

# Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain

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**Background and objective.** Resistance to antibiotics is a public health threat. A number of studies confirm the relationship between antibiotic use and the resistance rate. As a whole, physicians represent a large proportion of the health professionals involved in the use of this therapeutic group. Our study therefore sought to ascertain the opinions and attitudes of GPs in Spain with respect to antibiotics and resistance.

**Methods.** We used the focus group (FG) method, with each group comprising 4–12 primary care physicians and a moderator. Based on a previous systematic review, we drew up an agenda to be followed during the holding of the sessions. Group proceedings were recorded and the transcriptions then analysed separately by two researchers.

**Results.** Five FGs were formed, including a total of 33 physicians. The factors/attitudes that influenced the prescribing of antibiotics by GPs were fear, complacency, insufficient knowledge and external responsibility of the pharmaceutical industry, patients and over-the-counter antibiotics. The groups felt that antibiotic resistance was not a problem at a community level.

**Conclusions.** Identification of attitudes/knowledge related with inappropriate antibiotic prescribing will enable specific interventions to be designed, with the aim of targeting these shortcomings to improve antibiotic use and help reduce resistance.

**Keywords.** Attitudes, antibiotic prescription, antimicrobial resistance, primary care physicians, qualitative, Spain.

## Background

Resistance to antibiotics is an important public health threat, which is aggravated by the lack of development of new antimicrobial agents.<sup>1,2</sup> Currently, there are few doubts as to the association between antibiotic use and the spread of antimicrobial resistance. Ecological studies undertaken as a result of European initiatives suggest that there is a clear association between use of antibiotics (penicillins and fluoroquinolones) and resistance rates.<sup>3</sup> Moreover, there is a wide variability among countries, which is not justified by differences in the prevalences of infectious disease.<sup>3,4</sup>

The use of antibiotics occurs mainly in primary care.<sup>5,6</sup> In the best-case scenario, non-hospital use

exceeds 10 defined daily doses per 1000 population-day (DHD) versus hospital use of three DHDs.<sup>4</sup> In the period 1997–2009, mean non-hospital antibiotic use within the ambit of Spain's National Health System (NHS) was 20.15 DHDs.<sup>7</sup> These figures are higher still if total antibiotic sales are taken into account (a caption that also includes prescriptions by private physicians and drugs dispensed without medical prescription), which rose to 28.93 DHD in 2005 and would rank Spain among the highest consuming countries.<sup>8</sup> Compared with other European countries, therefore, Spain displays elevated antimicrobial resistance rates in community pathogens.<sup>9</sup>

In the light of the above situation, interest lies in exploring the possible causes of inappropriate

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antibiotic use in Spain. Many factors have been linked to inappropriate antibiotic use,<sup>10–12</sup> including insufficient knowledge, patient pressure and the pharmaceutical industry. Furthermore, different actors are involved in this inappropriate and excessive use of antimicrobials, namely, physicians, patients, pharmacists and health authorities. Since antibiotics are medications that can only be sold under medical prescription in Spain, any action aimed at improving the use of antimicrobials must necessarily target physicians. Accordingly, our study sought to ascertain GPs' opinions on and attitudes to antibiotics and resistance and discuss whether these differed from those found in other countries with lower consumption and resistance rates.

## Methods

### Study design

The focus group (FG) method was used to explore GPs' habits and knowledge with regard to antibiotics and identify the attitudes and/or factors that influence their being prescribed. We decided to use the FG technique because the interaction of group members tends to ensure that all the dimensions of the problem assessed are brought to light, information is simultaneously obtained on the subjective validity of various members of the group and in addition, it is a fast technique for generating such information.<sup>13</sup> A theoretical model based on a previous systematic review was constructed for the purpose of drawing up an agenda, which was to be followed during the group sessions to facilitate the identification of attitudes and/or factors.

