A window into the lives of junior doctors: narrative interviews exploring antimicrobial prescribing experiences

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Objectives: Prescribing medications is an important challenge in the transition to junior doctor practice. We explored the antimicrobial prescribing experiences of foundation year (FY) doctors in two UK hospitals. The study answers three research questions: (i) What types of antimicrobial prescribing experiences do FY doctors have?; (ii) How do they make sense of their antimicrobial prescribing experiences?; and (iii) What are their educational needs regarding antimicrobial prescribing?

Methods: A narrative interview study involving 33 FY1 and FY2 doctors in two UK hospitals (Location 1, England and Location 2, Scotland) was undertaken. Complementary analytical approaches to answer the research questions, including framework analysis and in-depth narrative analysis, were employed.

Results: FY doctors made complicated antimicrobial prescribing decisions. The context in which these decisions took place was also challenging, with marked variability in practice between wards within the same hospital, conflicting advice given by senior staff and a dearth of supervision and feedback. In-depth narrative analysis illustrated a complex interplay between what trainees say and how they narrate their prescribing experiences. Three data-derived educational strategies were identified and presented to an Expert Reference Group and research participants for their feedback and ideas for development.

Conclusions: The narrative approach provided a window into FY doctors’ experiences that was wider than the antimicrobial prescribing experiences themselves. The FY doctors described complex tasks being undertaken in challenging environments, where workplace cultures often failed to promote learning and feedback and where hierarchy sometimes worked against rational antimicrobial prescribing. Some practical solutions to these challenges are offered.

Keywords: foundation year doctors, prescribing practices, qualitative, narrative

Introduction

Prescribing errors are common, affecting 7% of medication orders, 2% of patient days and 50% of hospital admissions.1,2 Most prescribing errors are associated with antimicrobial drugs.2 The uncertainty associated with antimicrobial prescribing (e.g. unknown pathogen and non-specific tests) and the significant potential consequences of inadequate prescribing (e.g. anaphylaxis and antibiotic resistance) make it an important focus for research.

The transition from medical school to practice remains challenging. Junior doctors’ new prescribing responsibilities seem particularly anxiety inducing3 and it has been recommended that their prescribing is supported by ward-based teaching.4 The evidence about whether junior doctors are particularly error prone is conflicting, in that some studies report that junior doctors are no more likely to make a prescribing error than other prescribers whereas others show that many junior doctors lack the required prescribing abilities5,6 and a small but significant increase in patient mortality occurs when junior doctors start work.7,8 Either way, junior doctors are numerically the largest prescribers in hospital settings and require support, investment and research.9

Junior doctors work within teams to make decisions but are individually accountable for the prescriptions signed, so a broad set of skills and capabilities (e.g. time management, team working and communication) are required for safe prescribing, yet research has rarely addressed these broader aspects or the context in which these play out.10 A qualitative study with healthcare professionals at UK hospitals concluded that antimicrobial prescribing behaviour was influenced more by prevailing practice.
Antimicrobial prescribing by junior doctors

and professional hierarchy than by policy. Pulcini et al. reported that junior doctors struggle with making complex prescribing decisions and accessing senior support. Ross et al. observed that in 61% of prescriptions for new medicines the prescription writer was not the decision maker, with junior doctors writing most prescriptions but making least decisions. They also interviewed junior doctors who had made prescribing errors to explore perceptions of causes and identified five categories of error-producing conditions, including ‘environment’, which highlighted workload and time pressure and recommended future research exploring healthcare culture.

Designing evidence-based improvement initiatives for junior doctors is challenging, due to a lack of relevant antimicrobial prescribing research in hospital settings (where junior doctors are usually based) and a lack of research that is tailored to junior doctors. Most existing research on antimicrobial prescribing has been undertaken in primary care, with a focus on inappropriate prescribing. A PubMed search using the terms ‘prescribing AND antimicrobials AND doctor’ identified three studies in the last decade in hospital settings: the first explored barriers to optimal antibiotic use for community-acquired pneumonia in hospitals in the Netherlands; the second explored antibiotic prescribing for upper respiratory tract infections in emergency department patients; and the third explored beliefs of hospital physicians about antimicrobial prescribing in Sweden. Only one study focused on antimicrobial prescribing by junior doctors and this was a survey exploring French and Scottish junior doctors’ perceptions of their antibiotic prescribing practice. In summary, research providing an understanding of junior doctors’ antimicrobial prescribing experiences on hospital wards is urgently needed, to design interventions and improve patient outcomes.

