

Antibiotic prescribing practice in residential aged care facilities — health care providers' perspectives

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Widespread and inappropriate antibiotic use in residential aged care facilities (RACFs) has been widely reported.¹⁻⁴ This is especially concerning given emerging evidence of antibiotic resistance in RACFs.⁵ Further, older people are particularly susceptible to the adverse consequences of antibiotic use, including *Clostridium difficile* infection.⁶ Thus, efforts to optimise antibiotic prescribing in this population are warranted.

Existing strategies to improve antibiotic use have largely focused on the acute care setting;⁷ however, different approaches are needed in the RACF setting due to differences in antibiotic prescribing behaviour and organisational resources. Several studies have proposed various factors leading to the widespread prescribing of antibiotics in RACFs, including difficulty in establishing clinical diagnosis of infection and lack of onsite diagnostic facilities.^{1,8,9} These, however, were based primarily on anecdotal presumption rather than the individual experience of relevant health care providers.

There may be unique challenges to improving antibiotic use in RACFs; however, limited data exist. Accordingly, this study reports on the organisational workflow and workplace culture influencing antibiotic prescribing behaviour and the perceived difficulties in optimising antibiotic use in RACFs.

Methods

This study involved high-level care RACFs affiliated with four major public health care services in metropolitan and regional Victoria, Australia. It forms part of a larger study exploring antibiotic prescribing practices in RACFs. Key health care providers, namely nurses, general practitioners and pharmacists servicing individual RACFs, were recruited using a combination of purposive and snowball sampling strategies.¹⁰ Institutional ethics approvals were obtained from

Abstract

Objective: To explore organisational workflow and workplace culture influencing antibiotic prescribing behaviour from the perspective of key health care providers working in residential aged care facilities (RACFs).

Design, setting and participants: Qualitative approach using semistructured interviews, focus groups and onsite observation between 8 January 2013 and 2 July 2013. Nursing staff, general practitioners and pharmacists servicing residents at 12 high-level care RACFs in Victoria were recruited.

Main outcome measures: Emergent themes on antibiotic prescribing practices in RACFs.

Results: Sixty-one participants (40 nurses, 15 GPs and six pharmacists) participated. Factors influencing antibiotic prescribing practice have been divided into workflow-related and culture-related factors. Five major themes emerged among workflow-related factors: logistical challenges with provision of medical care, pharmacy support, nurse-driven infection management, institutional policies and guidelines, and external expertise and diagnostic facilities. Lack of onsite medical and pharmacy staff led to nursing staff adopting significant roles in infection management. However, numerous barriers hindered optimal antibiotic prescribing, especially inexperienced staff, lack of training of nurses in antibiotic use and lack of institutional infection management guidelines. With regard to culture-related factors, pressure from family to prescribe and institutional use of advance care directives were identified as important influences on antibiotic prescribing practices.

Conclusions: Workflow- and culture-related barriers to optimal antibiotic prescribing were identified. This study has provided important insights to guide antimicrobial stewardship interventions in the RACF setting, particularly highlighting the role of nurses.

all participating health care service networks and Monash University. Informed consent was sought from individual participants.

Senior executive nurses, nurse unit managers (NUMs) and registered nurses (RNs) were invited to participate in one-to-one interviews or focus groups. One-to-one interviews were conducted with GPs and pharmacists. Semistructured interview guides tailored to different health care providers' perspectives were used. All data collection and interviews were conducted by one or two interviewers (CJL and MK) between 8 January 2013 and 2 July 2013. Recruitment continued until data saturation was reached. All interviews were audio recorded and transcribed verbatim. Onsite observation of the working environment and documentation related to antibiotic prescribing was also undertaken. Field notes from onsite observations were compared with interview transcripts for discrepancies.

Data were analysed and coded for emergent themes using the framework

approach.¹¹ Data management was facilitated with NVivo version 9.0 (QSR). All transcripts were independently verified against audio recordings by CJL and MK. Data analyses were performed independently by CJL and MK for cross-validation purposes. Themes and codes were finalised at regular meetings involving all researchers.