The categories defined for this agenda were (i) the antibiotic prescribing process, (ii) practical consequences of misuse and (iii) recommendations for improving drug use. The following three subcategories were included under the first category: most frequent diseases for which antibiotics were used, types of antibiotics most and least frequently used and attitudes/factors that interfered in the prescription process. The attitudes/factors covered by the systematic review and included in the agenda were (i) fear/precaution, (b) external responsibility, (c) complacency and (d) insufficient knowledge.

### Study population and settings

The eligible population was made up of all GPs in the Spanish NHS in Galicia, actively engaged in health care during these months (3200 physicians). Galicia is a region lying in the northwest of Spain, with an area of 29 434 km<sup>2</sup> and a population of 2 794 516 million, 22.2% of which is aged >65 years. Practically, 100% of the population is covered by the publicly funded NHS.

In Spain, medical drugs may only be dispensed by community pharmacies, and in the case of antibiotics, a medical prescription is moreover required.<sup>14</sup>

### Selection of sample and procedure

The FG sessions were held in the provinces of Pontevedra and A Coruña (Corunna) in Galicia (NW Spain), from April through June 2009. In Spain, practically, 100% of the population is covered by the NHS. With the support of the Galician Association of Family & Community Medicine (Asociación Gallega de Medicina Familiar y Comunitaria—AGAMFEC), information on the research project was previously circulated via the channels usually used by this association, to foster professionals' motivation and encourage them to participate in the FGs.

Based on key informants, 75 candidates were contacted by telephone or e-mail, informed about the study's goal and invited to take part in the FGs. Finally, 33 physicians agreed to participate in the groups.

### Holding of FGs

Each FG was made up of 4–10 GPs. Pediatricians also took part in two cases (at those health centres selected which had pediatrics departments). Of the total, 57.7% of the participants were men. The FGs were guided by three of the researchers (JMV, PLV and ALD), who coordinated the participation of the group members in line with a pre-established agenda (see Appendix 1). With the aim of enhancing participation of the professionals, FG sessions were held in the meeting rooms of the respective health centres selected, normally on the day and at the time reserved by the center for teaching activities. In addition, each participant was presented with a gift valued at V20.

Participants were informed that sound recordings would be made of the sessions, that the confidentiality of all content would be respected and that in no case, would comments be identified with any particular participant. In every group, the written consent of all the participants was obtained. The study was evaluated and approved by the Galician Clinical Research Ethics Committee.

Group sessions were recorded using a digital recorder, lasted 60–90 minutes and were brought to an end when the information furnished by the participants provided no new ideas. Participants were coded according to gender (M, man and W, woman) and the serial number of the FG (FG1, FG2, etc.). To prevent any possible interpretation biases, the proceedings were transcribed by an independent researcher (MTT).

### Analysis

Once the literal transcription of the recordings of all the FGs had been completed, and following successive readings, we made a note of the different ideas, which had emerged in the group discussions and might be of use in the subsequent stages of the analysis. To this end, paragraphs containing relevant information were identified according to the categories predefined for the purpose of attaining the study's goals. This was

done by an independent peer review conducted by two members of the research team (JMVL and ALD), to ascertain what degree of discrepancy might be entailed in interpreting physicians' opinions to associate them with a specific attitude.

A computerized format was not used to process the results, in view of the fact that the utility of specific statistical programs is directed at analyses involving a large number of interviews, which was not the case in our study.

## Results

Five FGs were formed at five health centres in the Galician Autonomous Region. A total of 33 primary care physicians were interviewed, 14 women (42.4%) and 19 men (57.6%).

### Antibiotic prescribing process

The first item on the agenda was to ascertain the diseases for which antibiotics were most frequently prescribed. All the FGs concluded that these were respiratory diseases and upper respiratory tract infections in particular. They indicated that, within this group, the use of antibiotics was particularly frequent in exacerbations of chronic obstructive pulmonary disease (COPD). This category was followed by urinary and dermatologic infections and others which, albeit of less quantitative relevance, were nevertheless very characteristic, such as otitis media in children and the topical use of antibiotics in conjunctivitis.