Study aims and research questions (RQs)
This study aimed to explore the antimicrobial prescribing experiences of foundation year (FY) doctors in two UK hospitals (Location 1, England and Location 2, Scotland). The hospitals were selected as typical hospitals; we had no reason to suppose that junior doctors had particularly positive or negative antimicrobial prescribing experiences at these locations. The research aimed to answer the following RQs: (RQ1) What types of antimicrobial prescribing experiences do FY doctors have?; (RQ2) How do they make sense of their antimicrobial prescribing experiences?; and (RQ3) What are their educational needs regarding antimicrobial prescribing?

Methods

Study design
This study is based on social constructionist epistemology: we viewed knowledge and meaning as being constructed through social interaction. Its theoretical perspective is interpretivism and, consistent with this perspective, we took a narrative interview approach to data collection, underpinned by a belief that we make sense of our experiences through narrative. The use of qualitative research generates rich data around key questions (e.g. what, why, when and where?) and targets topics that FY doctors see as important, rather than imposing a researcher-led agenda.

Sampling and recruitment

Since all FY doctors would have useful accounts, recruitment was by e-mail via Deaneary circulation lists, through verbal presentations at educational sessions for FY doctors, posters in the doctors’ mess and medical library and through a snowballing approach whereby participants suggested others eligible for the research. Recruitment continued until 20 individual or group interviews had been undertaken. Our Expert Reference Group (ERG) (including hospital-based clinicians, microbiologists, pharmacists and FY doctors across both locations) advised on targeted recruitment. Participants were assured of anonymity, signed a consent form and provided basic demographic data. Research ethics approval was granted by both universities.

Data collection

Due to the sensitive topic of inquiry, participants were given the choice of a group or individual interview; group interviews often yield richer data because of the group dynamics, but individual interviews may be preferred and can be easier to arrange. Interviews began with an orienting question: ‘What is your understanding of antimicrobial prescribing?’ Following this, a narrative interviewing approach was used to explore FY doctors’ personal incident narratives of prescribing experiences. This encouraged the interviewees to recount significant events related to the topic, providing real examples and actual prescribing decisions. Participants typically related their experiences as stories, with a beginning, middle and end, a description of the people involved and a chronological sequence of events. At the end of the interviews, the interviewer asked about the educational needs of FY doctors during their transition to clinical practice. Interviews usually took place in medical school facilities and lasted 26–82 min (mean = 58).

Data analysis

Interviews were audio-recorded and transcribed verbatim, including paralinguistic markers (e.g. hesitations, pauses and laughter). To address RQ1, we employed a framework analysis involving theme identification, development of a coding framework and charting. An initial coding framework was created based on themes identified independently by all three authors based on four interview transcripts, followed by a consensus process. Coding of the transcripts was undertaken in ATLAS-ti (a computerized indexing system), with the framework being revised and amended iteratively to reflect the data. The data were mapped to the coding framework and charts were generated for each participant. Data mapping was at the level of whole narratives (narrative coding) and fragments of narrative and non-narrative data (fragmentary coding). The process of identifying themes and generating charts enabled a deep understanding of factors impacting on prescribing, as perceived by FY doctors, and comparison of data across sites. Numerical data are presented alongside quotes to emphasize patterns in the data. Despite quantification, we retain a process-orientated qualitative approach underpinned by interpretivism. The numerical values presented are for interviews (20 interviews), for participants (133 participants) and for co-occurrences (how frequently subthemes were associated). To address RQ2, we present an analysis of one exemplar narrative, which illustrates the complex interplay between the what (prescribing experiences) and the hows (emotion and identities) of FY doctors’ prescribing experiences.

To address RQ3, we identified three data-derived suggestions for educational interventions to support junior doctors’ antimicrobial prescribing, which had been mentioned frequently by participants at both sites. The educational interventions were presented to the study’s ERG and research participants. Feedback about acceptability, feasibility and likely impact of the interventions was sought, together with ideas about refinement and development.
Results

Participants

Thirty-three FY doctors participated in 20 interviews (14 individual and 6 group) across England and Scotland (Table S1, available as Supplementary data at JAC Online, provides demographic data).