Results

Characteristics of study sites and participants

Twelve public RACFs (with 30–100 beds per facility) within the four health care networks participated. Primary care was delivered by GPs from different practices (range, 1–19 GPs per RACF). Individual RACFs were serviced by external community pharmacies (for medication supply) and consultant pharmacists (for medication review). Sixty-one participants consented to interviews: 40 nurses

(four executive nurses, 15 NUMs and 21 RNs), 15 GPs and six pharmacists (Appendix online at mja.com.au). Fifteen RNs participated in three focus groups (4–6 participants per group). Other participants were interviewed individually.

Emergent themes

These can be categorised into work-flow- and culture-related factors.

Workflow-related factors

Logistical challenges with provision of medical care. An important

1 Logistical issues with offsite medical doctors and pharmacists

Issues with offsite doctors

Phone order of antibiotics

Q1: "[At the] MAC [medication advisory committee] meeting this morning they want me to sign off on a doctor that hasn't seen her resident since she had a UTI [urinary tract infection] in February, and still hasn't signed the drug chart... that patient hasn't been reviewed for over 4 months, and that's a fairly typical situation." (GP; 27 years' RACF experience)

Lack of instant support

Q2: "They [GPs] will prescribe something because if they don't prescribe something it could be 3 or 4 days before that resident gets an antibiotic prescribed." (NUM; 12 years' RACF experience)

Q3: "You know I'm not going to come here every day and listen to their chest... so you tend to treat earlier." (GP; 25 years' RACF experience)

Difficulties of locum doctors

Q4: "And in many cases they [locum doctors] will prescribe an antibiotic because if the locum got the call out at night they think 'I had better do something rather than nothing.'" (Pharmacist; 12 years' RACF experience)

Q5: "They [locum doctors] have got even a lower threshold of prescribing antibiotics than perhaps I do, and it's hard for them at 3 o'clock in the morning... it's harder to assess properly, and therefore I think there is an overuse [of antibiotics]." (GP; 5 years' RACF experience)

Issues with offsite pharmacists

Q6: "We just don't have an Imprest [onsite source] of antibiotics. I have to fax the pharmacy and wait for the next delivery. And with the aged care, with our aged care clientele here, sometimes 4 or 6 hours, or maybe 7 hours until we get that antibiotic, they can really deteriorate rapidly. I know it sounds extreme, but that can happen with them." (NUM; 37 years' RACF experience)

Q7: "They [pharmacists] are not there at 6 o'clock at night when I make the decision which antibiotic to put them [residents] on and they're not there, it's not their role. I don't see how they actually have a particular role. I'm happy to consider it, but I don't see where they would fit in with the decision making of which antibiotic, the side effects or something that's clinically assessed." (GP; 5 years' RACF experience)

Q8: "You see the drug chart, a course of antibiotics that happened 4 months ago, am I going to go back and look at what it was for, why it was for, did it have the right bugs? You know, it's just, at this point in time it is irrelevant to the review of this resident's medications." (Pharmacist; 12 years' RACF experience)

GP = general practitioner. NUM = nurse unit manager. Q = quote extracted from interview transcripts. RACF = residential aged care facility. ◆

2 Mixed perceptions about nursing-driven infection management

General practitioner perspectives

Q1: "Well the nurses in fact are very good, they call me because they're very much aware that the antibiotic has been ordered but what suits you see. And that's a good thing, because otherwise I'd forget the whole story if I don't hear anything." (GP; 40 years' RACF experience)

Q2: "...unfortunately from my perspective and my experience, the nursing staff are de-skilling, and I can't really rely on what they're saying to a great degree... because there's such a turnover of aged care nursing staff, and a lot of international graduates are coming into the industry, that's another good reason why I need to be responsive." (GP; 27 years' RACF experience)

Q3: "So we don't get really good feedback from nursing homes any more. We're told about everything, someone sneezed we get to hear about it... They often initiate MSUs [midstream urine tests] or urine ward tests on their own, and report those to us, so often insisting the urge to prescribe antibiotics to people with abnormal full ward tests or abnormal MSU even if they're clinically well. So we do get pressured a little bit by nursing staff to do something." (GP; 32 years' RACF experience)

