Appropriate medication use in aged residential care: Optimising the use of antibiotics, antipsychotics and fentanyl | Ngā rongoā tika mā ngā kaumātua/kuia: Kia tika te whāngai atu o ngā rongoā paturopi

May 2020 (updated June 2022)

Contents | Ngā ihirangi

Published May 2020 by Health Quality & Safety Commission New Zealand. Updated June 2022. Available online at www.hqsc.govt.nz | Enquiries to: info@hqsc.govt.nz

ISBN: 978-1-98-859975-5 (online)

Glossary and abbreviations | Kuputaka me ngā whakapoto

ACSQHC	Australian Commission on Safety and Quality in Health Care
AHRQ	Agency for Healthcare Research and Quality (USA)
Antimicrobial stewardship	a systems approach to using antimicrobials appropriately
ANZCA	Australian and New Zealand College of Anaesthetists
ANZSGM	Australian and New Zealand Society for Geriatric Medicine
ARC	aged residential care
bpac^{nz}	Best Practice Advocacy Centre New Zealand
BPSD	behavioural and psychological symptoms of dementia
CAUTI	catheter associated urinary tract infection
CFHI	Canadian Foundation for Healthcare Improvement
CI	confidence interval
COPD	chronic obstructive pulmonary disease
Deprescribing	planned and supervised process of reducing or stopping a medication
DHB	district health board
FDA	Food and Drug Administration (USA)
MDT	multidisciplinary team
MRSA	methicillin resistant *Staphylococcus aureus*
MSU	mid-stream urine (a urine sample that does not collect the first or last part of the urine that comes out)
NICE	National Institute for Health and Care Excellence
NSAID	non-steroidal anti-inflammatory
PHARMAC	Pharmaceutical Management Agency Ltd
Polypharmacy	the use of many medicines to treat one individual
prn	as required (medication dosing)
RANZCP	Royal Australian and New Zealand College of Psychiatrists
Urine microscopy	A test that inspects the urine for cells and other abnormalities
Urine culture	A test that multiplies bacteria from the urine, if bacteria are present their sensitivity to antibiotics can also be tested
UTI	urinary tract infection
WHO	World Health Organization

Introduction | Kupu whakataki

The Health Quality & Safety Commission (the Commission) is partnering with the aged residential care (ARC) sector to develop and implement an ARC quality improvement programme. The aims of that programme will be to improve the experience of care for residents and their families and whānau, reduce medication-related harm, reduce variation in patterns of care and support a culture of continuous quality improvement. In the early stages of this work, one focus is polypharmacy (where a health professional prescribes many medications to one individual).

This report focuses on optimising the use of the following medicines in ARC:

- antibiotics for urinary tract infection (UTI) to ensure appropriate antimicrobial prescribing
- antipsychotics for behavioural and psychological symptoms of dementia (excluding antipsychotic use in those older people with other mental health conditions)
- fentanyl for chronic pain (excluding its use in end-of-life care).

Optimising medication use is consistent with the impact areas of the Ministry of Health's 2015 Medicines New Zealand Implementation Plan as well as its 2016 Healthy Ageing Strategy. It is also consistent with the principles of Choosing Wisely and should help to avoid problematic polypharmacy.

A King's Fund report on polypharmacy in the United Kingdom in 2013 (Duerden et al 2013) defines polypharmacy as follows.

- **Appropriate polypharmacy** is prescribing for an individual for complex conditions or for multiple conditions in circumstances where the prescriber has optimised medicines use and prescribed the medicines according to best evidence.
- **Problematic polypharmacy** is prescribing multiple medications for an individual inappropriately, or where the medication does not achieve the intended benefit.

The King's Fund report identified that appropriate evidence-based polypharmacy can lead to increased quality of life, but that problematic polypharmacy is common (Duerden et al 2013). Action is needed on several fronts, involving collaboration between residents of ARC, managers of ARC, doctors, nurses and pharmacists.

As the King's Fund report also identified, it is important to know when and how to prescribe medicines for older people, who are more likely to experience multi-morbidity. If clinicians with up-to-date knowledge do not conduct regular medication review, there is a risk that treatment may be ineffective at best and harmful at worst (Duerden et al 2013).

Prescribers should prescribe medicines for evidence-based indications, at the right dose, for the appropriate duration and for the right person. This report outlines and provides advice on how the use of antibiotics, antipsychotics and fentanyl in the ARC setting may not always be appropriate.

To help reduce problematic polypharmacy and enhance the safety of care in the ARC setting, it is important to use these medicines only:

- based on evidence and guidelines
- with appropriate documentation and review
- with a view to deprescribing when they are no longer of benefit.

The general guidance in this report is likely to apply to most residents most of the time, offering an approach to the management of residents from a population health perspective. Given that clinical care is nuanced, however, it is also important to modify practice when context demands it.

Inappropriate prescribing can occur for reasons beyond lack of knowledge of evidence and guidance. Systemic factors such as inadequate staffing levels, lack of availability of appropriate dementia care facilities, and lack of training for staff in a facility with high turnover can all put pressure on prescribers. In addition to raising awareness of evidence and guidance, approaches that build staff capability, leadership, teamwork, communication and critical thinking may all be needed to support appropriate prescribing.

Methodology

To compile this report, we used a rapid evidence review, which aims to find the high-level literature summarising the evidence in the field. For this purpose, the search prioritised review articles, meta-analyses, and guidelines developed through literature review and expert consensus. The search, therefore, is targeted rather than exhaustive.

We also consulted an expert panel of pharmacists, nurse practitioners and doctors working in ARC. The expert panel answered questions and reviewed the draft report.

