Antimicrobial prescribing in residential homes

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Objectives: Research in residential homes has been limited to date and the extent of systemic and topical antimicrobial prescribing is largely unknown. The aim of this study was to investigate antimicrobial prescribing in residential homes in Northern Ireland (NI).

Methods: Point prevalence studies (PPSs) were completed in November 2010 (PPS1) and April 2011 (PPS2) in 30 residential homes. Data were obtained from care plans, medication administration records and staff in relation to antimicrobial prescribing and facility and resident characteristics, and analysed descriptively.

Results: The point prevalence of systemic antimicrobial prescribing was 9.4% in PPS1 and 9.2% in PPS2 (range 0.0%–33.3% during both PPSs). Trimethoprim was the most commonly prescribed systemic antimicrobial and the main indication was the prevention of urinary tract infections. Almost 25% of systemic antimicrobials were prescribed at inappropriate doses. The point prevalence of topical antimicrobial prescribing was 6.4% (range 0.0%–22.2%) in PPS1 and 5.9% (range 0.0%–21.1%) in PPS2. The most commonly prescribed topical antimicrobials were chloramphenicol eye preparations in PPS1 and fusidic acid skin preparations in PPS2; treatment with these topical antimicrobials was generally prolonged. More than 25% of all systemic and 55% of all topical antimicrobials were initiated following telephone consultations as opposed to face-to-face consultations.

Conclusions: The prevalence of systemic antimicrobial prescribing in residential homes in NI is relatively high compared with care homes (particularly nursing homes) in other countries. Systemic and topical antimicrobial prescribing is not always appropriate in terms of the doses prescribed and the duration of use. It is apparent that current strategies employed in NI are insufficient to ensure prudent antimicrobial prescribing within this environment.

Keywords: antibiotics, long-term care, care homes, urinary tract infections, systemic antimicrobials, topical antimicrobials

Introduction

Care homes in Northern Ireland (NI) fall into two broad categories: nursing homes and residential homes. Nursing homes provide nursing care along with personal care, whereas residential homes provide personal care only. Fewer comorbidities and better general health may reduce the risk of infection and subsequent antimicrobial prescribing in residential homes compared with nursing homes. However, residents in both nursing and residential homes use communal recreation and dining facilities, require interaction with staff to assist with activities of daily living, and may be frequently transferred to and from hospital, thus influencing the likelihood of acquiring infection.

Research to date in long-term care has focused on nursing homes or dual registered homes, i.e. nursing homes and residential homes combined. A literature search revealed evidence of just one study having reported on antimicrobial prescribing specifically in residential homes: the study focused on the prevalence of long-term care-acquired infections in Italian nursing and residential homes, with some reference to antimicrobial prescribing. In order to address this deficit, two point prevalence studies (PPSs) were conducted in residential homes in NI to determine the prevalence of antimicrobial prescribing and its relationship with resident and facility characteristics. This residential home study differed from other antimicrobial PPSs in care homes in that it investigated topical antimicrobial prescribing in addition to systemic antimicrobial prescribing.

Methods

Recruitment

Ethical approval was obtained from the Office for Research Ethics Committees Northern Ireland. All privately owned residential homes for older people (≥65 years) with 10 or more beds (n=72) were invited via...
letter to participate on a voluntary basis in the two PPSs. Ten beds was
used as the cut-off point, as 55 homes had less than 10 beds and resi-
dent recruitment would have been limited in these smaller homes. Resi-
dential homes that were publicly owned (i.e. in government trust
facilities), had less than 10 beds or were primarily for residents with
learning disabilities, physical disabilities, alcohol/drug dependence and
mental problems other than dementia or sensory impairment were
excluded ($n=161$).

All residents in participating residential homes were invited to partici-
pate in the two PPSs either personally or via their next of kin (if the resi-
dents were deemed incapable of consent). Residents were eligible to
participate if they were present at 8.00 a.m. on the morning of the PPS
days, they had been living in the residential home for at least 24 h (to
ensure that the residents’ care plans and medication administration
records were in place) and written informed consent/assent to partici-
pate had been provided by the resident/next of kin. Residents were
recruited up to and during the day of each PPS.