Coding framework

The final coding framework comprised six themes (Table S2, available as Supplementary data at JAC Online). Theme 1 contained the 127 personal incident narratives about antimicrobial prescribing identified in the data, with approximately twice as many narratives describing problematic or negative experiences as unproblematic or positive experiences. Common themes included prescribing errors (cited in 47 narratives), complex prescribing situations (46), tensions between individuals (46) and prescribing dilemmas (41). Approximately equal numbers of narratives were set in surgical and medical wards, with out-of-hours working and handovers identified as critical times for antimicrobial prescribing. In terms of explanations about why problems or dilemmas arose, 37 narratives described pressurized environments and 34 described the involvement of multiple people. Themes 2–5 contained fragmentary coding of four content-related themes (antimicrobial prescribing experiences, systems issues, working relations and educational needs, respectively). Theme 6 contained process-related data, illustrating how participants made sense of their experiences and the impact of these experiences, through choice of words, hesitations, laughter and metaphoric talk.

RQ1: What types of antimicrobial prescribing experiences do FY doctors have?

Theme 1 (holistic coding) and Themes 2–4 (fragmentary coding) address RQ1. There were no consistent differences in participants’ antimicrobial prescribing experiences identified across the two locations or between FY1 and FY2 doctors.

FY doctors described antimicrobial prescribing as challenging and influenced by multiple factors. Three aspects dominated: errors in antimicrobial prescribing; challenging antimicrobial prescribing; and protocol-driven antimicrobial prescribing. Prescribing errors were referred to in all interviews and engendered significant anxiety. FY doctors acknowledged their own limitations and described personal and external factors involved in error, including the following: misunderstanding protocols; problems accessing support; lack of continuity of care; unclear responsibilities; and being tired and pressurized (see Figure 1, Quote 1). Most participants (28) described challenging prescribing, including complex cases and situations causing uncertainty, such as patients with drug allergies (18) and side effects (23). Stop/start dates and other drug dosage timing matters were mentioned frequently (22), as were missed treatments (11). Concerns over two specific antibiotics, gentamicin and vancomycin, were raised (Quote 2). Protocol-led prescribing was described in all interviews (compared with only 14 references to ‘off-protocol’ prescribing), usually in positive terms since it encouraged familiarity with managing commonly occurring cases.

Protocols was not always straightforward, but off-protocol prescribing was generally described as more difficult and error prone, requiring greater judgement and with greater potential to involve conflicting guidance. Unarticulated rationales for senior clinicians’ prescribing decisions were enormously frustrating and sometimes time-wasting when FY doctors could not defend decisions made (Quote 3).

Systems issues, including healthcare culture, were raised frequently. Here we highlight three aspects: variation between wards; continuity of care; and time pressures and inefficiencies. Participants reported marked differences across wards, shifts and staff, with more variability between wards within one hospital than between locations. Some FY doctors described abrupt rotations between wards and the need for rapid adjustment to new rules/expectations; some received good inductions, but many felt unsupported and uncertain. Medical and surgical wards were markedly different, with surgical ward rounds and handovers tending to be quicker, with little discussion of cases. Senior surgeons were perceived as less available since they were often in the operating theatre and tended to have less antimicrobial prescribing expertise, requiring FY doctors to take more responsibility (Quote 4). Out-of-hours working (29 narratives) and handovers (21 narratives) presented challenges to continuity of patient care. Out-of-hours working provided independence but most experiences were negative, with co-occurrence of out-of-hours working with communication problems (40), discomfort (33) and error (30). Support was a concern out of hours (mentioned by 19), with limited and less immediate on-ward assistance. The protocol for phoning on-call staff was often unclear (e.g. who to call and what to check first) and sometimes resulted in a reprimand for phoning (Quote 5). Handovers were described as error prone, with co-occurrences with communication issues (28) and out-of-hours working (23). Participants attributed handover errors to unclear instructions, poor signatures, missing information and lack of follow-up. Doctors and patients moving between wards and shift working led to a lack of clinical ownership (Quote 6). Time pressures (mentioned by 28 participants) were manifested by staying after shifts, covering multiple wards, missing teaching opportunities and feeling pressurized or tired. Ward rounds were described as fraught, particularly in surgery and A&E, with little time for note making. Feeling pressurized was associated with healthcare culture (31 co-occurrences), errors (22) and out-of-hours working (22). FY doctors were frustrated when time was wasted looking for things (e.g. stickers and equipment), doing menial tasks or ‘chasing information’ (Quote 7), particularly when this meant that ‘more important’ activities were rushed.