Nursing staff perspectives

Q4: "Whereas if we've got a result that you know the antibiotics and the infection don't match, we'll call the GP. If they have prescribed we'll call the GP and say 'um change', or if they haven't prescribed we'll call them and say 'can we have a prescription?'" (NUM; 12 years' RACF experience)

Q5: "That should be his [GP's] role I suppose. It's not up to me to go and check what the results are and hop on the phone and say '...there's resistant or sensitive bug, so what do you want them to have?'" (NUM; 25 years' RACF experience)

Q6: "I am saying the patient doesn't require antibiotic; that's my feeling, what if my assessment is wrong? And so we tend to follow someone else especially the GPs." (RN; 2 years' RACF experience)

NUM = nurse unit manager. Q = quote extracted from interview transcripts. RACF = residential aged care facility. ◆

concern cited by all informants was the lack of onsite doctors to provide immediate clinical assessment. Consequently, antibiotics were commonly prescribed by phone order, especially for minor or recurrent infections. Telephone prescription would not necessarily be followed by onsite review (Box 1, quote 1). Due to logistical barriers, GPs tended towards initiating antibiotics early rather than waiting and observing (Box 1, quotes 2 and 3). There was delay in reviewing antibiotic prescriptions, particularly among GPs without regular onsite visits. All stakeholder groups believed that reliance on locum doctors was associated with greater use of antibiotics (Box 1, quotes 4 and 5).

Pharmacy support. Half the RACFs (6/12) did not have access to onsite antibiotics for after-hours use, which sometimes hindered timely administration (Box 1, quote 6). Medication review for individual RACF residents was only performed annually by consultant pharmacists through a scheduled residential medication management review; as such, short-term courses of antibiotics were rarely reviewed. Most GPs and nurses felt that there was a limited role for pharmacists in influencing antibiotic prescribing (Box 1, quote 7). Pharmacists also perceived major challenges in guiding antibiotic use, including their offsite location, limited communication with GPs and lack of access to clinical notes (Box 1, quote 8).

Nurse-driven infection management. All participants acknowledged the significant role of nurses in driving infection management in RACFs, with mixed opinions about having such a nurse-led system. Some GPs felt confident with nursing assessment, relying primarily on nursing staff information to guide their decisions to prescribe antibiotics (Box 2, quote 1). Other GPs had negative views, commenting on rapid staff turnover, lack of experienced nurses and variability of assessment quality, especially from agency or casual nursing staff (Box 2, quote 2). Several GPs also raised concerns about overreporting and pressure to treat from nurses, leading to unnecessary antibiotic prescribing (Box 2, quote 3). From nurses' perspectives, some emphasised their influence on GPs in initiating or changing

antibiotics (Box 2, quote 4). However, many considered their responsibility in infection management overwhelming, given existing staffing and workload issues. Some also indicated a lack of confidence and knowledge in advising about antibiotic use (Box 2, quotes 5 and 6).

Institutional policy and guidelines for antibiotic prescribing. None of the participating RACFs had an antimicrobial restriction policy. Prescribing was often based on residents' histories and antimicrobial susceptibility results, if available. In most instances, however, the type and dose of antibiotics were chosen without following guidelines or evidence, with few GPs citing use of the Australian *Therapeutic guidelines: antibiotic*.¹² Indeed, several GPs had concerns that the guidelines are generally not applicable to the older RACF population. Pharmacists likewise claimed that choice of antibiotics used in this population did not normally follow the guidelines (Box 3, quotes 1 and 2).

There was no standardised method for infection surveillance across participating RACFs. Some (eight RACFs) used infection control practitioners and followed the McGeer definitions for infection surveillance,¹³ while others (four RACFs) had a self-initiated infection registry. Only one facility monitored long-term trends in antibiotic use and the benefits of this were highlighted (Box 3, quote 3).