**Data collection**

Data were collected for each residential home during one single day
between 1 and 30 November 2010 (PPS1) and again between 1 and
30 April 2011 (PPS2). To ensure consistency in data collection, one
pharmacist collected all of the data from the 30 residential homes.
Two data collection documents were completed in each home: the resi-
dential home data collection form (to obtain some general data about
the residential home including the size of the home, the number of occu-
pied beds and the organization of medical care) and the resident data
collection form for each participating resident (to obtain data including
gender, age, comorbidities, mobility, catheterization and influenza vac-
cination history). In addition, details of systemic and/or topical antimicro-
bials prescribed for each participating resident during the PPSs were
recorded on the resident data collection form. Details of prescribing of
antivirals and antiseptics, e.g. chlorhexidine scrub and benzalkonium
lozenges, were excluded. Data were obtained by examining care plans
and medication administration records in the residential homes and
from information provided by staff.

**Data entry and analysis**

A formal sample size calculation was not conducted for this study. We
recruited the same number of homes ($n=30$) as we had done in our pre-
vious nursing home study to facilitate comparison.

The anonymous data from the completed residential home data col-
clection forms and resident data collection forms were entered into SPSS
version 18 and analysed descriptively. Antimicrobial prevalence was cal-
culated first at each individual home level and the mean calculated to
give a combined prevalence. To investigate residential home characteris-
tics, homes were divided into approximate thirds using tertiles, where
possible. ORs with 95% CIs were used to assess the associations
between residential home and resident characteristics and antimicrobial
prescribing. Most of these characteristics were recommended by the Im-
proving Patient Safety in Europe proposal on the surveillance of nursing
home acquired infections in Europe. Pearson’s $\chi^2$ test or Fisher’s
exact test was used as appropriate to determine the statistical signifi-
cance of the generated ORs, with significance set a priori at $ P \leq 0.05$.

The appropriateness of the doses of the antimicrobials prescribed was
determined by comparing the doses prescribed with the recommended
doses listed in the British National Formulary (BNF) (version 62) and
the Northern Ireland Antimicrobial Guidelines for Primary Care. In all
cases the doses listed in the two reference sources were identical, with
the exception of amoxicillin/clavulanic acid, for which the Northern
Ireland Antimicrobial Guidelines recommended a higher dose. This
higher dose was used during analysis.

The duration of treatment was determined from the residential home
medication administration records and/or from the prescribers’ intended
duration of treatment being specifically recorded and/or from the
number of days supplied. The amount of time prophylactic antimicrobials
were prescribed before the residents were admitted to the residential
homes was not known and thus not accounted for. When residents
were on, e.g. day 2 of a 5 day course, it was assumed that the resident
would complete the course. It is possible that some antimicrobial
courses, particularly topical formulations, were continued after the pre-
scriber’s initial intention for treatment. Therefore, the duration of treat-
ment was a crude estimate.

**Results**

**Participants**

Consent was obtained from 30 residential homes, which repre-
sented 41.7% ($n=30/72$) of all eligible residential homes and
12.9% ($n=30/233$) of the total number of residential homes in
NI. The participating residential homes had 850 residents
present in PPS1 and 849 residents present in PPS2. Consent
was provided for 585 and 578 residents in PPS1 and PPS2,
respectively, providing mean consent rates of 68.8% in PPS1 and
68.1% in PPS2. Consent was provided personally by 61.7% of
residents in PPS1 ($n=361$) and 62.8% of residents in PPS2
($n=363$), with the remaining assent provided by next of kin.