Insofar, as the most frequently used types of antibiotics were concerned, beta-lactams (specifically, amoxicillin) ranked first, followed by macrolides, topical aminoglycosides and fluoroquinolones. In the case of the least prescribed, participants cited cephalosporins, tetracyclines (because they are only used in acne), erythromycin, clarithromycin and, in general, antibiotics that were very novel and those that had more side-effects.

With respect to the factors that influenced the choice of antibiotic, participants indicated that they were guided, firstly: by the patient's clinical profile, i.e. 'I pay a lot of attention to the appearance of the secretions; if they're white or transparent, I view it as most likely being viral; if they look greenish, I view it as most likely being bacterial' (M1 FG4); by their own professional experience; by the recommendations laid down by the clinical guidelines, 'It's good to have a guideline but it must be adapted to the local situation' (M1 FG4) and by the price of the drug. Furthermore, they pointed out that pharmaceutical companies exerted an influence when it came to choosing between one antibiotic and another: 'The influence of the pharmaceutical industry is so clear that, when they stop promoting a medication, then, in the long term, you too stop using it' (M1 FG5).

They considered that the factors influencing the prescription of antibiotics were (see Table 1):

1. fear: 'Among people with heart failure, with COPD, you can't say, well let's see if it turns out to be viral and not give the patient anything. Sometimes one has to attack and that's all there's to it [. . .] because that way, in 8 days you've got the problem solved, and if you leave it any longer then maybe you have to hospitalize the patient' (W2 FG1); 'The patient's already come to see you three times . . . I think it's viral, but well, well the fact is, it is viral but it seems that it may re-infect, or who knows, for your own peace of mind, for the patient's peace of mind, and then, when he's already been to see you three times, hey, and he's been suffering from whatever it is for 10 days, then even though you initially thought it was viral, well then, well you give him a course of antibiotics, it's true' (M2 FG2).

2. External responsibility, whether of the: patient, 'We aren't to blame; it's the patients who don't take the medication when you give it to them' (M1 FG1); pharmacies, 'They still dispense antibiotics without a prescription at the pharmacies [. . .] then they come to you with the receipt so that you give them the prescription' (W1 FG5) or pharmaceutical companies, 'We are constantly being bombarded by the pharmaceutical industry because they keep on saying that this is the latest cephalosporin, the best, the one that's recommended in all the guidelines for the treatment of increased expectoration in COPD, and it's a lie; and so that's what we have to fight against, [. . .]' (M4 FG2).

3. complacency: 'I've seen children who come with a virosis for which they don't need an antibiotic but as they're not satisfied, they go and see a private doctor' (W4 FG1); 'The fact is that if I don't prescribe them something, they'll go to another physician so that he'll prescribe it for them' (W2 FG4).

4. lack of information on the part of the physician: 'The fact of the matter is that there's the problem that physicians and patients believe in this (antimicrobials), so . . . it's a problem, it's a habit, and habits are very hard to break' (M1 FG3).

### Practical consequences of misuse

Do you stop to think a lot about bacterial resistance when it comes to practising routine medicine? No (M1 FG1).

Most of the FG members perceived resistance as being unimportant in upper respiratory tract infections but important in urinary infections. In addition, they considered resistance as being a problem at a hospital rather than at a community level, and attributed such antibiotic resistance to patients' non-compliance with

TABLE 1 Conclusions of the five FGs regarding the tools for ascertaining type of infection involved, factors affecting antibiotic administration and resistance