Expert panel

We consulted the following expert panel members in preparing this report:

Julia Brookes (clinical pharmacist, residential aged care, Waitematā DHB)

Matthew Croucher (chair of the NZ Dementia Cooperative, psychiatrist of old age, Canterbury DHB)

Julie Daltrey (nurse practitioner, University of Auckland)

Jo Hikaka (pharmacist and doctoral candidate, School of Pharmacy, University of Auckland)

Brendan Ng (geriatrician, Capital & Coast DHB)

Kathleen Potter (medical researcher, Ryman Healthcare)

Bernadette Rehman (clinical pharmacist, residential aged care, Waitematā DHB)

Bridget Richards (nurse practitioner and chair, New Zealand Nurses Organisation Gerontology Nurse Specialists)

Maree Todd (quality and risk, Bupa Care Services New Zealand, and geriatrician, Auckland DHB)

Managing suspected urinary tract infection (UTI) in aged residential care | Te whakahaere poke aramimi (UTI) i te wāhi tiaki kaumātua

Overview

Key messages

1. An antimicrobial stewardship policy and programme at ARC facilities should govern the use of antibiotics for UTI in order to minimise the increasingly serious problem of antimicrobial resistance.
2. Follow evidence-based practices that include hand hygiene and mechanical prevention strategies (eg, catheter care) to prevent UTIs.
3. Staff should have education about formal criteria for diagnosing UTI, including appropriate documentation.
4. We do not recommend using urine dipsticks for diagnosing UTI in ARC because they have a very high false positive rate.
5. If you suspect a UTI, use a diagnostic strategy and formal criteria and consider empirical antibiotics if defined red flags are present.
6. When antibiotics are required, avoid overtreatment by following local antibiotic prescribing guidelines, use a narrow spectrum agent, and modify the treatment and duration once you know the mid-stream urine (MSU) test culture and sensitivity result.
7. In rare cases where a resident may need antibiotic prophylaxis, consider specialist consultation and prescribing.

Resources for further reading (full text)

- Jump et al. 2018. Infectious diseases in older adults of long-term care facilities: update on approach to diagnosis and management
- Meddings et al. 2017. Systematic review of interventions to reduce urinary tract infection in nursing home residents
- bpac^{nz}. 2015. A pragmatic guide to asymptomatic bacteriuria and testing for urinary tract infections (UTIs) in people aged over 65 years
- Australian National Centre for Antimicrobial Stewardship: Example policy for the aged care setting
- Health Quality and Safety Commission. 2022. A guide to improving use of antibiotics in the management of urinary tract infections in aged residential care.

This following section on managing suspected UTI in ARC presents a background review of relevant evidence and practice as of May 2020. The review was commissioned by the Health Quality & Safety Commission to help inform the development of national care quality improvement recommendations. Under the leadership of a steering group the Commission subsequently prepared a 'how-to guide' (2022) for improving use of antibiotics in the management of urinary tract infection. The guide was produced following testing of the relevant interventions at several ARC facilities across the country and includes a measurement plan. In addition to drawing on the evidence below, this guide was informed by evidence, stories and the learnings of the project team, ARC staff, residents and whānau. Where the content of A guide to improving use of antibiotics in the management of urinary tract infections in aged residential care differs from the content of the evidence review below, footnotes have been added to provide the relevant context.

Background

This section deals with the use of antibiotics for urinary tract infection (UTI) in aged residential care, focusing largely on uncomplicated UTI. Antibiotic use is common in ARC; for example, 69 percent of ARC residents in New Zealand received a course of systemic antibiotics in 2017 (Health Quality & Safety Commission 2019). Urinary tract infection (UTI) is one of the most common infections diagnosed in ARC (Nicolle 2016). However, not all bacteria in the urine are harmful, and residents without urinary symptoms do not need investigation or treatment (bpac^{nz} 2015; Zalmanovici Trestioreanu et al 2015). The prevalence of asymptomatic bacteriuria may be as high as 50 percent among females in ARC (Nicolle et al 2005) and 80 percent among those with incontinence (Biggel et al 2019); in addition, all residents with indwelling catheters can be assumed to have bacteria in their urine (bpac^{nz} 2015). Together, these findings mean that the chance of urine testing positive for bacteria is very high among ARC residents. As a result, up to three quarters of prescriptions for UTI that prescribers give in ARC are for residents who do not meet the criteria for UTI (D'Agata et al 2013) and over half of antibiotic courses administered in ARC may be unnecessary or excessively broad spectrum (Jump et al 2018).

Inappropriate use and overuse of antibiotics is a major threat to health care globally because it contributes to antibiotic resistance and *Clostridium difficile* infection (Jump et al 2018). A study of positive urine cultures and sensitivity to antibiotics from ARC residents in the United Kingdom from 2010–2014 revealed they had more than four times the rate of *E. coli* and *Klebsiella* UTI caused by antibiotic-resistant bacteria compared with non-ARC adults (Rosello et al 2017). Antibiotic resistance is an increasingly serious problem in New Zealand (Royal New Zealand College of General Practitioners 2015; Thomas et al 2014) and has the potential to limit the effectiveness of future medical care. The New Zealand Ministry of Health has an antimicrobial resistance policy and Antimicrobial Resistance Action Plan.

In addition to the risk of antimicrobial resistance, prescribing antibiotics for those who do not need them can cause harm by having adverse effects such as diarrhoea, nausea and allergic reactions. Using antibiotics when they are not needed also involves a cost.

Current practice

International practice

Internationally, deficiencies in the diagnosis and treatment of UTI in ARC follow a pattern. For example, prescribers have:

- used antibiotics to treat asymptomatic patients
- made a diagnosis on the basis of positive urine culture alone
- not de-escalated or adjusted treatment once they knew the results of laboratory investigations such as culture
- provided treatment for an inadequate duration (Falcone et al 2019; Haaijman et al 2018; Lemoine et al 2018).

A study of 591 nursing homes in Ontario found highly divergent urine culturing rates, and this variability was associated with higher antibiotic use and rates of *C. difficile* infection (Brown et al 2019). In the Netherlands, in 75 percent of cases involving urine culture there was a discrepancy between the actions that seemed logical based on the culture results and the actions that prescribers actually took (Haaijman et al 2018).