**Residential home and resident characteristics**

The characteristics of the 30 participating residential homes are
summarized in Table 1. The residential home managers were
qualified nurses in 14 (46.7%) homes; the remainder were
social workers or had previous management, care or administra-
tive experience. The residential homes had a mean number of 30
beds (range 12–84) and a mean number of 29 general practi-
tioners (GPs) (range 2–74) provided care to the homes
(Table 1). In 29 of the 30 residential homes GPs were reported
to visit only when requests were made. In one residential
home, it was reported that one GP, who cared for approximately
one-third of the residents, made a weekly visit to assess his/her
patients. In several residential homes (PPS1, 13.3%; PPS2, 10.0%)
no medication reviews were carried out. A medication review is ‘a
structured, critical examination of a patient’s medicines with the
objective of reaching an agreement with the patient/patient’s
representative about treatment, optimizing the impact of medi-
cines, minimizing the number of medication-related problems
and reducing waste’. It was reported that the administration
of medication was carried out primarily by care assistants, e.g.
oral and topical formulations, and community nurses, e.g. intra-
muscular and subcutaneous formulations. Only one home
reported that residents were involved in their own medication
administration. When a key contact (a senior member of staff)
in each residential home was asked ‘when a resident has a sus-
pected infection will the GP visit the resident before prescribing
antimicrobials?’, the responses were ‘never/seldom’ (PPS1, 23.3%; PPS2, 30.0%), ‘sometimes’ (PPS1, 40.0%; PPS2, 50.0%) and
‘mostly/always’ (PPS1, 36.7%; PPS2, 20.0%). During both
PPSs, most residential homes (86.7%) had a designated person
in charge of infection control and all staff were reported to
receive annual infection control training.
The majority of residents were female (PPS1, 75.2%; PPS2, 75.6%) and had a mean age of 85 years (PPS1, 84.7 years; PPS2, 84.5 years). Further information on the characteristics of the participating residents is provided in Table 2.

### Antimicrobial prevalence

The mean systemic antimicrobial prevalence for the consenting residential home residents was 9.4% (95% CI 6.3–12.4) in...
PPS1 and 9.2% (95% CI 6.1–12.3) in PPS2, ranging from 0.0% to 33.3% between residential homes during both PPSs. Residential homes 1 and 12 had the highest rates of systemic antimicrobial prescribing in PPS1 and PPS2, respectively, and residential homes 26–30 had no systemic antimicrobial prescribing at all (Figure 1). All systemic antimicrobials prescribed at both PPSs were oral formulations.

The mean topical antimicrobial prevalence for consenting residents was 6.4% (95% CI 4.0–8.7) in PPS1, ranging from 0.0% to 22.2% between homes, and 5.9% (95% CI 3.0–8.0) in PPS2, ranging from 0.0% to 21.1% between homes in PPS2. Residential home 3 had the highest prevalence of topical antimicrobials prescribed in PPS1, but had no topical antimicrobial prescribing in PPS2, while home 29 demonstrated the reverse pattern (Figure 2). Topical antimicrobial prescribing did not follow the same trend as systemic antimicrobial prescribing (Figure 1) for individual homes.

**Antimicrobials prescribed**

Antimicrobials for systemic use [WHO’s Anatomical Therapeutic Chemical (ATC) class J01] represented 89.3% and 96.0% of the total systemic antimicrobials prescribed in November and April, respectively. Antifungals for dermatological use (ATC class D01), e.g. terbinafine, accounted for 5.4% in PPS1 and 2.0% in PPS2, intestinal anti-infectives (ATC class A07), e.g. nystatin, accounted for 3.6% in PPS1, antiprotozoals (ATC class P01), e.g. metronidazole, accounted for 1.8% in PPS1 and antymycotics for systemic use (ATC class J02), e.g. miconazole systemic gel, accounted for 2.0% in PPS2.

In the J01 class, J01E antimicrobials, i.e. sulphonamides and trimethoprim, were most commonly prescribed during both PPSs (Figure 3), followed in descending order by J01C antimicrobials, i.e. β-lactam antibacterials and penicillins, in November and April and J01X antimicrobials, i.e. ‘other antibacterials’,
e.g. nitrofurantoin, in April. When all systemic antimicrobials from all classes were considered, the most commonly prescribed antimicrobial during both PPSs was trimethoprim (PPS1, 28.0%; PPS2, 33.3%). Cefalexin was the second most commonly prescribed antimicrobial in PPS1 (14.0%) and the third most commonly prescribed in PPS2 (12.5%), while nitrofurantoin was the second most commonly prescribed antimicrobial in PPS2 (18.8%) and the third most commonly prescribed in PPS1 (10.0%).

A number of the topical antimicrobials that were prescribed did not have WHO ATC codes due to having multiple active ingredients. For example, Timodine® has four active ingredients. As a result, topical antimicrobial prescribing is not presented according to WHO classification groups but according to the individual antimicrobials prescribed, as shown in Figure 4; an explanation of the proprietary products is provided in Table 3. Chloramphenicol eye preparations (21.9%) were the most commonly prescribed topical preparations in November, while fusidic acid skin preparations, e.g. Fucibet® and Fucidin® (23.5%), were most commonly prescribed in April.