	FG I	FG II	FG III	FG IV	FG V
How do physicians differentiate between viral and bacterial infection?	Rapid diagnostic tests Based on experience	Rapid diagnostic tests Use of delayed prescribing	Based on clinical profile Supplementary tests	Based on experience Use of clinical guidelines	Based on clinical profile Rapid diagnostic tests Use of clinical guidelines
Factors that influence antibiotic use	Based on clinical profile Fear due to patient characteristics	Complacency	Complacency	External responsibility of pharmacies Complacency	Fear due to negative disease progress  External responsibility of pharmacies External responsibility of patient Concern due to lack of patient follow-up
	External responsibility of patient External responsibility of pharmacies	Fear due to patient characteristics  Insufficient knowledge	External responsibility of pharmacies Fear due to physicians' lack of confidence	External responsibility of health care system Concern due to lack of patient follow-up	Insufficient knowledge  External responsibility of health care system
	Complacency	External responsibility of pharmaceutical companies	Fear due to negative disease progress	External responsibility of other professionals	External responsibility of laboratories Complacency
	Concern due to lack of patient follow-up in medical emergencies	External responsibility of health care system	Fear due to patient characteristics	Fear due to patient characteristics	Fear due to patient characteristics
Resistance	It is a problem at a hospital level	No resistance discerned, except in some cases of urinary infection	The issue has been exaggerated  No resistance discerned, except in urinary infections.	Discerned above all in urinary infections (less so in respiratory infections)	Resistance is frequent in urinary and respiratory infections Resistance is a problem in routine clinical practice.
	It does not affect them in their work	It is a problem at a hospital level	Treatment non-compliance, hospital treatments, drugs dispensed without prescription and dentists are to blame	Caused by patients' non-compliance with prescription and excessive use at a hospital level	Prolonged use of antibiotics facilitates appearance of resistance Dentists and misuse by patients are to blame

treatment, drugs being dispensed without medical prescription and the volume of inappropriate prescriptions being issued by other professional groups in general and by dentists, community pharmacists and the veterinary industry in particular.

Recommendations for improving drug use

Finally, we sought to record proposals for improving antibiotic use (see Table 2). Among these, great stress was laid on: the need for better access to diagnostic tests [such as the rapid strep test and C-reactive protein test], 'What we miss is having far

more tests, far more rapid analyses for taking decisions based on a certain degree of evidence'(W2 FG4); access to patients' e-histories; better population education to avoid pressure to prescribe these drugs, 'Patient education is fundamental, as is a good physician-patient relationship' (M3 FG4), 'What has to be done is to educate people, so that they know when it is and when it isn't necessary to go the doctor' (M2 FG3); having a health professional available at a hospital level for expert consultation on possible doubts and continuous medical education.

TABLE 2 Recommendations proposed by the different FGs to improve antibiotic use

Recommendations	No. of times mentioned
Better population education	2
Greater access to diagnostic tests	5
Enhanced degree of communication between primary and secondary health care levels	1
Transfer of chronic patients to primary care	1
Total access to patients' e-histories (particularly in emergencies)	3
Continuous medical education	2
Availability of a professional at a hospital level for expert consultation and discussion	2
Clinical guidelines to be used as a reference but not interpreted literally	1
Use of delayed prescribing	2
Availability of a map of local resistance	2
Regular meetings with primary care pharmacy or local area management to gain a more accurate idea of their respective prescription profiles and so pinpoint what they might be doing wrong	1

## Discussion

### Principal findings

In this first Spanish qualitative study to explore GPs' opinions about and attitudes to antibiotics and antimicrobial resistance, the factors that influenced prescribing were found to be fear, complacency, insufficient knowledge and external responsibility. GPs perceived upper respiratory tract infections as the principal disease for which they prescribed most antibiotics and beta-lactams as the most frequently prescribed antimicrobials.

### Comparison with literature

The physicians in all five groups agreed on the fact that the disease for which they prescribed most antibiotics was acute upper respiratory tract infection, which includes otitis, sinusitis, pharyngitis, tonsillitis and bronchitis. This opinion is confirmed by several studies.<sup>15</sup> The most frequent of such infections is pharyngitis/tonsillitis, conditions that cause a sore throat, symptoms which, according to a number of studies, generate the greatest volume of consultations in primary care<sup>16,17</sup> and for which avoidance of inappropriate antibiotic prescribing has been recommended.<sup>18</sup> This category is followed by urinary infections, a finding in line with previous studies.<sup>15</sup>

Among the groups and antibiotics cited by participants as being the most prescribed in primary care, are beta-lactams, followed by macrolides, a finding that agrees both with the conclusions of the European Surveillance of Antimicrobial Consumption (ESAC)<sup>4</sup> and with the recommendations of the various antibiotic prescription guidelines used in primary care.<sup>18–20</sup> There is wide variability in antibiotic prescribing in

Europe,<sup>21</sup> something that cannot be accounted for by differences in morbidity.