In one prospective study, prescribers de-escalated treatment in only two out of 157 possible cases as further test results became available (Lemoine et al 2018) and prescribers rarely stop antibiotics (Kistler et al 2017). Non-specific symptoms and signs often influenced prescribing rather than urinary symptoms and signs (Kistler et al 2017).

In the United States, researchers have reported that treatment rates vary across 161 nursing homes by up to 10 times; in addition, prescribers use both long-duration prophylactic antibiotics that are not supported by evidence and antibiotic classes such as fluoroquinolones that are associated with adverse effects in the elderly (Thompson et al 2020). Another study has described substantial misunderstandings among staff about managing asymptomatic bacteriuria (Drekonja et al 2019).

An Australian survey of 407 aged care homes and multi-purpose services in 2018 found that prescribers did not document the indication for antibiotics in 25 percent of prescriptions and did not document the review or stop date in 59 percent of prescriptions (ACSQHC 2019). In light of evidence, the Australian Commission on Safety and Quality in Health Care (ACSQHC) has concluded that antimicrobial stewardship activities targeting UTI prophylaxis for longer than six months, and excessive daily doses of cefalexin to treat cystitis could significantly reduce unnecessary antibiotic consumption among Australian residents of aged care facilities (Dowson et al 2019).

New Zealand practice

In New Zealand, an analysis of urine sample testing in those aged over 70 years who were living in the community in the Auckland region found that over a third of samples may have had no clear clinical indication for testing (Upton et al 2016). Another study of symptomatic women with uncomplicated cystitis revealed that most prescriptions for first-line antibiotics (trimethoprim and nitrofurantoin) did not comply with New Zealand guidance on dose and duration for treatment (Gauld et al 2016). Although neither study used data from ARC, their findings suggest a pattern of testing and prescribing that does not follow guidance.

Overall, in New Zealand, people in the community consume a comparatively high level of antibiotics, which is encouraging the spread of antibiotic-resistant bacteria. Unfortunately ethnic disparity exists in this practice. Māori and Pacific peoples have only moderately higher rates of antibiotic dispensing despite higher rates of infectious diseases when compared with people of European, Middle Eastern, Latin American or African, or Asian ethnicity (Whyler et al 2018). Further research is needed to find out whether this data means that Pacific peoples and Māori are under-prescribed antibiotics or whether people of other ethnicities are overprescribed them. However, prescribers should take into account that reducing access to antibiotics for Māori and Pacific peoples despite their greater need has the potential to worsen disparities in health outcomes, compared with the non-Māori, non-Pacific population, when considering appropriate interventions for antibiotic prescribing in ARC.

Hutt hospital has reported on an effort to stop unnecessary treatment of asymptomatic bacteriuria. It aimed to reduce clinically inappropriate urine culture requests by removing urine dipsticks from wards as well as providing staff education on using Choosing Wisely principles. The result was a 28 percent reduction in monthly urine culture requests for inpatients as well as annual savings of at least $41,760 (Wilson et al 2019). Several ARC facilities in New Zealand have tried a similar strategy, with audits showing consistent reductions in antibiotic use of 60–70 percent (B Harris, personal communication, 19 January 2020).[1]

New Zealand Atlas of Healthcare Variation

The New Zealand Atlas of Healthcare Variation tracks how the provision and use of specific health services and health outcomes varies across different geographical areas. The Atlas provides the following evidence relevant to UTI in ARC.

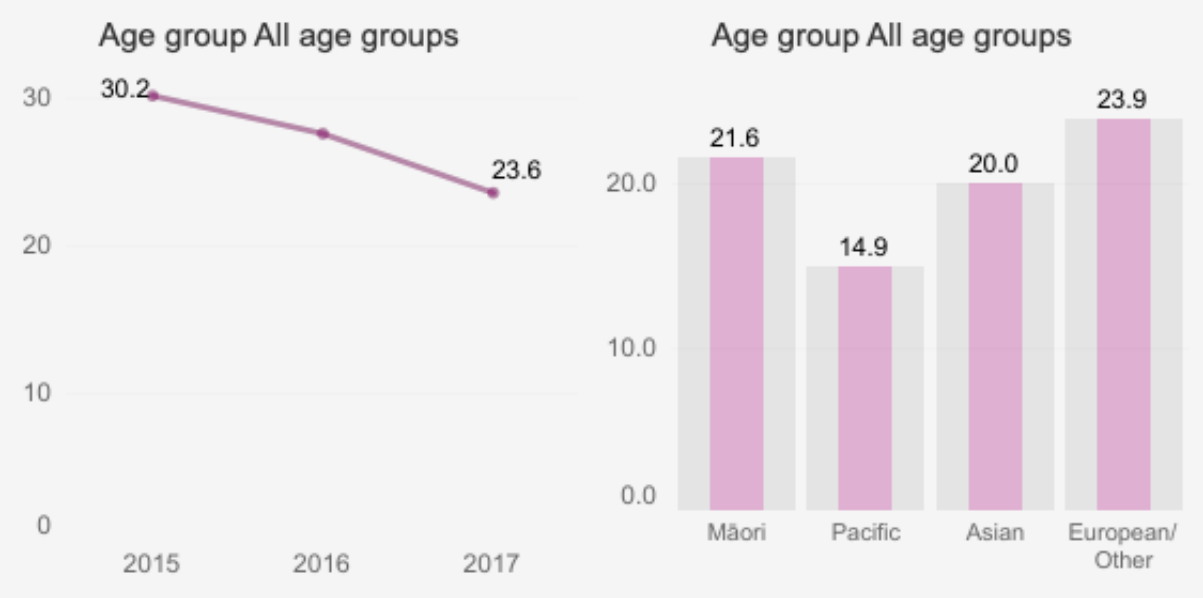
- Of those aged 85 years and over living in ARC, 70 percent received an antibiotic in 2017.
- The rate of dispensing antibiotics specifically indicated for UTIs increased sharply with age and for people living in ARC.
- Dispensing rates for antibiotics were higher among people living in ARC than among those living in the community.
- In those aged 85 years and over living in ARC, district health board (DHB) dispensing rates ranged from 55 to 83 percent, with an average rate of 70 percent. Three DHBs had statistically significantly higher dispensing rates than the average. These rates compare with a national average of 57 percent for people aged 85 years and over living in the community.
- The rate of antibiotics dispensed for a UTI varied according to where people live: for those aged 65–74 years, 6 percent of people in the community received an antibiotic for a UTI compared with 20 percent of those living in ARC.
- In the community, dispensing was six times higher in women than men and was statistically significantly higher in those of European/Other ethnicity. Female ARC residents received 1.6 times more UTI antibiotics than male ARC residents.