**Indications for antimicrobial prescribing**

The majority of systemic antimicrobials were prescribed for the purpose of preventing urinary tract infections (UTIs) in both PPS1 (39.3%) and PPS2 (46.0%). The total antimicrobials prescribed for UTIs (prophylactic, empirical and following culture samples) accounted for 50.0% and 66.0% of all antimicrobials prescribed in PPS1 and PPS2, respectively. Trimethoprim was the most commonly prescribed antimicrobial for the purpose of preventing UTIs (November, 45.5%; April, 43.5%), followed by cefalexin (November, 27.3%; April, 21.7%) and nitrofurantoin (November, 18.2%; April, 30.4%), while the most commonly prescribed

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**Figure 3.** WHO ATC group J01 antimicrobial subcategories that were prescribed in 30 residential homes in November 2010 and April 2011, expressed as a percentage of the total J01 antimicrobials. J01E, sulphonamides and trimethoprim; J01C, β-lactams/penicillins, e.g. amoxicillin; J01D, other β-lactam antibacterials, e.g. cefalexin; J01F, macrolides, lincosamides and streptogramins, e.g. erythromycin and clindamycin; J01X, other antibacterials, e.g. nitrofurantoin; J01A, tetracyclines, e.g. doxycycline; J01M, quinolones, e.g. ciprofloxacin.

**Figure 4.** The most commonly prescribed topical antimicrobials in 30 residential homes during two PPSs in November 2010 and April 2011, expressed as a percentage of the total topical antimicrobials prescribed.
prescribed antimicrobial for the empirical treatment of UTIs was trimethoprim (80.0%) in November and in April (85.7%).

In PPS1, the treatment of respiratory tract infections (RTIs) was the second most common indication resulting in antimicrobial prescribing (19.6%). The most commonly prescribed antimicrobials for the empirical treatment of RTIs were amoxicillin (November, 45.5%; April, 71.4%) followed by clarithromycin (November, 18.2%; April, 28.6%) and co-amoxiclav (November, 18.2%). In PPS2, three indications were ranked second in terms of the most common indications resulting in antimicrobial prescribing: the treatment of RTIs (14.0%), the treatment of skin/wound infections (14.0%) and the treatment of UTIs (14.0%).

Most topical antimicrobials were prescribed for the treatment of skin/wound infections (PPS1, 62.5%; PPS2, 41.2%) or for the treatment of ‘other’ infections (PPS1, 28.1%; PPS2, 55.9%) such as conjunctivitis and vaginal thrush. Timodine® (see Table 3) (PPS1, 30.0%; PPS2, 21.4%) and fusidic acid (PPS1, 20.0%; PPS2, 35.7%) were most commonly prescribed for skin/wound infections, while chloramphenicol (PPS1, 64.3%; PPS2, 30.0%) was most commonly prescribed for ‘other’ infections, i.e. primarily eye infections.

**Dosing of antimicrobials**

Most antimicrobials were prescribed at appropriate doses in PPS1 (76.8%) and PPS2 (72.0%), when compared with the recommended doses listed in the BNF (version 62)13 and the Northern Ireland Antimicrobial Guidelines for Primary Care.14 All residents who were prescribed cefalexin for the purpose of preventing UTIs (PPS1, n=6) and PPS2 (n=5) received a daily dose of 250 or 500 mg rather than the recommended daily dose of 125 mg. Almost half (PPS1, 50.0%; PPS2, 40.0%) of all residents who were prescribed trimethoprim to prevent UTIs during PPS1 (n=10) and PPS2 (n=10) were prescribed twice the recommended dose, i.e. 200 mg at night rather than 100 mg at night.

All topical skin preparations were prescribed within the recommended dosing frequencies of two- or three-times daily applications during both PPSs. Most residents (85.7%) in PPS1 and all residents in PPS2 who were prescribed chloramphenicol eye drops or eye ointment were not directed to apply them as frequently as recommended in the BNF. The drops were prescribed twice or four-times daily and the ointment twice daily.