With reference to appropriate antibiotic use, the participants in the five groups stated that one of the greatest difficulties was posed by uncertainty in the etiological diagnosis, an aspect that characterizes the management of these disorders. As possible solutions for overcoming this uncertainty, they proposed some initiatives, such as greater access to rapid diagnostic tests (which are not yet available at some health centres in Galicia) or the use of clinical guidelines. It has been shown that access to rapid diagnostic tests improves antibiotic prescribing<sup>22</sup> and that rendering clinical guidelines more readily manageable in a consultation setting can be useful for reducing inappropriate prescription of such drugs.<sup>23</sup> Other factors that have also been shown to help reduce this uncertainty are the physician's clinical experience and knowledge of the patient.<sup>24</sup> One group made mention of the option of delayed antibiotic prescribing as an intermediate solution in doubtful cases but argued that this measure was not yet widely implemented in Spain.<sup>24,25</sup>

In particular, participants identified resistance at a urinary infection level, something that is in agreement with the data yielded by a number of reports on the situation in Spain.<sup>26,27</sup> Even so, it should be noted that most of those interviewed felt that the issue of resistance did not significantly affect them in their work and that it was a problem mainly at a hospital level. Indeed, only one of the groups made the point that resistance was a problem in daily clinical practice and was frequent in urinary and respiratory infections. Perhaps, this perception may be explained by the fact that resistant cases tend to be followed up in a hospital setting, and this gives a false impression of the non-existence of resistance. These data are in line with those obtained from a study similar to ours conducted in the UK.<sup>28</sup> Such opinions should give cause for reflection as to whether national campaigns undertaken in different countries in the Europe or USA are really effective, seeing as the physician, the very person bearing the single greatest responsibility for prescribing, does not seem to have perceived the importance of resistance and its link to inappropriate use. One option for alerting the members of this group to the importance of resistance would be for regular reports to be issued on any resistance encountered in isolations performed in their geographic setting. This could be a way of ensuring, at this level, that sight was not lost of this problem.

Insofar, as the attitudes that influence antibiotic prescribing in primary care were concerned, fear and complacency were confirmed, in line with other studies.<sup>29–32</sup> In our study, we sought to conduct an in-depth examination of the processes generated by these attitudes. In all groups, the principal causes that gave rise to an attitude of fear/precaution and culminated in the prescribing of an antibiotic were shown to be:

comorbidity (COPD, advanced age and other risk factors), non-satisfactory clinical progress and envisaged difficulty of follow-up. Our area is characterized by the high percentage of the population aged >65 years and the wide degree to which the population is dispersed, factors which could serve to exacerbate physicians' fear of complications. With respect to this latter case, special mention was made of the management of unknown patients (e.g. those who were seen in emergency wards or who came from other physicians). In such instances, faced with the fear that complications might set in and the difficulty of following up disease progress, practitioners tend to prescribe an antibiotic, even though its indication may well be questionable. The principal cause that induces the attitude of complacency is the pressure explicitly or implicitly exerted by the patient to have an antibiotic prescribed. This attitude is constantly repeated in most of the studies addressing the prescription process.<sup>31,33,34</sup> The options for combating these attitudes are, in some cases, difficult to tackle, such as ensuring that all the patients are consulted and followed up by their usual physician. However, the use of delayed prescribing and the dissemination of this concept among the population to facilitate acceptance could be an excellent weapon for eliminating physicians' fear of non-immediate prescribing of antibiotics in doubtful cases.<sup>24,25</sup>