It was routine practice at several RACFs to perform regular (monthly or bi-monthly) dipstick urinalysis for all residents, regardless of presence of symptoms. However, this practice was criticised as leading to overtreatment of asymptomatic bacteriuria, with consistent views across stakeholders supporting its abolishment (Box 3, quotes 4 and 5).

External expertise and diagnostic facilities. Most GPs rarely sought advice from infectious diseases specialists (Box 3, quote 6). External supports used included microbiologists at pathology services (regarding multidrug-resistant organisms) and mobile services from hospitals (eg, Mobile Assessment and Treatment Service and In-Reach service) for assistance in administering intravenous antibiotics.

Few of the RACFs (2/12) had onsite radiology or pathology services. Most

3 Institutional guides and external support for infection management

Institutional guides

Antibiotic policy and guidelines

Q1: "They [elderly residents] always get the acute bronchitis which the antibiotic guidelines say no evidence that antibiotics make any difference to acute bronchitis. But what about in the 70s age group? What is the data? Do we have any evidence? Obviously so little evidence pertains to elderly people." (GP; 5 years' RACF experience)

Q2: "You will see particular prescribing habits from doctors. One particular doctor everything with the cephalixin is always 10 days, but generally it is a 7-day course." (Pharmacist; 4 years' RACF experience)

Surveillance of antibiotic use

Q3: "I keep a spreadsheet so I know who's getting antibiotics and when they're getting them, how long they're on for, so I keep a note of that... I'll start posting that [antibiotic register spreadsheet] out to all the nursing staff... they can maybe become a bit more frontline with that as well, and saying to the doctors, you know they [the residents] have had this [antibiotic] twice so do you not think maybe they should be using something else." (NUM; 9 years' RACF experience)

Regular dipstick urinalysis

Q4: "I know staff sometimes they're very very proactive, they're checking urine non-stop, but in nursing home we're not supposed to do it, it's not a good practice... some GPs will ask if they're symptomatic or asymptomatic, but some GPs they will give [antibiotic] order [without asking]." (NUM; 12 years' RACF experience)

Q5: "I have tried to tell every facility when they are resident of the day don't check their urine. You know, of course they are going to have white cell counts, of course they are going to have nitrites. I mean they are, most of them are incontinent, they have got pads... I get frustrated with that. So I tend not to prescribe antibiotics in those instances." (GP; 20 years' RACF experience)

External support

Q6: "I don't think we rely on too much external sources for that [antibiotic prescribing], we make those calls ourselves... very occasionally [I would] ring infectious diseases registrars and get advice from the major hospitals, but that's not very common." (GP; 32 years' RACF experience)

Q7: "... [Ordering investigations for] respiratory [infections], rarely, occasionally sputum [culture] if they're not improving. Chest x-ray, a lot of them aren't in the position to go out and don't want to go out. Often the next step is if they are for hospital would be hospital." (GP; 20 years' RACF experience)

Q8: "Well one thing that would be helpful is the ability to get a blood test on the day if you wanted one... most usually the [pathology service] they won't come for 3 or 4 days. And if we could get immediate pathology for what we wanted, then it would make it easier to know by the morning whether I really need to treat it or not." (GP; 25 years' RACF experience)

Q9: "I would always send an MSU [midstream urine] if I suspected a UTI [urinary tract infection], because of firstly wanting to confirm the diagnosis, and secondly wanting to make sure that there was not resistant bugs there." (GP; 20 years' RACF experience)

Q10: "You see the trouble is that in terms of MSU that they are so common that every second person has it every second week... So I think we are wasting resources if we order MSU every time." (GP; 25 years' RACF experience)

GP = general practitioner. NUM = nurse unit manager. Q = quote extracted from interview transcripts. RACF = residential aged care facility. ◆

GPs rarely ordered radiological investigations for chest infections, partly because of the difficulty in transferring debilitated residents to an external site (Box 3, quote 7). Additionally, delay in pathology sample collection often complicated the clinical decision (Box 3, quote 8). Interestingly, GPs had mixed views about the usefulness of urine cultures in guiding antibiotic treatment for urinary tract infections (UTIs) (Box 3, quotes 9 and 10).