[1] Ben Harris is a medical laboratory scientist (microbiology – Canterbury SCL).

Among residents of all ages in ARC, the dispensing rates for an antibiotic specifically indicated for UTI have been moving downwards, from 30.2 per 100 in 2015 to 23.6 in 2017. However, data appears to suggest that the rate for European/Other ethnicity (23.9) remains higher than that for Māori (21.6) and much higher than that for Pacific peoples (14.9) – see Figure 1.

Up-to-date analysis on dispensing of antibiotics specific to UTI in the ARC setting can be found on the Atlas of Healthcare Variation Community antibiotic use landing page.

Figure 1: Aged residential care residents receiving an antibiotic specifically indicated for UTI in New Zealand, 2015–17



Source: New Zealand Atlas of Healthcare Variation (Health Quality & Safety Commission 2019).

Managing UTI in ARC – what the evidence indicates

Diagnosis of UTI

Do not try to diagnose residents without symptoms

A Cochrane systematic review of antibiotics for asymptomatic bacteriuria found that treating those without symptoms has no benefit (Zalmanovici Trestioreanu et al 2015). Therefore, health professionals should usually not undertake investigations such as urine testing in the absence of urinary tract symptoms (bpac^{nz} 2015; Lim et al 2015). Furthermore, treating asymptomatic patients is associated with increased antimicrobial resistance (Das et al 2011).

Avoid using urine dipsticks in the ARC setting

Given the high rate of asymptomatic bacteriuria and pyuria in the ARC setting, the dipstick test can only ever be useful when it is negative in the context of fever or systemic (non-genitourinary) symptoms. In these cases, a negative dipstick rules out UTI and suggests another source of infection. But if the dipstick is positive and the resident has fever, then it directs the investigation towards UTI even though another source of infection is more likely. Urinary infection caused fever without localising findings in only 10 percent of episodes in

bacteriuric residents (Orr et al 1996). The danger of using dipstick testing is that health professionals may overlook other sources such as upper or lower respiratory tract infection, ulcers or wound infections. They should not use dipstick testing to diagnose UTI in the ARC setting.[2]

Criteria for clinical diagnosis

Consensus criteria for diagnosing UTI in ARC are available (eg Loeb et al 2001), Surveillance criteria have also been established (eg McGeer et al 1991, Stone et al 2012). Several organisations, including the Agency for Healthcare Research and Quality, Public Health Ontario and South Australia Health, recommend some variation of these criteria.

Studies show that using formal criteria for initiation of an antibiotic for urinary tract infections in the long-term care setting improves recognition of asymptomatic bacteriuria and reduces inappropriate antibiotic use in this vulnerable population (Loeb et al 2005). Figure 2 is one previously published example of how such criteria can be formulated algorithmically (Crnich 2014). The figure outlines appropriate management of suspected UTI in ARC and when to prescribe antibiotics based largely on the Loeb criteria.[3] For additional information about care of residents with suspected UTI, see the Health Quality & Safety Commission's Frailty care guide on UTI.

Diagnosis of UTI can be difficult in ARC because many residents have chronic genitourinary symptoms and functional disabilities (Genao and Buhr 2012). However, evidence does not support diagnosis of UTI when symptoms are non-specific and not localised to the urinary tract, even when urine cultures are positive (Sundvall et al 2011). Because there are some exceptions to this, health professionals should use their clinical judgement for residents with conditions such as renal calculi, urinary obstruction and urinary tract stents.

[2] The Commission's 'how-to guide' (2022) reiterates that dipsticks should not be used to diagnose a UTI but may be used to rule one out in appropriate clinical circumstances.

[3] Following the project team's review of the evidence presented in this document, as well as additional engagement with the ARC sector, under the guidance of the steering governance group, a locally relevant decision tool was developed based on the McGeer criteria and Public Health Ontario's UTI assessment algorithm. This tool can be found in the appendix of the 'how-to guide' (2022) and is recommended for use in ARC in Aotearoa New Zealand.