Another of the causes mentioned, and one that is featured less prominently in studies on this topic, is the attitude of external responsibility. Physicians lay the blame for inappropriate use of antibiotics on other professionals, such as dentists, community pharmacists, veterinary surgeons or pharmaceutical companies. With respect to the first group, studies on prescribing in Spain confirm that the oral bacteria most frequently implicated in odontogenic infection display increased resistance to the action of the most usual antibiotics.<sup>35,36</sup> An increase has thus been detected in resistance to macrolides, beta-lactams and clindamycin in strains of both *Streptococcus viridans* and *Porphyromona*, *Prevotella* spp and *Fusobacterium* spp, producers of beta-lactamase isolated in the buccal cavity.<sup>37–40</sup> Similar results have been reported by studies undertaken in pharmacies, where a relationship has been observed between the dispensing of antibiotics without prescription and the genesis of resistance.<sup>10,41,42</sup> Although by law antibiotics may only be dispensed in Spain on presentation of a medical prescription, the reality is that dispensing drugs without a prescription is still common practice. Indeed, one study undertaken in this country established that as many as 65.9% of pharmacists dispensed amoxicillin to their pharmacy's regular customers, a percentage that fell to 40.9% when it came to supplying those who were not regular customers.<sup>14</sup> The data also seem to confirm that the veterinary industry may have something to do with the increase in resistance.<sup>43,44</sup>

With respect to pharmaceutical companies, while in Spain, it is the norm for pharmaceutical sales representatives to visit physicians to present their products, and this has often been regarded as a factor associated with inappropriate prescribing;<sup>45</sup> in the case of our study, it is noteworthy that this was only mentioned by two of the groups.

#### Strengths and weaknesses

This study has the limitations and strengths peculiar to the use of qualitative methodology. Among its limitations is the low number and source of the participants (health professionals drawn from a specific area of Spain, who are not necessarily representative of all primary care physicians in the employ of Spain's NHS), something that restricts the study's generalization to other areas or countries. Among the study's advantages is the fact that the interaction which typically takes place among the members of a FG, enabled ideas on antibiotics and resistance to be obtained, which would otherwise have been difficult to obtain without such interaction.<sup>46–48</sup>

A systematic review of quantitative studies was recently published, addressing the factors associated with inappropriate prescribing of antibiotics. Although the authors of the review indicate that most of the studies display very important methodological limitations which determine the grade of evidence of their conclusions, the review nevertheless concludes that there seem to be two attitudes, namely, fear and complacency, which are associated with misprescription of antibiotics.<sup>49</sup> Our study's qualitative approach enabled one more attitude to be detected, i.e. external responsibility (essentially with reference to pharmacists), something that reaffirms the usefulness of qualitative methodology.

#### Implications for practice and research

Inappropriate antibiotic prescribing at a non-hospital level is one of the causes of the resistant germ emergency. It appears that the attitudes, which mainly lead to inappropriate prescribing are fear of complications, complacency vis-avis patient pressure, and insufficient knowledge. Using a well-designed quantitative study, it would be pertinent to assess whether such attitudes/knowledge were associated with the quality and quantity of antibiotic prescribing. Once the attitudes and/or knowledge associated with inappropriate prescribing were identified in this way, specific interventions focusing on these shortcomings could then be designed to improve the use of antimicrobials and contribute to reducing resistance.<sup>50</sup>

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## Declaration

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## APPENDIX 1 Qualitative approach to GPs' attitudes and knowledge which influence inappropriate antibiotic prescribing

### Objective

The study's aim is to ascertain why GPs who work in the primary care setting of the Galician Health Service prescribe antibiotics inappropriately.