Working relations with colleagues were challenging too. Here we discuss three aspects: support for antimicrobial prescribing; hierarchies; and conflicting opinions. All 20 interviews identified support for antimicrobial prescribing as a challenge. The staff reported to support FY doctors were microbiologists (11 mentions), pharmacists (9) and registrars or senior house officers (7). Positive experiences involved discussing and sharing rationales, receiving constructive feedback and ward-based teaching. Negative experiences included seniors not being supportive or available, being unnecessarily critical, having unreasonable expectations and undermining confidence (Quote 8). Nineteen interviews discussed medical hierarchy, which sometimes worked well, with consultants leading important decision making but...
enabling juniors to take part. However, most comments about hierarchy were negative, with associated poor team relations and treatment delays (Quote 9). Differences of opinion between senior colleagues on prescribing issues, usually consultants and other experts (e.g. microbiologists and pharmacists) disagreeing about an off-protocol drug, presented FY doctors with a dilemma: they often had to choose whose ‘side’ to take (12 mentions) and felt stuck in the middle (23 mentions; see Quote 10).

RQ2: How do FY doctors make sense of their antimicrobial prescribing experiences?

To address RQ2, we present an exemplar narrative analysis, drawing on a single narrative from Theme 1 and fragmentary data from Themes 2–6. The chosen narrative (Figure 2), from a white male FY1 doctor aged 25–29 years, was selected as typical and illustrating many themes. The participant recounts a challenging

<table>
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<th>Quote</th>
<th>Participant</th>
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<td>1 “I remember prescribing amoxicillin for a penicillin allergic patient because it was on... a surgical ward round that you don't have time to write in the notes and so they are so flustered out there like on surgical ward rounds it's so quick if you are too slow the registrars often are like three patients ahead of you so erm I didn't look at the front of the Kardex and she [the patient] ended up getting the drug but she didn't have any reaction whatsoever (laughs) so it was okay in the end but erm yeah I remember that.”</td>
<td>Female FY1 Location 2</td>
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<td>2 “Gentamicin and vancomycin are two toxic antibiotics they can give you both erm permanent deafness and also erm renal failure erm they have to be dosed according to very strict protocols and there are various ways of dosing them. The BNF says one way and then each hospital takes up their own dosing schedule... there are several blood tests involved depending on what level erm what concentration, how many times a day this patient, so every patient is individual and when you are on a busy ward round looking after thirty patients having to go at a particular time to do a blood test, getting that blood test and then adjusting the dose from that result is fairly complicated and the registrars have difficulty doing it so, often, but it's often left to the F1 to do...”</td>
<td>Male FY1 Location 1</td>
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<td>3 “The situation I had recently in surgery where I had to actually get my consultant out of theatre walk him down to the gastroenterologist and get him [the consultant] to explain why they [the surgical team] wanted this procedure because I explained to them [the gastroenterology team] three times what he [the consultant] said and he [the gastroenterologist] still didn’t want to do it and he [the gastroenterologist] said “no” he wanted to speak with the consultant.”</td>
<td>Male FY1 Location 1</td>
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<td>4 “Our job really was to manage the more medical side of things and his job was the surgeon... it’s not like that at all in the medical side of the hospital... I think probably half of them [surgeons] are, expect their FY staff to deal with things like prescribing antibiotics and that kind of thing so they don’t really keep up-to-date with it erm and because they are so much more of a surgeon than trying to treat things with medications they seem to be a bit out of touch.”</td>
<td>Female FY2 Location 1</td>
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<td>5 “I went to the registrar who wasn’t a renal registrar he was the registrar on-call overnight and he didn’t know so he asked me to phone the microbiologist on-call and this was at about 5 o’clock in the morning and so I had a double check for half an hour and made sure there was nothing in there [the BNF and guidelines] and eventually phoned the microbiologist and I think that she was incredibly angry with me over the phone about me the most junior member of the team was calling her at 5.30 in the morning to ask advice.”</td>
<td>Female FY2 Location 1</td>
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<td>6 “Umm well I felt like it a [the error] could have been avoided maybe if our handover was much better at that time because it was the Friday and I think, cos she [the patient] was reviewed over the weekend by one of the registrar but it [the error] wasn’t just picked up about the level so I was just wondering if it [the error] could have been avoided.”</td>
<td>Female FY1 Location 2</td>
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<td>7 “It’s frustrating it’s stressful erm I get angry about it... It’s just a waste of time when you know we are... walking up the corridor back to get to my consultant and walking around the ward round doing other jobs and I just go back and forth and like you know taking like hours to organise tests and stuff it’s not a good use of my time you know the Trust are paying like you know quite substantial amounts of money and I’m just doing like what a secretary would do you know.”</td>
<td>Male FY1 Location 1</td>
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Figure 1. Quotes to illustrate RQ1 and RQ3.
antimicrobial prescribing experience (Theme 2), which occurred out of hours (Theme 3) and involved working relations (Theme 4). The participant wanted to prescribe antibiotics to prevent sepsis but received conflicting advice from his registrar and the microbiologist. Our analysis explores this narrative holistically to illustrate the interplay between what is said and how it is said.

