussion with the Steering Group and after being applied to more transcripts. Transcripts were double-coded until consensus was reached. The thematic framework was applied to data using the qualitative software package, NVivo8.²⁰ Preliminary analytic themes were validated by the interviewers at a workshop. Interviewers made fieldnotes after each interview, providing contextual detail for the central research team, and were referred to when emerging reports of data were discussed.

Ethical considerations

Ethical review committees approved the study. All transcripts were anonymised and identifiable details were deleted.

RESULTS

The gender of clinicians was balanced overall (41% females, $n=78$) with five networks interviewing more females than male clinicians (Barcelona, Cardiff, Łódź, Milan, Southampton). The approximate age of clinicians ranged from 30 to 67 years (mean 43 years ($n=71$)). The number of years clinicians had been in practice ranged from not yet a full year to 33 years (mean 16 years ($n=75$)). All clinicians practiced within family practice/primary care and all were trained in primary medical care/general medical practice. The majority did not list a special interest. Of those that did, the most common was internal medicine. Interviews ranged between 16 and 100 min duration, with an average of 37 min.

The non-clinical factors identified by clinicians as influencing antibiotic prescribing fell into two main areas. First, there were specific factors imposed by the

healthcare system operating within individual networks. Second, there were factors which cut across networks and related to the characteristics of clinicians. Representative quotes are provided in [tables 1 and 2](#). More extensive quotes are available online (see supplementary tables S1 and S2). Each quote is followed with a code that refers to the network and the clinician’s unique study number.

Network-associated system factors

We identified system-related factors associated with a particular network by both the frequency and vigour (extent to which clinicians elaborated upon and/or engaged with a theme) with which clinicians talked about them. By examining the clinician interviews in detail we identified three key system factors for specific networks ([table 1](#)—extracts are numbered and referred to in the text).

Access to antibiotics and self-medication in the Barcelona and Milan networks

Clinicians in the Barcelona network explained that certain antibiotics were frequently available for patients to purchase ‘over-the-counter’ from pharmacists, and patients had often already begun to self-medicate with antibiotics before consulting (extract 1). Clinicians in the Milan network also reported that self-management occurred, as antibiotics might also be supplied directly to patients by pharmacists before they had consulted the clinician (extract 2). This restricted management options. Clinicians felt that if the patient had already started taking antibiotics then they had no choice but to advise them to complete the course. In extract 1, the clinician explains a patient might say they had already started taking antibiotics when the clinician would not have advised the patient to do so. However, the clinician is resigned to the patient continuing with the medication ‘very well, if you decide that ... I would tell you not to take it, but well ...’.

Systems to reduce patient expectations in the Antwerp and Southampton networks

Clinicians from the Antwerp-based network felt that recent public information campaigns had an impact on reducing patient expectations for antibiotics. This made it ‘easier’ for the clinician to not prescribe antibiotics in the consultation (extract 3). Clinicians in the Southampton network indicated a similar change where patient expectations had changed and patients more readily accepted that they did not need antibiotics (extract 4). However, in Southampton this change was attributed to the work that clinicians had put in to ‘educating’ patients, and a generally well-informed patient population, rather than as a result of public information campaigns.

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Table 1 Network-associated system factors influencing clinicians' antibiotic prescribing