Culture-related factors

Patient. Most GPs and nurses felt that resident frailty was an important factor in early initiation of antibiotic treatment, with many GPs also prescribing broader spectrum antibiotics (eg, amoxicillin-clavulanate as opposed to amoxicillin) for this reason (Box 4, quotes 1 and 2). Difficulties in assessing

residents with behavioural problems or cognitive deficits also complicated the prescribing decisions. Among this population, correctly obtaining a urine sample for microbiological investigation was often impossible. Fever and typical urinary symptoms were often not observed in presumed UTIs, and therefore, the decision for antibiotic therapy frequently depended on less specific symptoms including changes in behavioural or functional status (Box 4, quotes 3 and 4).

Family. Pressure from family members was identified to influence antibiotic prescribing (Box 4, quotes 5 and 7). Often there were unrealistic expectations of antibiotics being prescribed for minor symptoms or to avert hospitalisation. Antibiotics were sometimes prescribed for residents in end-stage illness to fulfil family expectation.

4 Cultural factors related to patient, family and institutional factors influencing antibiotic prescribing behaviour

Patient factors

Q1: "I think the doctors' kind of point of view is get them on antibiotics quite quickly before it gets any worse or turns into anything else, so I think that's probably part of the reason they tend to jump on antibiotics first... they don't do the tests to see actually what's going on first, they'll put the antibiotics out and then go from there." (NUM; 9 years' RACF experience)

Q2: "First of all they don't breathe as deeply, they're more likely to develop pneumonia just from a cough, and they deteriorate very very fast... So again you want to be more aggressive in terms of treatment, they're more likely to require things like the high powered antibiotics like ceftriaxone, for example." (GP; 30 years' RACF experience)

Q3: "So a lot of our residents are incontinent so it makes it very difficult to get a clean sample for a full ward test, but what we do do where we can't get a sample is use a urine analysis strip to just sort of soak it in the pad and just see if there's any indication there. Sometimes it's too difficult to get an MSU [midstream urine], and doing an in-and-out catheter is not advisable to get an MSU, so we would just go mainly on the symptoms of what we see... 99% of the time we won't get a culture." (NUM; 5 years' RACF experience)

Q4: "But usually by this stage you know their behaviours have changed and they've got changes in their urine... particularly we can't wait to see whether it resolves, we've got to treat them just to get their behaviours under control." (NUM; 30 years' RACF experience)

Family factors

Q5: "I think sometimes there is a potential for family members to push for use of antibiotics where they shouldn't have and the GP has gone with the wish of the family." (NUM; 13 years' RACF experience)

Q6: "Well the family, the resident and the staff... the bias is always an inappropriate expectation of the use of antibiotics." (GP; 5 years' RACF experience)

Q7: "If I think it's a viral thing and they've got a cough and they haven't got fevers, I tend to kind of go 'let's just see how they go'. But if the family is insistent or if they [residents] are insistent, then I do tend to prescribe rather than argue with them." (GP; 12 years' RACF experience)

Institutional factors

Q8: "I would think so, because the other thing that's happened in aged care is there's a reluctance to let people die from their chest infections, there's a real push from nursing home staff to treat people. And often I think that's for secondary gain, you know they don't want an empty bed, so they pressure GPs to treat people that otherwise shouldn't be treated." (GP; 32 years' RACF experience)

Q9: "I think staff sometimes worry, and that's borne out of a litigious consciousness, and staff worry that 'oh my God they've coughed twice, better report it'. Because if they don't report it then whose fault is that? That's our fault, and we don't really like to be blamed for things. So there's that potential to overreport I think." (NUM; 12 years' RACF experience)

Q10: "Certainly in our area of work we have groups of people that are so advanced in their debility and dementia that you have to ask the question 'will we treat or not treat'. So there's a bit of an algorithm there. So I would like to think that a lot of my residents have got advance care plans." (GP; 27 years' RACF experience)

GP = general practitioner. NUM = nurse unit manager. Q = quote extracted from interview transcripts. RACF = residential aged care facility. ◆

Institutional. Several GPs felt institutional pressure to use antibiotics in order to avoid legal consequences and sometimes to prolong a resident's life inappropriately, with most nursing staff admitting to overreporting symptoms due to fear of litigation (Box 4, quotes 8 and 9). Both GPs and nurses emphasised the importance of advance care planning in guiding antibiotic prescribing decisions (Box 4, quote 10).