The FY1 followed the registrar's advice and prescribed antibiotics. He justified his action by repeatedly suggesting that the patient could have become septic. Narrative analysis revealed how the participant constructed his personal and professional identities as he made sense of his experience and actions. In some respects, he constructed his identity as an authoritative, knowledgeable and responsible doctor through his use of the personal pronoun ‘I’ (e.g. ‘I was called’, ‘I wanted to give him’, ‘I gave them anyway’ and ‘I decided to treat’) and use of medical terminology (e.g. ‘haematuria’, ‘inflammatory markers’ and ‘sepsis’). However, he also constructed his identity as lacking experience, e.g. never having seen a supra-pubic catheter sewn in before. Furthermore, his construction of himself as authoritative, knowledgeable and responsible wobbles somewhat through his
Mark* I was called to see someone who had... prostate cancer and he had... a supra-pubic catheter which was pussing and giving him pain he wasn't septic I wanted to give him antibiotics because I didn't want him to go septic and his bloods were you know... he had raised inflammatory markers and I spoke to the microbiologist and she said “don’t give antibiotics ‘cos there’s going to be bugs everywhere” the site was pussing all sorts and erm she said “don’t treat him with antibiotics because they are not clinically septic” and when I spoke to my Reg and he was like “well that’s all very well for micro to say but they don’t have to actually treat your patient you have to” and said to give the antibiotics ‘cos I mean I gave them anyway... that’s the story where you sort of like have a bit of a conflict of interest... you have that quite often where you sort of speak to micro and they say one thing or another like “give the antibiotics sort the antibiotics” you know your seniors or the clinical situation would deem you wouldn’t...

Int: What happened?
Mark: Well he got better er the main problem was like I just said clean make sure it's really nice and clean in the area and it probably needs changing if anything erm I did try to change it but the thing is it was sewed in and I've never seen a supra-pubic catheter sewn in before so I was like “oh I'd better not change that I can’t change it” so we just cleaned around it and it was on the weekend actually that was the weekend and catheterised him urethrally which we managed to because it was by-passing a little bit and there wasn't much draining out so and so he had two going at the same time... erm so I mean that’s one example I can think of.

Int: Can you remember what you might have felt around that time being given these kind of conflicting views?
Mark: Well I was just a bit frustrated... I suppose you’d say frustrated... I sort of sided with my registrar who said “give the antibiotics” it’s very well for micro to say “well they're not clinically septic” but it doesn't mean they are not going to be clinically septic and there was an obvious source of infection yes you can't treat like all catheters and that sort of thing erm but you know his bloods showed that he was getting worse... I can’t remember exactly why I was called I think I was called to see him because he had haematuria but also his site looked horrible and that sort of thing erm and so I sided like with my registrar...

Int: Sometimes the F1 is kind of caught a little bit piggy in the middle
Mark: Oh yeah you are all the time ((says laughingly))...

Int: Did you say you felt frustrated about that?
Mark: Well you can do you can I mean I am quite easy going so I am just like well you know I sided with my registrar if I didn't do anything it probably would be okay but you know it was sort of that sort of situation you know it was a weekend... they are not going to be seen until Monday you probably ought if they are going to get septic the quicker they get antibiotics the better you know et cetera so I decided to treat you know get it was only one shot of antibiotics... it was just like one treatment to treat the sepsis and see what happens see if everything gets better.

Int: Okay and can you remember what happened?
Mark: Well he got better yeah he got seen by one of the urology team anyway and they changed the supra-pubic catheter and cleaned it out and erm you know he was fine and he was fine a couple of days later so...