Feature	Network	Extract	Extract number
Access to antibiotics	Barcelona	<i>It happens very often, 'Doctor, I've already taken Clamoxyl'. Well then you tell him, 'Very well, if you decide that...I would tell you not to take it, but well'. Or the great majority has antibiotics at home and in the chemist, they can go there directly and ...the chemist will prescribe antibiotics...it happens very often (Barcelona 31)</i>	1
	Milan	<i>Self-prescriptions. This is an important issue. Many patients call you saying they've been taking an antibiotic for the past three days... maybe given by the chemist, or something they had at home. In these cases, based on the symptoms, you wouldn't have given an antibiotic (Milan 51)</i>	2
Systems to reduce patient expectations	Antwerp	<i>That government campaign against antibiotics, that sure is terrific, because before that you really had to put a lot more energy in the people, and now, the young people, they are all up-to-date uh [...] They really come in and say like: "if it is not necessary, no antibiotics", uh. Like that uh, that's really easy (Antwerp 35)</i>	3
	Southampton	<i>For many years we've tried to explain to patients that having antibiotics won't necessarily get them better... I think what's changed is that patients are starting to understand that more (Southampton 29)</i>	4
Lack of consistent guidelines	Balatonfüred	<i>There are... five types of protocol, but this is the minimum. Let's say there's one by the IBR ((special Hungarian health care association)), there is an advice by the Infektológiai Társaság ((Infectologists' Association)), according to this there is this National Guideline, but which should be followed can depend on the pharmaceutical firm giving let's say training about antibiotics. [...] National guideline?...I couldn't tell which is equivalent to that one (Balatonfüred 370)</i>	5
	Balatonfüred	<i>Protocols, should be elaborated, which let's say would give national guidelines, and to make these available for everyone. The physicians, the GPs, the doctors from different fields, the ones working on pulmonological departments (should know) which steps to follow (Balatonfüred 384)</i>	6
	Łódź	<i>I try to manage according to guidelines [...] I would like always to apply to them, but not always I succeed [...] These data from which I probably use refer to some foreign populations, and this is not, let us say, my population, Polish or mine here local. So here I perceive this deficiency (Łódź 78)</i>	7

Lack of consistent guidelines in the Balatonfüred and Łódź networks

The lack of formal, consistently available national guidelines on antibiotic prescribing was an issue discussed by clinicians in the Balatonfüred and Łódź networks. In Balatonfüred, the majority of clinicians were not aware of a single national guideline on antibiotic prescribing (extract 5). Some clinicians were aware of guidelines available from other countries or professional bodies, but did not always value them because they came from multiple sources, did not necessarily suit their own local situation or because they were not up-to-date. Some clinicians mentioned the need for guidelines in order to 'protect' the clinician in their decision-making (extract 6). In Łódź, clinicians talked about the use of guidelines from a variety of sources, but also mentioned guidelines published by pharmaceutical companies. Their recommendations were often inconsistent with other available guidelines, adding to the picture of conflicting advice offered by

many different sources and not necessarily applicable to the local situation (extract 7).

Apart from the occasional mention of competition between practices for patients in the Antwerp-based network, 'business'-related factors were not prominent in clinicians' accounts.

Clinician characteristics

We also identified three key themes relating to the characteristics of clinicians that influenced antibiotic prescribing, regardless of network. These were clinicians' professional ethos, self-belief in their decision-making and their commitment to shared decision-making with the patient (table 2—extracts are numbered and referred to in the text).

Clinicians' professional ethos

Many clinicians felt that receptiveness, that is, the extent to which they kept an open mind and embraced new

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Table 2 Clinician characteristics influencing clinicians' antibiotic prescribing

Feature	Description	Extract	Extract number
Clinicians' professional ethos	Receptiveness	<i>Old habits die hard [...] even when new guidelines are implemented I find it difficult to put these into practice. I am so used to the old ways (Utrecht 72)</i>	7
	School of thought	<i>I've always been a bit reserved, because my Professor back... already made us understand good and proper that you have to be very careful with that stuff ((antibiotics)) (Antwerp 77)</i>	8
Self belief in decision-making	Tolerating uncertainty	<i>I think what also plays a role is the feeling of the doctor, it feels somewhat safer to let the patient go home with antibiotics than without antibiotics [...] Well, you think, if there still is something wrong and it actually is a bacterial infection, of which someone could also die (Utrecht 16)</i>	9
	Confidence	<i>I struggle to an extent with my confidence at not giving antibiotics and with patient expectation to give antibiotics. Um, but I think that we're in a climate where antibiotic prescribing is reducing as people [...] are more amenable to the idea that an antibiotic may not be necessary. But I think the threshold at which one uses them is still something that I feel that I slightly struggle with (Southampton 43)</i>	10
Commitment to shared decision-making		<i>When one is younger one is usually, maybe correctly so, or maybe incorrectly so, one is a bit more uncertain and tends to rely more heavily on diagnostic testing. As one gets older one tends to be a bit more self-confident and may reason 'well I've seen so many similar situations before, I'm fairly sure of my diagnosis' (Milan 65)</i>	11
	Sharing responsibility	<i>The image of the doctor really has changed over time, hasn't it?! I can tell the patient what I think would be the correct treatment, but I can't force them...The patient is the one who decides (Barcelona 115)</i>	12
	Confrontation threshold	<i>If patients really insist and if you will really end up with an unpleasant conflict if you do not give in, then you do give way every once and a while (Utrecht 100)</i>	13
	Emotional investment	<i>At the beginning ...I had a greater enthusiasm in dissuading the patient...in explaining him that the antibiotic is not necessary with relation to what I do now (Lódź 78)</i>	14
		<i>Some say give me antibiotics...I still do the effort of explaining it to them, like I say you mean antibiotics, don't you. But in this case it's more likely that they will cure you later instead of sooner. They don't help for this kind of infections, viruses, and if you give antibiotics for things they are not meant for, then, in the end, you only suffer from the side effects and you'll be sick even longer...But then you really have to bother to explain, 'cause it's far more difficult not to prescribe antibiotics, than to prescribe them (Antwerp 77)</i>	15