**Duration of antimicrobial prescribing**

On average, systemic antimicrobials (excluding all prophylactic antimicrobials and antimicrobials to treat fungal nail infections) were prescribed for 1 week (PPS1, 7.0 days (range 3–17); PPS2, 7.5 days (range 3–24)). However, the majority of residents (PPS1, 50%; PPS2, 80%) who were prescribed trimethoprim to treat UTIs received <7 days of supply, i.e. 3 or 5 days of supply.

Residents were prescribed topical antimicrobials for an average of 4 months (PPS1, 134 days (range 1–1113 days); PPS2, 145 days (range 4–1261 days)). Some residents received chloramphenicol eye preparations for prolonged periods, e.g. 15 and 19 days for treatment and 164 days for prophylaxis. During both PPSs one resident was prescribed Timodine® (nystatin and benzalkonium chloride) for more than 3 years (PPS1, 1113 days; PPS2, 1261 days).

**Antimicrobial prescribing following face-to-face consultation or telephone prescribing**

The majority of systemic antimicrobials prescribed in the residential homes were initiated following GP visits (PPS1, 69.6%; PPS2, 57.9%), some were initiated following telephone calls (PPS1, 26.1%; PPS2, 36.8%) and for the remainder it was not known how the antimicrobial was prescribed. Fewer than half of all topical antimicrobials were prescribed following GP visits (PPS1, 40.0%; PPS2 44.4%), more than half were initiated as a result of telephone consultations (PPS1, 56.0%; PPS2, 55.6%) and in several cases it was not known how the antimicrobial was prescribed.

**Risk factors for antimicrobial use**

When residential home and resident characteristics were investigated, a few significant associations were found to exist with systemic and topical antimicrobial prescribing for one of the PPSs, but not usually for both of the PPSs (Table 4).

**Discussion**

This is the first study to investigate antimicrobial prescribing in residential homes in NI. The point prevalence of systemic and topical antimicrobial prescribing was 9% and 6%, respectively, with marked variation evident between residential homes during both PPSs. The rate of systemic antimicrobial prescribing was lower than that in nursing homes in NI (April 2009, 13%; November, 2009, 11%),13 but considerably higher than that reported for European nursing homes (April 2009, 7%; November, 5%).10 Canadian long-term care facilities (6.0%)9 and Italian residential homes (5%).5 With the exception of the Italian study, a literature search revealed no evidence of any other research having investigated antimicrobial prescribing specifically in residential homes.

On searching the literature there was no information relating to topical antimicrobial prescribing specifically in care homes. Heginbotham10 reported that topical antibacterials accounted for 20.5% of the total number of antibacterials dispensed in primary care (which encompassed prescribing for all patient groups in the community, including care homes) in Wales, while in this study the prescribing of topical antimicrobials specifically for
Table 4. Significant risk factors associated with systemic and topical antimicrobial prescribing in November 2010 and April 2011, expressed as ORs with 95% CIs

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>November (OR, 95% CI), P value</th>
<th>April (OR, 95% CI), P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic antimicrobials and frequency of medication reviews</td>
<td></td>
<td></td>
</tr>
<tr>
<td>several times per year</td>
<td>1.8 (0.8–4.0), P = 0.14</td>
<td>1.7 (0.7–4.3), P = 0.27</td>
</tr>
<tr>
<td>once a year</td>
<td>8.3 (1.0–67.9), P = 0.04*</td>
<td>2.1 (0.6–7.4), P = 0.33</td>
</tr>
<tr>
<td>not formal—on a when required basis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systemic antimicrobials and GPs visiting and examining patients before prescribing antimicrobials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>never/seldom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sometimes</td>
<td>0.4 (0.2–1.0), P = 0.05*</td>
<td>0.6 (0.3–1.3), P = 0.21</td>
</tr>
<tr>
<td>mostly/always</td>
<td>0.4 (0.2–0.8), P = 0.01*</td>
<td>0.4 (0.2–0.8), P = 0.01*</td>
</tr>
<tr>
<td>Systemic antimicrobials and number of months residing in the home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤12</td>
<td>1 (reference)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>13–24</td>
<td>0.4 (0.2–0.8), P = 0.01*</td>
<td>1.3 (0.5–3.3), P = 0.53</td>
</tr>
<tr>
<td>≥25</td>
<td>0.8 (0.4–1.6), P = 0.52</td>
<td>0.9 (0.5–1.8), P = 0.74</td>
</tr>
<tr>
<td>Systemic antimicrobials and wheelchair bound/bedridden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topical antimicrobials and surgery in previous month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not applicable as n = 0</td>
<td>2.8 (1.1–7.1), P = 0.04*</td>
<td>1.1 (0.1–8.8), P = 0.99</td>
</tr>
<tr>
<td>Topical antimicrobials and wounds (not pressure wounds)</td>
<td>38.1 (3.4–432.9), P = 0.008*</td>
<td>not applicable as n = 0</td>
</tr>
<tr>
<td>Topical antimicrobials and pulmonary disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 (0.6–3.6), P = 0.36</td>
<td>2.3 (1.1–5.1), P = 0.03*</td>
</tr>
</tbody>
</table>