Int: What did you sort of take from that that experience?
Mark: Err that when you talk to people it is for advice and you know you’ve got to go on your clinical judgement even if maybe the advice that you get is not necessarily what you want to hear.

*Please note, Mark is a pseudonym for the participant.

Figure 2. Exemplar narrative to illustrate RQ2.

use of the pronoun ‘you’ rather than ‘I’ in the following comment: ‘you’ve got to go on your clinical judgement’, which suggests a lack of ownership and agency over his clinical judgement. The use of ‘you’ here communicates a generally admitted ‘truth’ that he wants his audience to share. However, he does construct his identity as professional by identifying the boundaries of his own
competence (with respect to the sewn-in supra-pubic catheter). Despite repeatedly recounting his frustration at his seniors’ conflicting views, he constructs his personal identity as ‘quite easy going’, thereby attempting to manage the interviewer’s impressions of him as a person not easily flummoxed.

The participant employs negative emotion talk throughout his narrative (e.g. ‘conflict’, ‘frustrated’ and ‘horrible’). He also establishes emotional tone through subtle devices such as using the reported talk of the microbiologist (‘she said “don’t treat him with antibiotics”’) and registrar (‘he was like “well that’s all very well for micro to say”’) and through repetition (‘you can do you can’), negatives (‘I didn’t want him to go septic’), judgements (‘it doesn’t mean they are not going to be clinically septic’) and references to cognitive states (‘I wanted to give him antibiotics’).

He also uses metaphoric linguistic expressions, e.g. ‘I sided with my registrar’ three times in his narrative, implying the conceptual metaphor of ‘microbiologist–doctor relationship as war’ and the FY doctor having to pick sides. He also repeatedly referred to his male patient as ‘they’ throughout the narrative, which communicates an adversarial ‘them and us’ relationship between doctor and patient. Furthermore, he uses laughter for shared understanding in his agreement with the interviewer that FY1s play ‘piggy in the middle’ between the conflicting views of their seniors. Holistically, exploration of how this participant narrates his antibiotic prescribing experiences (Theme 6) suggests this experience was troublesome.

RQ3: What are FY doctors’ educational needs regarding antimicrobial prescribing?

Theme 5 covered the educational needs of FY doctors and highlights four areas: inductions; supervision and feedback; ward-based teaching; and formal teaching away from the ward. Inductions and written information about individual wards were important due to interward variability. Good induction practice included protected time for shadowing the new role, senior staff briefings covering efficient working and error prevention, written information about ward procedures and signposting to support and when to access it. FY doctors mentioned protocols and guidelines frequently, particularly the support they provided for ward-specific prescribing decisions if easily accessible. Awareness of guidelines was frequently lacking and participants described finding guidelines by chance, sometimes after doing something wrong (Figure 1, Quote 11). Supervision and feedback was deemed important but extremely variable and often lacking. Both positive and developmental feedback was deemed valuable. Most feedback received was critical, so no feedback was commonly assumed to be positive (no news equals good news; Quote 12). Ward-based teaching was highly valued by participants, being linked to known patients and usually involving an expert interacting with just one or two learners. FY doctors appreciated extensive discussions of individual cases, experts sharing their rationales and role modelling the justification of decisions. FY doctors described significant variability in the quality and availability of ward-based teaching. Not all seniors wished to teach and some participants were angry that opportunities for learning were missed (Quote 13). The formal education programmes experienced by participants received mixed reviews. The consensus was that antimicrobial prescribing should be covered in the formal programme, especially drug calculations (24 participants), dosage issues including missed doses (21), choice of antibiotics in complicated situations such as allergies, drug resistance and contraindications (20) and controlled antibiotics (20). Participants valued teaching that was clinically relevant, appropriately pitched and succinct. Formal learning in small groups based on real experiences was particularly valued. Presentations by microbiologists and pharmacists received positive feedback (Quote 14).

Participants identified several interventions that could address their educational needs. These included strategies to cope with interward variability and abrupt transitions between them, strategies to promote ward-based teaching and insights into expert decision making, strategies to improve supervision and feedback and strategies to promote access to clinically relevant formal teaching. Three promising educational strategies were selected by the research team:

(i) An induction pack for FY doctors starting work on each ward. This would include formal documentation, but potentially also some of the more idiosyncratic information such as preferences of the different consultants and some very practical tips such as how previous FY doctors structured their days.