developments, impacted on their management and prescribing behaviour. There is an implication that clinicians who are less willing to embrace change will continue to prescribe antibiotics as they have always done through routine and everyday experience (extract 7). This was a strong theme that emerged across networks. The 'school of thought' that the clinician came from was also reported to have a bearing on management decisions. This seemed to be influenced by the training they had received. For example, in extract 8, a clinician explained that he had always been cautious

about prescribing antibiotics due to the attitude of the Professor he had trained under as a medical student. However, this factor was not fixed, and clinicians often talked about how their beliefs had changed since qualification or in early practice.

Self-belief in decision-making

Clinicians' self-belief in their decision-making was key to management and involved the extent to which they tolerated uncertainty, and their degree of confidence. Many clinicians expressed the feeling that management

decisions could be influenced by fear of the patient developing complications and their condition deteriorating (extract 9). Clinicians reported that greater discomfort in the face of uncertainty made antibiotic prescribing more likely. They prescribed 'just in case' the patient may have, or may develop, a more serious condition. Some clinicians reported that they felt more pressure to prescribe to patients if they consulted on a Friday in case the patient's condition deteriorated over the weekend. This often related to their own past experiences or anecdotes about other clinicians' experiences when they had not prescribed antibiotics to a patient who had later developed complications or been hospitalised. Clinicians also talked about their concern, in some cases, that they might receive complaints from patients who feel that a clinician is not technically 'capable' if they do not prescribe. Clinicians' confidence in assessing whether antibiotics were appropriate or not appeared to be related to clinicians' own knowledge and experience (extract 10), with clinicians reporting increased confidence as they saw more patients over time with similar symptoms (extract 11).

Commitment to shared decision-making

The management decision was influenced by the extent to which clinicians believed that patients should share in the management decision and take responsibility for their own health. It influenced the extent to which clinicians felt that they could and should control the prescribing decision and take on board patients' expectations and preferences. For example, in extract 12, the clinician explains that he recognises the patients' contribution and feels that he does not have ultimate control over a shared management decision and whether or not the patient receives antibiotics.

Clinicians' tolerance of conflict varied. Some felt that they were more likely to prescribe antibiotics in order to avoid conflict with a patient wanting antibiotics (extract 13). This might not necessarily be a fixed characteristic in the clinician but may be dependent on the encounter with an individual patient.

The emotional investment clinicians put into discussing the management decision also varied. The effort and enthusiasm clinicians devoted to dissuading patients who unnecessarily wanted antibiotics appeared to have an impact on clinicians' decision-making. For some clinicians this differed day-to-day depending on the individual patient or their own mood at that time. However, other clinicians felt that they had a general tendency towards either putting in the extra emotional energy needed to dissuade the patient, or not. This did not necessarily relate to the time clinicians had been in practice. Some felt that they had more energy to engage with patients about this issue when recently qualified (extract 14), while some experienced clinicians' felt it necessary to put in extra effort to explain to the patient the evidence for limiting antibiotic use (extract 15).