*Significant.

older people in residential homes in NI represented 35.5% and 38.8% of all prescribed antimicrobials in November and April, respectively, and may have been the result of the older population having more skin and soft tissue infections.\(^{17}\)

The frequent prescribing of trimethoprim in the residential homes mirrors findings from nursing homes in Europe\(^{10}\) and more specifically in NI.\(^{11}\) The total antimicrobials prescribed for UTIs, including prophylactic, empirical and following culture samples, accounted for >50% of all systemic antimicrobials prescribed. This is similar to the situation in nursing homes in NI,\(^{11}\) Norway\(^{8}\) and Sweden,\(^{18}\) but differs from nursing homes and residential homes in Italy,\(^{5}\) where RTIs were more prevalent than UTIs. During PPS1, most of the topical antimicrobials were prescribed for the treatment of skin/wound infections while in PPS2 most were prescribed for the treatment of conjunctivitis. Clusters of infectious conjunctivitis have been reported in the nursing home environment.\(^{19}\) The English Health Protection Agency’s (HPA’s) guidelines state that only severe conjunctivitis should be treated, as most cases are viral and/or self-limiting.\(^{20}\) It has been reported that some doctors have difficulty in distinguishing between viral and bacterial conjunctivitis\(^{21}\) and this may be a contributing factor to the frequent use of chloramphenicol in residential homes. Most cases of conjunctivitis resolve spontaneously within 5 days\(^{22}\) and a ‘wait and see’ or delayed prescribing approach is advised.\(^{23}\) The appropriateness of frequent use of chloramphenicol eye preparations in residential homes is questionable.

Almost 25% of systemic antimicrobials were prescribed at inappropriate doses and this was primarily related to the prescribing of higher than recommended doses of trimethoprim and cefalexin for the purpose of preventing UTIs. This has also been identified as an issue in nursing homes in NI\(^{11}\) and highlights a learning need for prescribers. Excessive dosages increase the likelihood of adverse drug events, particularly in care home residents.\(^{24}\) Detail on renal function was not obtained during the study as this information was not available in the care plans and medication administration records held in the residential homes. Whether prescribers took account of residents’ renal function in relation to the prescribing of antimicrobials, such as nitrofurantoin, is not known, and this may be an additional factor influencing the appropriateness of doses used in the residential homes.

Almost all residents who were prescribed chloramphenicol eye preparations were given directions for application at a frequency lower than that recommended in the BNF (version 62).\(^{13}\) However, administering eye drops at the recommended frequency of every 2 h may not be practical in terms of staff availability for administration and acceptability to residents. Prescriptions appeared to match administration as there was no evidence of any missed doses in the medication administration records. Adherence to medication is not considered to be an issue in nursing homes in NI and staff tend to control the administration of medication in order to ensure safety, quality and continuity of care.\(^{26}\) This seems to also be the case for residential...
homes, as only one home reported that residents were involved in administration of their own medication.

The BNF (version 62) does not provide any recommendations as to the optimum duration of treatment for most infections, including UTIs, while the Northern Ireland Antimicrobial Guidelines for Primary Care recommend that all men and postmenopausal women who are prescribed trimethoprim or nitrofurantoin for the empirical treatment of UTIs should receive 7 days of supply. GPs are expected to comply with the NI antimicrobial guidelines; however, most residents who were treated empirically with trimethoprim for UTIs received 3 or 5 days of supply. The English HPA and the Scottish Intercollegiate Guidelines Network state that women of all ages who have UTIs should be treated for 3 days and that men should be treated for 7 or 14 days. This highlights an issue for prescribers in terms of conflicting guidelines.