Figure 2: Example of an algorithm for managing UTI in aged residential care

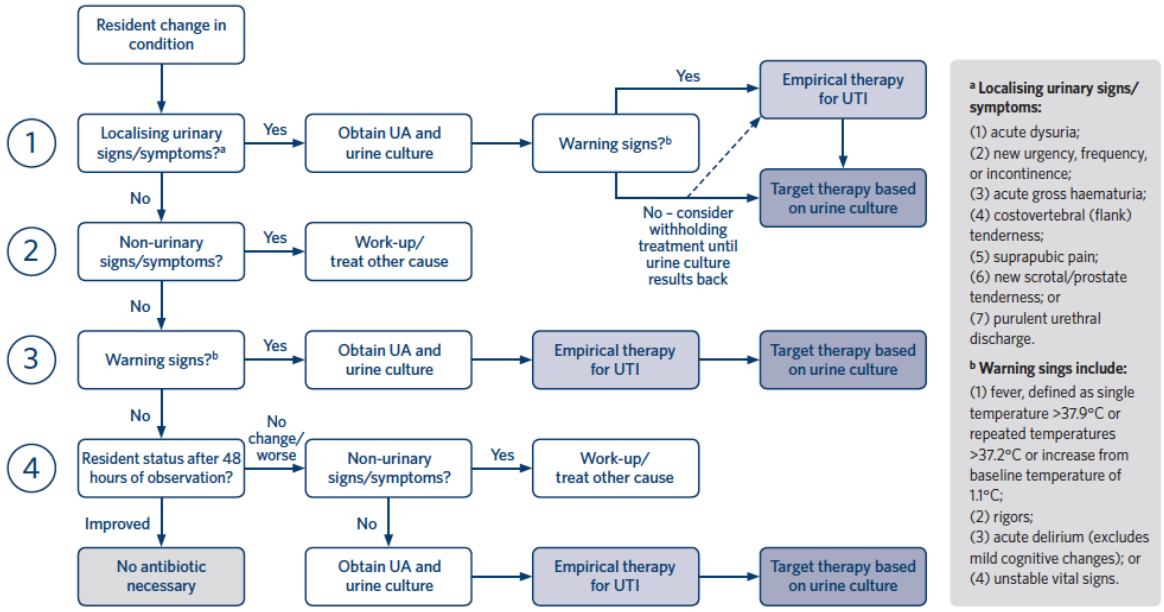


Figure: Unified algorithm for the diagnostic evaluation and treatment of suspected UTIs in nursing homes. *(Crnich and Drinka, 2014)*
Abbreviations: UA, urinalysis; UTI, urinary tract infection.

Source: Crnich and Drinka (2004)

Dementia and delirium

Communication barriers may also make it difficult to diagnose UTI. Mental deterioration and falls are not usually indicators of UTI when isolated, and it is usually not possible to attribute non-localising symptoms to UTI even if the urine culture is positive because of the high background rate of bacteriuria in the ARC population (Jump et al 2018).

UTI causes only 5–8 percent of delirium cases. Delirium (often diagnosed as behavioural and psychological symptoms of dementia – BPSD) may respond to hydration. It is reasonable to observe elderly residents with acute mental status changes accompanied by bacteriuria and pyuria, without clinical instability or other signs or symptoms of UTI, to establish whether their confusion resolves over 24–48 hours without antibiotics, while searching for other causes of their confusion (Schulz et al 2016).

A review of four consensus statements reported that none of them cites delirium alone as a reason to culture the urine or initiate antibiotics for a UTI (Finucane 2017). This guidance and these consensus statements ‘do not recommend testing for, making the diagnosis of, or treating a “UTI” in otherwise asymptomatic, non-catheterized long-term care residents who become delirious, even if they are febrile’. Antibiotic treatment for the combination of fever and delirium is accepted, regardless of urinary tract findings, but this is based on the likelihood of non-urinary infection and the choice of antibiotic should reflect this likelihood. The algorithm in Figure 2 (above) provides for empirical treatment in residents with acute mental state changes at step 3 following on from ‘Warning signs?’.

Urine culture

Given the potential for resistant organisms, consider sending urine for microscopy and culture from all residents in ARC who meet the clinical criteria for UTI (as in Figure 2).[4] A negative microscopy effectively rules out the diagnosis and has a 95 percent negative predictive value (High et al 2009); however, pyuria on microscopy does not diagnose UTI. A positive culture supports the diagnosis if the resident also meets the clinical signs and symptoms criteria.

Use urine culture and sensitivity testing to improve antibiotic selection and reduce the spread of multidrug-resistant organisms (bpac^{nz} 2015). Specify clinical details and the indication for testing on the laboratory request. Consider delaying antibiotics until you know the culture and sensitivity results. These results should inform your choice of treatment. If symptoms have not persisted, then the resident may no longer require antibiotics. However, if the resident shows warning signs or symptoms or has relevant difficulties in communicating symptoms, or there will be a substantial delay before you can perform a urine culture, then obtain a urine specimen, consider beginning treatment and adjust the treatment when you know the laboratory results. This action may be necessary because there is a real risk of sepsis and mortality.

Refer to comprehensive guidance on the diagnosis of UTI in ARC residents. This guidance is available in:

- an update on the approach to diagnosis and management of infectious diseases in older adults of long-term care facilities (Jump et al 2018)
- local New Zealand guidance on a pragmatic approach to asymptomatic bacteriuria and testing for UTI (bpac^{nz} 2015).

Indwelling urinary catheter

Nearly all residents with an indwelling catheter will have bacteria in their urine. Catheter associated UTI (CAUTI) may present with fever alone and symptoms may not localise to the urinary tract. If you are considering UTI, send a voided urine sample for analysis. If you cannot obtain a voided specimen, then obtain one from a new catheter.

Antibiotics for UTI

Antimicrobial stewardship

Antimicrobial stewardship is ‘an organisational or healthcare system wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness’ (bpac^{nz} 2017a). It is one response to the emerging global antimicrobial resistance emergency. Antimicrobial stewardship emphasises an evidence-based prescribing practice in order to prevent antimicrobial resistance and should be in the foreground of treatment decisions.

The Loeb consensus indicates that prescribers should initiate antibiotics for presumed urinary infection only with presentations of acute dysuria or where there is fever (> 37.9°C)

[4] For the clinical criteria recommended by the Commission following sector engagement, overseen by the steering governance group, see *A guide to improving use of antibiotics in the management of urinary tract infections in aged residential care* (2022).

with one of: new or worsening urgency, frequency, suprapubic pain, gross haematuria, costovertebral angle tenderness or urinary incontinence (Loeb et al 2001). The algorithm in Figure 2 gives one example of how to determine when to start antibiotics.[5]

Recent evidence from one cohort study of elderly in primary care indicates that early antibiotics (as opposed to a watch and wait approach) is associated with a decrease in all-cause mortality, adjusted hazard ratio 1.16 (1.06–1.27) (Gharbi et al 2019). Therefore, in the presence of clear clinical diagnostic criteria for UTI, antibiotics may be appropriate for most older adults.