DISCUSSION

Principal findings

This trans-European qualitative study identified two main areas of non-clinical factors that influence antibiotic prescribing in primary medical care. First, clinicians' accounts identified non-clinical factors imposed by the healthcare system operating within specific regional primary care research networks. Certain factors clustered together indicating similarities between networks. These related to direct patient access to antibiotics without consulting a doctor in southern Europe (Barcelona and Milan networks); systems to reduce patient expectations for antibiotics (Southampton and Antwerp networks); and lack of consistent treatment guidelines in Eastern Europe (Balatonfüred and Łódź networks).

Second, accounts revealed factors related to specific characteristics of clinicians, regardless of geographical network (professional ethos, self-belief in decision-making and commitment to shared decision-making).

Strengths and limitations

Qualitative interview methods were used because our aim was to generate themes important to clinicians themselves rather than quantify responses to questionnaire items predetermined by researchers. This is the first study to use semistructured, qualitative interviews to capture clinicians' views about LRTI management across a broad range of contrasting European countries. It allowed us to explore practice in different cultural and healthcare delivery systems.

There were challenges in managing a large qualitative, multi-European study and extensive data set. However, we addressed these through careful study design. We ensured the use of consistent methods through a specially designed training course and the use of a common topic guide. The framework approach was chosen to ensure a thorough well-documented process of analysis.¹⁹

The process of translating data from one language to another may have resulted in some of the interviewees' original meaning being lost, altered or misinterpreted. However, we attempted to address this through a number of measures including face-to-face training and an explicit process developed before data collection started.²¹ The interview guide was discussed at length at the training session with the interviewers from the nine 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 the interview guide as they had first-hand experience of the data and of the culture of the people being studied. Where this was not possible, a native-speaking translator with similar understanding of the culture was hired. After the data had been translated the interviewers, or a representative, from each of the

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networks checked the meaning of the data extracts on which the main analysis was based.

Many of the interviewees were also NNFs and would have had some contact (involving data management and recruitment of patients into the GRACE-01 observational study) with the clinicians before interviewing them. We felt that this would be unlikely to bias clinicians' responses as relationships were professional and not personal. In fact, we considered that previous contact between interviewer and interviewee may promote rapport and frankness. Two of the 11 interviewees worked as health practitioners in the regions in which they were interviewed and therefore might have had a prior peer-clinician relationship with some of the clinicians interviewed. However, the interviewees received training in their ethical responsibilities to the interviewee with regard to privacy and dignity, and also techniques to ask neutral questions, be sensitive to the interviewees' own agenda and create a supportive communicative atmosphere in which interviewees should feel free to answer questions honestly and openly.

The clinicians who participated were all affiliated to a research network and so may not have been representative of all general physicians (GPs) in their country. Generally, clinicians with an interest in research might be more likely to practice according to guidelines.²² However, this does not seem to have had a detrimental effect on our study as clinicians elaborated upon a range of other factors, in addition to guidelines, that influenced their prescribing decisions.

Interviews gather clinicians' reports of practice, rather than actual practice. However, qualitative research methods aim to generate further understanding and explore the themes that are important to the people being studied and their value in prescribing research is documented.²³

Comparison with previous research

Our findings regarding lack of consistent guidelines and importance of patient awareness are in keeping with research by Scoggins *et al*²⁴ who investigated GPs in the UK and identified the influence of trustworthy information sources and media influences on patient demand as having an impact on prescribing decisions. Our findings are also consistent with those of Tonkin-Crine *et al*²⁵ who found that clinicians in different European countries had varying experiences of receiving guidelines and some worried about whether the advice was independent. Other qualitative research has acknowledged the influence of wider health system factors on antibiotic prescribing decisions including influence of policy documents,¹⁶ and single practice GPs experiencing a lack of professional support.¹¹ However, these factors were not awarded high prominence. This could be because they were single country studies that did not compare systems in other countries. However, we have been cautious in attributing factors reported by individual clinicians from individual research networks to national differences as

qualitative research does not aim to produce generalisable findings.