(ii) Strategies to encourage clinicians to engage in more of the informal ward-based teaching that FY doctors appreciate so much. In particular, strategies that encourage the explicit sharing of decision-making steps, so that the FY doctors can see the rationales underpinning the prescribing decisions made by their seniors.

(iii) A new model of support and feedback, which provides FY doctors with the autonomy to work independently, but such that they can access support and receive feedback regularly and when most needed. A system of ‘checking’ or ‘countersigning’ prescriptions in the first few months might be an example and a reason for FY doctors to engage in dialogue with seniors about prescribing.

The feedback received from the ERG and participants (six experts, five FY1s and six FY2s across the two sites) was generally positive, but no single strategy was ranked highest. There was good consensus amongst study participants that induction packs were not yet standard practice and would be useful. They had mixed views about whether including the antimicrobial prescribing preferences of consultants was a good idea; overall, they felt this would be useful but probably inappropriate. The ERG also felt induction packs could ensure consistency of information to FY doctors, but many believed this was already standard practice (perhaps highlighting a mismatch between intention and reality). Experts felt strongly that information about idiosyncratic prescribing preferences of different consultants should not be included, since this could be seen to condone substandard clinical practice, discourage prescribers from striving for evidence-based prescribing decisions and deviate from Trust policies. The question of how packs would be kept updated was also raised.

Research participants and the ERG agreed that understanding experts’ prescribing decision making was important and should happen routinely. Feasibility was questioned due to time pressure, willingness and abilities of some senior doctors, but participants noted the willingness and availability of some other experts, including microbiologists and pharmacists. The participants also welcomed support and feedback, but the feasibility of countersigning prescriptions was questioned because of the busy ward
environment and the fact that they often worked alone or with little support. The ERG agreed that FY doctors should be receiving support and feedback, but again felt this was standard practice. They agreed that countersigning prescriptions was probably not feasible and might lead to treatment delays.

**Discussion**

This study aimed to explore the antimicrobial prescribing experiences of FY doctors across two UK hospitals and inform educational development. It addresses a need for research that explores the hospital culture in relation to prescribing and uses a narrative approach for the first time. Although the focus of the research was antimicrobial prescribing, this approach provided a window into the broader experiences of junior doctors. Challenges relating to antimicrobial prescribing were identified, alongside wider issues such as preparedness for the FY role, support for decision making, navigating medical hierarchies and coping without feedback on practice. Furthermore, an exemplar narrative illustrates the complex interplay between several themes (the whys and hows) and the emotional impact of challenging antimicrobial prescribing experiences on participants.

Our study identifies healthcare culture and hospital processes as important targets for improvement strategies. This extends previous research that concludes that prescribing interventions tend to neglect the social context and highlights the need for research that recognizes the environment as an error-producing condition. In the error-producing category of ‘environment’ in the study by Ross et al., the attribution of cause was usually described as a function of the individual (e.g. workload and time pressures), whereas in our study it was more a function of the system (e.g. culture and processes). This difference may reflect the different topic (their focus on prescribing errors, ours on prescribing experiences), theoretical framework (their use of Reason’s model of accident causation and human error, our use of interpretivism) or methodology (their use of non-narrative interviews, our narrative approach).

Opportunities to learn and refine the craft of prescribing within the complex ward-based environment were reported as patchy and FY doctors often could not leave the busy ward environment to attend formal teaching. The descriptions of learning opportunities in this study suggest that Hafferty’s descriptions of the formal, informal and hidden curriculum are applicable to FY doctors’ workplace learning, with the formal curriculum being the teaching delivered away from the ward (‘the stated, intended, and formally offered and endorsed curriculum’, p. 404), the informal curriculum being ward-based teaching (which tends to be unscripted, predominantly ad hoc, and highly interpersonal’, p. 404) and the hidden curriculum being the healthcare culture (‘a set of influences that function at the level of organizational structure and culture’, p. 404). McLellan et al. suggest that a technical focus on isolated prescribing competences is unlikely to support new graduates in becoming safe prescribers and the comparison with Hafferty’s thinking would suggest that this is because it neglects the informal and hidden curricula of hospital wards. Our study also suggests that it may be impossible to prepare undergraduates fully for their first day as an FY doctor, particularly given the variability of ward environments. We support recommendations for a more integrated and contextualized approach to undergraduate prescribing education, but also recognize the importance of informal ward-based learning using real patient ‘cases’ for junior doctors in role.