Antibiotic selection

Where residents meet the diagnostic criteria for UTI and initiation of antibiotics, treat them with an antibiotic selected in line with local guidance that takes account of local pathogens and antimicrobial resistance patterns. Review treatment and modify it if necessary based on the results of urine culture and sensitivity.

You may consider empirical treatment if substantial delays in obtaining laboratory results are likely or if there are compelling reasons to initiate treatment immediately, such as red flags or resident deterioration. In the absence of any immediate harm, you might try alkalinisation of the urine to alleviate symptoms and encourage hydration.

bpac^{nz} (bpac^{nz} 2017b) offers local antibiotic guidance for New Zealand. First-line treatment in New Zealand, as of August 2019, is with nitrofurantoin or trimethoprim. Prescribers may prefer trimethoprim in the ARC setting due to potential for renal impairment (bpac^{nz} 2017c) and the likelihood that no recent renal function test results are available. Nitrofurantoin is not advised if the creatine clearance is < 60 mL/min (bpac^{nz} 2017c). Avoid fluoroquinolones (Lim et al 2015). Dose and treatment duration should be consistent with guidance and the shortest effective course is preferred (bpac^{nz} 2018a). When considering antibiotics, take account of the severity of symptoms, risk of complications, previous urine culture and sensitivity results, and previous antibiotic use that may have led to resistant bacteria.

Treatment adjustment

Review treatment once urine culture and sensitivity results are available, considering whether to de-escalate treatment or narrow the spectrum as well as the need for continued treatment. If susceptibility testing indicates resistance to commonly available antibiotics, guidance suggests discussing treatment with a clinical microbiologist or infectious diseases specialist (bpac^{nz} 2015). Document variations.

Indwelling catheter

If fever is the only symptom in residents with an indwelling catheter, then waiting may be appropriate because up to two-thirds of these elevated temperatures can resolve within 24 hours (Warren et al 1987).

[5] Refer to *A guide to improving use of antibiotics in the management of urinary tract infections in aged residential care* (2022) for local recommendations on diagnosis and treatment of UTI in ARC.

UTIs in men

Always consider UTIs in men to be 'complicated'. They are associated with a more diverse range of causative bacteria and warrant longer treatment regimens. You could consider male residents with UTIs for further investigation if appropriate (bpac^{nz} 2015).

Antibiotics for prophylaxis of UTI

A review of infectious disease in ARC made clear that health professionals should avoid prophylactic antimicrobial therapy for women or men with recurrent UTI infection because it does not decrease the frequency of symptomatic infection (Jump et al 2018). A systematic review of interventions to prevent UTI in nursing home residents found that antimicrobial prophylaxis should not be recommended for those with indwelling catheters (Meddings et al 2017). bpac^{nz} advice agrees that prophylactic treatment is a 'last resort' (bpac^{nz} 2015). First try other treatments such as topical oestrogen for atrophic vaginitis. There is some opinion in New Zealand that health professionals should prescribe prophylactic antibiotics for UTI in consultation with an infectious disease specialist. Either way, always consider the principles of antimicrobial stewardship.

Additional information

The 'Resources for further reading' in the Overview section above contain additional information on diagnosing, treating and preventing UTI in ARC. Subjects include special cases such as complicated UTI, non-resolving UTI, UTI in diabetics, UTI in men and the management of those with indwelling catheters.

Cost-effectiveness considerations

Suspected UTI is a major reason for antibiotic prescribing in ARC. Therefore protocols that should offer good return on investment are those that aim to limit both:

- urine testing where the probability of UTI is low
- antibiotic therapy in cases with no clear symptoms or signs.

A systematic review in 2014 found that implementation of antimicrobial stewardship programmes in hospitals has been associated with reduced use of targeted antibiotics, reduced incidence of *C. difficile* and multidrug-resistant organisms, and significant cost savings (Wagner et al 2014). Infection prevention programmes to reduce catheter associated UTIs may also save costs (Hutton et al 2018).

A United Kingdom cost-effectiveness study estimated trimethoprim was the most cost-effective treatment when resistance was less than 30 percent. However, at higher levels of resistance, this was not the case. Knowing local resistance levels is key to effective and cost-effective empirical prescribing (Sadler et al 2017), and cost-effectiveness in New Zealand should be investigated.

Locally in New Zealand, anecdotal as well as unpublished evidence suggests that removing urinary dipsticks from ARC facilities has dramatically cut the measured rate of UTI diagnoses. It has also led to an unmeasured but implied significant reduction in pressures

towards antimicrobial resistance, toxicity issues and diarrhoea, which in turn has probably reduced all these associated costs.[6]

Possible interventions and recommendations

The evidence outlined above suggests that, to ensure antimicrobial use is evidence-based, a bundle of interventions should target the inappropriate use of antibiotics in ARC through:

1. preventing UTI
2. using diagnostic criteria for UTI
3. implementing antimicrobial stewardship programmes.

In addition, the evidence indicates the need for staff education in each of these three areas.

1. Preventing UTI

A systematic review of interventions to reduce the incidence of UTI in ARC residents found evidence for the following interventions (Meddings et al 2017).

Interventions that may be effective

The following interventions **may** be effective in reducing UTI incidence:

- **hand hygiene** alone or as part of care bundles, which may decrease CAUTIs and methicillin resistant *Staphylococcus aureus* (MRSA) UTIs
- **treatment of atrophic vaginitis** with topical oestrogens, which may decrease recurrent UTIs in post-menopausal residents of ARC facilities
- **interventions to improve management of urinary incontinence**: education, protocols, and interventions by incontinence specialists may decrease UTIs in those with urinary incontinence
- **effective infection control programmes** including hand hygiene, surveillance of nosocomial infections and encouraging reduced catheter use, which may reduce CAUTI in ARC facilities
- interventions around the use of urinary catheters to:
  - reduce unnecessary urinary catheter placement
  - improve catheter insertion technique
  - improve choices of catheter type
  - promote washing hands and putting on gloves before catheter or bag care
  - ensure appropriate placement of catheter bag so that it is below the bladder but not on the floor
  - avoid equipment sharing between catheterised residents
  - spatially separate catheterised residents
  - remove unnecessary catheters.