Topical antimicrobials were prescribed, on average, for 2–3 years. One resident had been prescribed 164 days of chloramphenicol eye drops to prevent conjunctivitis, with no information being provided as to any special circumstances warranting prolonged use. In some residential homes, annual medication reviews were not conducted; therefore, it is likely that some residents who were prescribed antimicrobials for long-term use had no follow-up reviews to assess continued appropriateness. Topical antimicrobials used for prolonged periods are likely to select for antibiotic-resistant staphylococci at the skin surface. One UK study reported a significant correlation with intermittent or prolonged use of fusidic acid for 2–3 years. This reinforces the need for the prudent use of all antimicrobials, including topical antimicrobials.

Care homes in NI have a large number of different GPs and GP practices providing care to residents; however, this does not appear to be associated with antimicrobial prevalence. Only one residential home was found to have a system in place where a GP (who cared for one-third of the residents) made a weekly visit. A study conducted in assisted living facilities in the USA found that the rate of inappropriate prescribed medication was associated with the absence of regular physician visits. More than 25% of systemic and 50% of topical antimicrobials were prescribed following telephone consultations. GPs have been encouraged to improve antimicrobial prescribing in NI by conducting audits and the use of antimicrobial guidelines. However, Cochrane reviews have reported that audits and feedback have a small to moderate influence on professional practice and healthcare outcomes and that guidelines are not always adhered to. The PPSs showed that systemic and topical antimicrobial prescribing were not always appropriate in terms of doses prescribed and duration of use; therefore, current methods employed in NI to improve antimicrobial prescribing appear to be insufficient. In the UK, as part of the General Medical Services (GMS) contract, GPs have various Quality and Outcomes Framework (QOF) targets in relation to prescribing, which, if achieved, result in payment to their practice. It has been suggested that reducing antimicrobial prescribing would be a suitable QOF indicator in the GMS contract. Furthermore, the role of a ‘lead GP’ in residential homes should be explored, with possible responsibilities including commissioning services, monitoring residents, ensuring regular medication reviews and liaising with other GPs. A lead GP may improve prescribing and reduce the common practice of telephone prescribing.

Some residential home and resident characteristics were found to have significant associations with antimicrobial prescribing in one of the two PPSs. For example, being wheelchair bound/bedridden was associated with antimicrobial prescribing in PPS1, but not in PPS2. Most of the associations involved small sample sizes and large CIs, thus creating uncertainty about their significance.

Several limitations are associated with this study. For example, full participation of residents was not achieved due to the need to obtain consent/assent, the appropriateness of the prescribed antimicrobials were not assessed in relation to the presence of bacterial/fungal infections and the duration of treatment was a crude estimate. Data collection for each participating nursing home was confined to one specific day in November and April and thus the information is not representative of the previous days and months. However, the data obtained during both PPSs were very similar and PPSs have been used in other nursing home studies and are considered useful surveillance tools. A large number of residential homes were excluded from the study due to having less than 10 beds and/or being publicly owned, although public homes are not known to differ from private homes in NI in relation to the provision of care and antimicrobial prescribing.

Despite several limitations, this research has provided important information about antimicrobial prescribing in residential homes, an under-researched area both in NI and globally.

Conclusions

This is the first known study to report on antimicrobial prescribing prevalence rates in residential homes in NI; a high rate of systemic antimicrobial prescribing has been identified. It is apparent that UTIs are problematic for both residential home and nursing home residents in NI and additional support in this area may prove beneficial. An initial insight into the use of topical antimicrobials in residential homes has been provided and the frequent treatment of conjunctivitis (usually a self-limiting condition) has highlighted an education need for prescribers. The lack of involvement of some GPs in residential homes in NI must be addressed, particularly when less than half of all residential home managers are qualified nurses and there is limited medical experience in this environment.

The extent of antimicrobial resistance in individuals residing in residential homes is currently unknown. The next steps may be to monitor both antimicrobial prescribing and antimicrobial resistance in residential homes, as these factors, along with subsequent education, are important aspects of antimicrobial stewardship programmes.

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Transparency declarations

None to declare.

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