Discussion

To our knowledge, this is the first study that has explored the views of key health care providers about barriers and challenges to optimising antibiotic prescribing in RACFs. One of the major concerns raised was the logistical barrier associated with lack of onsite doctors. This places heavy responsibility on nurses for infection

management, a role they are generally not trained to perform. Indeed, this study highlighted a perceived lack of knowledge and guidance regarding antibiotic use among nursing staff. Further guidance and support to the nursing staff is clearly needed. Additionally, the *Therapeutic guidelines: antibiotic*¹² were deemed not relevant to the RACF population, highlighting an unmet need.

Extending the roles of pharmacists in antimicrobial stewardship (AMS) in the RACF setting has shown positive outcomes.^{14,15} There is potential for consultant pharmacists to provide additional support to nursing staff, particularly with regard to education about appropriate antibiotic use and facilitating surveillance of antibiotic use. Extensive antibiotic surveillance has been common practice in the United States and in European RACFs;^{16,17} however, such activities are

relatively scarce in Australian RACFs. Monitoring of longitudinal trends of antibiotic use and benchmarking across RACFs will be a useful starting point to improve antibiotic use.

Another recurrent theme was the influence of routine dipstick urinalysis (regardless of symptoms) on overprescribing of antibiotics for asymptomatic bacteriuria. Despite studies showing that urine dipstick tests are unreliable for identifying older residents with laboratory evidence of UTI,¹⁸ half of the participating RACFs used routine full-ward tests. Anecdotally, positive dipstick urinalysis often led to initiation of antibiotics, especially among psychogeriatric residents. This is concerning, given that treatment for asymptomatic bacteriuria has been shown to contribute to the emergence of antibiotic resistance.^{19,20} Accordingly, nursing staff education highlighting evidence-based practice about diagnosis and treatment of UTI should be promoted.

Empiric antibiotic prescribing without pathological or radiological investigations was found to be common practice. Reassessing antibiotic therapy according to culture and susceptibility results is critical given the increasing occurrence of multidrug-resistant organisms in the RACF setting,^{21,22} and particularly helpful given the GPs' reliance on nursing staff to follow-up on the duration and outcomes of antibiotic treatment. Indeed, the recently revised McGeer criteria for infection surveillance has recommended mandatory urine culture for the diagnosis of UTIs.¹³ On the other hand, however, mandatory culture of urine samples regardless of obvious signs and symptoms could paradoxically lead to an increase in unnecessary antibiotic prescribing for asymptomatic bacteriuria. Thus, strict evidence-based guidelines for the indication of urine cultures and treatment of UTIs are warranted.

The pressure to prescribe antibiotics from nursing staff and family was reportedly a significant influence on antibiotic prescribing behaviour; notably, these factors are potentially modifiable. Antibiotic prescribing decisions in older patients are often difficult and controversial, particularly as part of end-of-life care.²³ Studies have shown higher use of antibiotics and a greater risk of acquiring multidrug-resistant

organisms among older people with advanced dementia or end-stage illness,^{24,25} highlighting the need to re-evaluate antibiotic prescribing in this group. Ideally, all new residents of RACFs should have an advance care plan, including decisions about future antibiotic therapy and palliation alternatives. This might prompt appropriate discussions with family and reduce pressure to prescribe in some situations.

In conclusion, significant issues with the existing organisational workflow and culture of RACFs have been identified that might contribute to poor antibiotic prescribing practices, underlying the need for targeted AMS initiatives in this setting. Further intervention should consider the limitations of institutional resources and health care professionals' working relationships within this environment. Importantly, this study has highlighted areas and modifiable factors that will assist in developing future AMS interventions.

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