[6] This paragraph is based on the expert opinion of Ben Harris, medical laboratory scientist (microbiology – Canterbury SCL).

Interventions unlikely to be effective

The following are **not** likely to be effective in reducing UTI incidence:

- antimicrobial prophylaxis for chronically catheterised residents
- other chronic chemoprophylaxis (eg, with methenamine)
- fluid intake for the purpose of preventing infection[7] (although fluids have other benefits)
- improving general resident hygiene
- cranberry products as UTI prophylaxis
- vitamin products as UTI prophylaxis
- different catheter tip configurations
- routine perineal cleaning with antiseptics
- irrigations and washouts of indwelling catheters
- routine catheter replacement.

Catheters and prevention of CAUTI

A Cochrane systematic review concluded that the evidence is currently insufficient to assess how various policies for replacing long-term urinary catheters affect outcomes (Cooper et al 2016). However, the introduction of an evidence-based catheter protocol, along with web education materials, in long-term care has been associated with a decrease in CAUTI of 74 percent (absolute risk reduction 3.58 infections per 1,000 catheter-days, $p < 0.03$) (Zurmehly 2018). These results may reflect a low baseline level of knowledge on how to care for residents with indwelling catheters; if so, educational interventions may need to address this issue.

Care bundle approaches show promise. In the United States, a randomised controlled trial and then a nationwide programme after it used one bundle that emphasised professional development around the use of urinary catheters, along with practising antimicrobial stewardship and promoting a culture of teamwork around resident safety. This approach reduced overall multidrug-resistant organisms by 23 percent, new MRSA acquisition by 22 percent and clinician-diagnosed CAUTIs by 31 percent (Mody et al 2015). CAUTI rates fell by 54 percent across 500 residential facilities (incidence rate ratio 0.46; 95% confidence interval (CI) 0.36–0.58, $p < 0.001$). The number of urine cultures ordered for all residents decreased by 15 percent (Mody et al 2017).

2. Using diagnostic criteria for UTI

Various organisations have published and adapted diagnostic criteria for UTI; for example, the Health Quality & Safety Commission has produced the 2019 Frailty care guide on UTI. No set of criteria will be completely reliable so clinical judgement will always be important when making the decision to diagnose UTI or initiate an antibiotic. However, the practice of using evidence-based criteria and following a diagnostic strategy is probably more important

[7] However, a subsequent study on hydration/structured drink rounds indicated that this approach may prevent UTI and reduce hospitalisation (Lean et al 2019).

than the choice of which particular set of criteria to use. Figure 2 above combines both diagnostic criteria and a pathway to initiation of an antibiotic.[8]

Ben Harris (personal communication, 19 February 2020) has suggested that:

> Quality improvement efforts focused on standardizing the resident assessment process and restricting use of urinalysis and culture to residents with a reasonable likelihood of a UTI will go a long way toward reducing the frequency of the antibiotic cascade seen in [ARC] facilities.

3. Implementing antimicrobial stewardship programmes

Antimicrobial stewardship programmes promote the safe prescribing of antimicrobials, which includes antibiotics, in order to reduce the antibiotic resistance of micro-organisms. In a review of antimicrobial stewardship programmes in ARC (Falcone et al 2019), high-quality cluster randomised controlled trials and low- to moderate-quality quasi-experimental studies showed educational interventions directed at nurses and physicians are effective in reducing unnecessary antibiotic prescriptions.

One prospective cluster randomised controlled trial included 1,600 ARC residents in the United Kingdom. It found that antimicrobial stewardship tools can decrease antimicrobial use in ARC by 4.9 percent (95% CI 1.0–8.6, $p=0.02$) (Fleet et al 2014). Additionally, programmes of education along with simple clinical decision aids (Lee et al 2018) and workshops, webinars and coaching calls (Salem-Schatz et al 2019) have reduced urine culture ordering, antimicrobial prescribing for asymptomatic bacteriuria, and *C. difficile* infection rates.

What other jurisdictions have done

Public Health Ontario

Public Health Ontario has developed an Implementation Guide to support the ARC sector to implement a UTI programme. A pilot of the programme across 10 facilities in 2016–2017 reduced urine culturing rates by 29 percent, urinary antibiotic prescription rates by 41 percent and total antibiotic prescription rates by 27 percent (Public Health Ontario 2018). Best practices the programme emphasises include:

- obtaining urine cultures only when residents have the indicated clinical signs of UTI
- prescribing antibiotics only when residents meet specified criteria
- reassessing antibiotic treatment once urine culture and sensitivity results are available
- avoiding the use of dipsticks to diagnose UTI.

[8] See the Commission's *A guide to improving use of antibiotics in the management of urinary tract infections in aged residential care* (2022) for criteria developed and tested in conjunction with the ARC sector in New Zealand.

Australian Commission on Safety and Quality in Health Care

Following the results of the 2018 Aged Care National Antimicrobial Prescribing Survey, the ACSQHC made the following recommendations, which could be considered in New Zealand (ACSQHC 2019).

- Use evidence-based infection assessment tools.
- Implement infection prevention and control practices to reduce the risk of residents acquiring a preventable infection and support appropriate management of infections if they occur.
- Use microbiological testing to confirm infections and inform antimicrobial treatment choices.
- Access and use evidence-based guidelines for prescribing antimicrobial treatment to make more appropriate choices of agent and more appropriate decisions on duration of use.
- Use medication charts that improve documentation for antimicrobial prescriptions (eg, charts that require documentation of indication and review date).
- Conduct routine antimicrobial therapy reviews, including prescriptions for prophylaxis, as required (prn) administration and topical antimicrobial use.