Clinicians' professional ethos influenced prescribing decisions and encompassed receptiveness to new ideas and the school of thought that clinicians came from. Previous research suggests that this contributes to the cementing of social norms which relate to prescribing behaviour and the extent to which clinicians prescribe according to habit.^{24 26 27} In order to address this, clinicians need to be flexible in response to new evidence and evolving methods of clinical assessment.

Clinicians' self-belief in decision-making was identified as key to prescribing decisions. Low confidence and low tolerance for uncertainty could lead to defensive medicine and prescribing 'just in case'. Diagnostic uncertainty has previously been found to be associated with increased antibiotic prescribing.²⁸ This is in keeping with previous research that identified the influence of anticipated regret and the chagrin factor, as clinicians try to limit the regret that would be caused by unwanted consequences of their prescribing decisions.^{14 29-33} However, this defensiveness is not only a personal characteristic but may be due to wider system factors such as the education of medical students who are taught to take no risks and that making mistakes is unacceptable,³⁴ and the fear of losing patients to competitors in a general practice system where patients can freely change clinicians.^{27 32 34}

Views on the extent to which clinicians should share responsibility for prescribing decisions with patients influenced prescribing decisions. DeScheeper *et al*²⁹ found that difference in the hierarchical relationship between doctor and patient was an important influence on antibiotic prescribing and use. Clinicians with a preference for a less hierarchical relationship are more likely to involve patients in the decision about whether an antibiotic is needed. Involving the patient in decision-making is useful in promoting rational antibiotic use.¹³ We found that the doctor-patient relationship also related to clinicians' confrontation threshold and emotional investment. While confrontation threshold is alluded to in much research on the influence of patient expectations on prescribing decisions, less detailed research exists on clinicians' emotions surrounding the ability to withstand patient pressure.^{3 15 35 36}

Implications

Our findings show that there are a host of non-clinical factors that are regarded by GPs as important in prescribing decisions about antibiotics. Interventions for achieving a reduction in antibiotic prescribing will need to consider factors associated with healthcare systems. These include limiting patients' self-management with antibiotics before consulting in primary care, increased public awareness about antibiotics through public information campaigns and reinforced messages directly from patients' own clinician, and provision of more consistent and locally relevant guidelines. However, healthcare system factors engrained in national governmental

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policy are hard to change. Intervention planners need to develop interventions that are sensitive to local contexts across Europe, demonstrating awareness of the fixed characteristics of that healthcare system and acknowledging the ways these may constrain clinicians' prescribing decisions. To gain a greater overview of the fixed characteristics of the healthcare system in each country, we gathered data and produced a descriptive map of the macrofactors which could potentially influence routes to management of patients with acute cough or other signs of LRTI through the healthcare system for each country involved in the GRACE study. We combined a key informant interview for each network with documentary evidence to provide a description in relation to a number of areas including: the healthcare organisation; alternative healthcare settings; financial aspects of patient care; guidelines on antibiotic prescribing for LRTI; the drug regulatory system; and the use of near-patient and laboratory tests on patients with LRTI. The data were interpreted and a 'patient pathway' (PP) through the healthcare system in each European countries was produced. Examples of completed PPs can be found on the GRACE website <https://www.grace-lrti.org/portal/en-gb/publications/grace-02%20patient%20pathways>. We have not included the PP data in this paper because we did not want to risk diluting the sharp focus of the current analysis, and also as we are in the process of developing the PPs to triangulate the macrolevel data with the interview data collected for the GRACE qualitative study.

Attempts to reduce prescribing will also require clinicians who are receptive to change, confident in their decision-making and prepared to invest time and effort into explaining their prescribing decision, particularly decision to not prescribe. One evidence-based way to address all these areas would be to target clinicians early at the point of education/training, enhancing their awareness of their attitudes and offering strategies to cope with risk taking, and simple communication strategies to deal with confrontation and sharing of responsibility with patients.^{26 34 37–40}

Interventions will need to take both categories of factors into account and be locally flexible as they differ in relevance and prominence between different countries.

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