### Design

- Data-collection technique: FGs
- Type of sampling: Theoretical. Bearing the scientific literature on the subject in mind, there is evidence to show that medical internship training ('Médico Interno Residente—MIR') can influence physicians' prescribing. We feel that the workplace could also influence prescribing. We shall try and create two groups per structural segment (specialization via or not via MIR and rural or urban work setting) defined so as to ensure that results obtained in one are ratified in another ('saturation' of information).
- Sampling units: All GPs who work in primary care in the Galician Health Service ('Servizo Galego de Saúde—SERGAS').
- Participant selection method: Snowball method, based on key informants who facilitate contact with other physicians, taking the variable of segmentation into account, i.e. specialization via MIR, specialization other than via MIR, urban health centre and rural health centre. Possible candidates will be contacted by telephone or e-mail and invited to collaborate. With the support of the Galician Association of Family & Community Medicine ('Asociación Gallega de Medicina Familiar y Comunitaria—AGAMFEC'), information on the research project will be previously circulated, via the channels usually used by this association, to foster participation both at this and at subsequent stages. One week before holding the respective group sessions, participants will be recontacted to confirm their attendance.
- Place and date of group sessions: In view of the designated study objectives (determinants of prescribing), group sessions will preferably be held at venues unconnected with the Galician Health Service, to ensure that the study is in all cases kept separate from the health authority. Group venues and timetables will be tailored to the needs of the final participants.
- Duration: 1 hour.
- Ethical aspects: Prior to the commencement of group sessions, participants will be asked to give their informed consent to the proceedings being recorded.



## Structure of FG discussion content

### A. Prescription process in respiratory infections.

For which diseases do you frequently prescribe antibiotics? (Ignorance)

Which antibiotics do you use most? Why? (Ignorance)

Which do you hardly use? Why? (Ignorance)

\*And penicillin, it continues to appear in all the guidelines and is hardly ever prescribed in primary care: to what do you feel this is due?

\*Which data sources do you use to bring yourself up to date on the treatment of respiratory infections?: industry, colleagues, clinical guidelines, administration . . . ?

What criteria do you use to diagnose infections of bacterial aetiology? (external factors associated with patients)

\*Which symptoms or signs lead you to consider the need to prescribe an antimicrobial?

\*Is the patient's clinical history important in the treatment of this type of infection? Is the patient's age important when it comes to prescribing an antibiotic?

\*Do you evaluate other non-clinical factors, such as sociofamilial situation (multipathology and elderly patients in the family), for prescribing an antimicrobial?

What barriers do you come up against at the time of diagnosis? (external factors associated with industry)

\*What in your opinion is the role played by lack of access to supplementary tests?

\*What do you feel influences the lack of time for assessing and following up patients' compliance with prescriptions? \*and the excessive number of patients?

\*Do you think industry influences the prescribing of antimicrobials in primary care? Industry

There are other factors that may influence us in antibiotic prescribing, for example:

\*Sometimes the diagnosis is not definitive and it is preferable to prescribe, lest the case become complicated and turn into pneumonia. Fear

\*What influence do certain characteristics of the patient have, such as his/her occupational status, the fact of living far from the health centre and having difficulties in getting there . . . (individual patient's well-being versus public health).

\*And the patients?: do they put pressure on you to prescribe antimicrobials, e.g. occupational status, imminent travel plans. (Complacency)

### B. Practical consequences of misuse: resistance:

In practice, do you believe that there are consequences of inappropriate antimicrobial prescribing? Indifference

\*Does it seem to you that resistance tends to be more of an intangible issue, for the attention of specialists, but has no influence on routine medical practice.

\*How do you perceive the problem of resistance in your setting? Have you had any negative experience with resistance?

Do you believe in the discovery of new antibiotics with an improved profile and that these will replace existing ones with a high resistance rate? Faith in innovation

Do you have information on the resistance rate in your area? Do you think that this would be of use to you? Ignorance

What do you think are the causes of resistance? External responsibility

\*Hospital prescription? Which specialists are the worst prescribers?

\*Dispensing without medical prescription at pharmacies?

\*Misuse by patients?

\*Indiscriminate use in veterinary medicine?

\*Is it possible that there might be other causes?