FY doctors in this study received very little feedback about their antimicrobial prescribing and described having to assume that ‘no news is good news’, which has been reported previously in the UK. Similarly, previous research reports a culture of ‘non-interference’ with senior doctors’ prescribing decisions, which prevented intervention or discussion. Elstein identified feedback as an important aspect of developing appropriate diagnostic decision making and points out that concert musicians and professional sports people receive immediate feedback regularly and carefully review mistakes. He concluded that improving the provision and utility of feedback in clinical settings is a priority and although his work involved diagnostic decisions, our data suggest this applies equally to prescribing decisions.

**The novel contribution of this research**

This research focuses on an important topic with potential to improve antimicrobial prescribing and patient safety. It provides information to support medical graduates in their transition to an antimicrobial prescribing role, which our data show is currently marred by negative experiences within a hierarchical structure and a lack of ward-based support, teaching and feedback. Qualitative research relating to junior doctors’ prescribing experiences is currently lacking, particularly for antimicrobial prescribing where there are, to our knowledge, no previous studies. We used a novel narrative approach to generate rich data about antimicrobial prescribing that is grounded in the lived experiences of FY doctors. Three novel findings are: (i) the generally positive impact that protocols in antimicrobial prescribing have on FY doctors’ experiences; (ii) the negative impact of conflicting opinions between senior staff for FY doctors; and (iii) the way that participants narrated their experiences, suggesting that antimicrobial prescribing is an emotionally demanding endeavour. The data also support existing research on handovers, variability between wards and the importance of ward-based learning.

**Methodological strengths and challenges**

A key strength was the use of narrative interviewing, which promotes discussion of real experiences and grounds data in the lived experiences of participants, rather than abstracted statements or opinions. FY doctors also advised on recruitment and data interpretation, which ensured that the research team, data presentation and resulting recommendations are credible, acceptable and feasible. A methodological challenge was that by asking participants to talk about memorable antimicrobial prescribing events, coupled with the project aim of improvement strategies, there will inevitably be a focus on more negative events. The researchers attempted to balance this within the interviews by using prompts (e.g. ‘Can you describe any positive antimicrobial prescribing experiences?’) but the findings should be interpreted in that context and triangulated with future studies. Although purists might balk at our inclusion of numbers in a qualitative research study, this is a legitimate strategy to help make patterns across the data visible, while maintaining a process-orientated qualitative approach underpinned by interpretivism. In qualitative research, where one is not claiming
Recommendations for practice and future research

This study provides important insights into the experiences of UK FY doctors. It demonstrates the impact of taking on new and substantial responsibilities within a complex environment and with limited support, feedback and supervision. This study proposed three data-derived educational strategies that could address the educational needs of junior doctors in relation to prescribing. Of these, providing an induction pack for each ward was considered the most acceptable and feasible and we recommend this is implemented across all hospital wards. Increasing informal ward-based teaching, particularly to make rationales for decision making explicit, and increasing feedback are also required but harder to implement. Interestingly, there was a mismatch between FY doctor experiences and the beliefs of experts about FY doctor experiences, highlighting the importance of involving junior doctors as codevelopers of educational strategies. Existing medical students will need careful preparation to work in healthcare, to be able to negotiate their roles within a hierarchical environment, to be proactive in seeking the information they require to make good decisions, to have organizational awareness and an eye to quality improvement and to be resilient to the pressures they will inevitably experience.

Future research should acknowledge prescribing as a mixture of knowledge, skills and judgement, in interaction with a complex, social context, where there is no simple relationship between knowledge and behaviour. In common with other authors, our research suggests that prescribing initiatives focusing on knowledge and skills are likely to have limited impact. Successful strategies to support junior doctors’ antimicrobial prescribing on hospital wards will need to acknowledge the inherent complexity and variability of the settings. Socio-cultural theory suggests that context is more than just ‘the setting’ and can determine the prescribing decisions that are made (professional judgements), those that are valued (workplace culture) and those that are possible (hospital process). Situated learning theory and activity theory propose that knowledge, knowing and the context in which that knowledge is applied are interlinked and this is supported by Eraut’s work on factors affecting the learning of young professionals at work. Socio-cultural theories may offer a useful framework for future research by providing a lens that can accommodate the wide range of interacting factors influencing workplace behaviour.

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Transparency declarations

None to declare.

Supplementary data

Tables S1 and S2 are available as Supplementary data at JAC Online (http://jac.oxfordjournals.org/).

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