Summary

The evidence presented above suggests that, to help reduce inappropriate use of antibiotics in aged residential care facilities in New Zealand, a bundle of interventions is likely to be useful. The bundle could include the following.

Improve prevention through:

- emphasising preventive strategies such as hand hygiene and barrier protections
- professional development around the use of urinary catheters and the mechanical issues that lead to UTI.

Improve diagnosis through:

- not using urine dipsticks to diagnose UTI
- using diagnostic criteria for UTI
- using an algorithm to determine when to start treatment with antibiotics (being sensitive to red flags)
- using medication charts or an electronic record requiring important information such as indication (why antibiotics have been started or not been started) and the review plan.

Practise antimicrobial stewardship through:

- implementing antimicrobial stewardship policies and programmes that include guidance on choosing a narrow spectrum antibiotic and who should prescribe prophylaxis as a last resort
- providing education about this bundle of interventions to all staff, including nurse practitioners and general practitioners.

Metrics to evaluate the effect of this bundle approach could include:

- the Atlas of Healthcare Variation measure of ‘urinary specific antibiotic in aged residential care’
- the incidence of UTI at each facility
- the duration of antibiotic when UTI is present
- transfer rate to hospital for those with UTI (and incidence of adverse outcomes such as urosepsis)
- total antibiotic use at each facility.

Managing behavioural and psychological symptoms of dementia (BPSD) – appropriate use of antipsychotics in aged residential care | Te whakahaere tohumate whanonga, hinengaro o te korongenge (BPSD) – te tuku tika i te rongoā i te wāhi tiaki kaumātua

Overview

Key messages

- Antipsychotics are not first-line management for BPSD; clinical guidelines recommend psychosocial measures.
- Most BPSD are transient and respond to non-pharmacologic management.
- BPSD can express unmet need. Spending time with people with BPSD is important.
- Antipsychotics are not an effective way of treating many BPSD and have only modest effect in treating aggression, agitation and psychotic symptoms.
- Antipsychotics carry a Food and Drug Administration (FDA) black box warning about older people with dementia, because they increase the risk of death. For this reason, carefully consider the risks and benefits of treatment and use antipsychotics only as a last resort.
- Identify and document specific problem behaviours and stop antipsychotics if they are ineffective.
- Review antipsychotic use in elderly people with dementia regularly (at least every three months).
- With appropriate psychosocial and environmental supports in place, most antipsychotics can be deprescribed safely, even when they have been effective.
- Interventions to reduce antipsychotic use in dementia have been successful in Australia and Canada, reducing use by 38–54 percent as well as achieving cost savings.
- Successful interventions included audit and feedback, education about dementia and non-pharmacologic approaches, and multidisciplinary medication review.
- Sometimes antipsychotics have been prescribed for psychosis and other mental health conditions. The guidance in this section is specific to BPSD and does not apply to these situations.

Resources for further reading (full text)

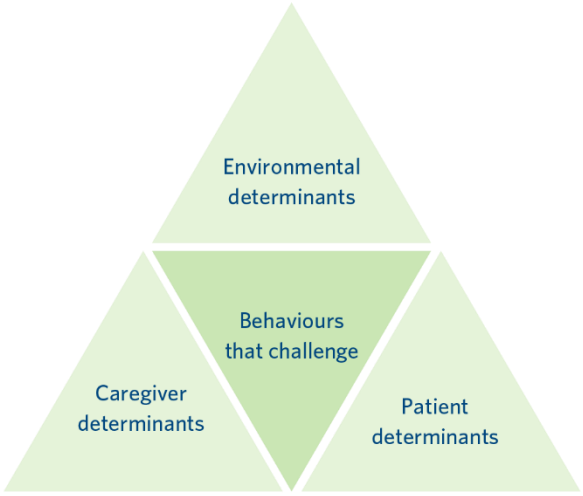
- Health Quality & Safety Commission. Frailty care guide: Behaviours that challenge
- Health Quality & Safety Commission. Frailty care guide: Dementia
- South Island Alliance: Dementia is Everybody's Business framework

- bpac[nz]: Managing patients with dementia: what is the role of antipsychotics?
- New South Wales Ministry of Health and the Royal Australian and New Zealand College of Psychiatrists (RANZCP). 2013. Assessment and Management of People with Behavioural and Psychological Symptoms of Dementia (BPSD)
- Dementia Training Australia resources: including poster, quick reference cards and review reminder stickers
- Dementia Training Australia: 'Beat-D' Environmental Design App
- University of Tasmania: 'Understanding Dementia' free online course

Background

This section covers the use of antipsychotics for those residents who live with dementia, some of whom do not have a formal dementia diagnosis. Sometimes antipsychotics are appropriately prescribed for mental illness such as schizophrenia and other psychoses, and sometimes inappropriately prescribed for other 'off label' indications. However, here we focus on the use of antipsychotics when used to manage behavioural and psychological symptoms of dementia (BPSD) rather than in those older people with other mental illness. BPSD are very common in people with dementia, occurring in over 95 percent at some point in their dementia journey (Kales et al 2015), and BPSD impact on their quality of life. These BPSD include disturbed perception, thought, mood or behaviour that does not occur because of another major neuropsychiatric disorder. These behaviours emerge from the interaction of environmental, caregiver and resident determinants, including but not limited to the dementia itself (James and Jackman 2017) – see Figure 3.

Figure 3: Interacting variables that lead to behavioural and psychological symptoms of dementia



Source: James and Jackman (2017): conceptual Model of Behaviour diagram depicting the many variables that can have an impact on behaviour that challenges.

Evidence outlined below indicates that psychotropic medicines are of limited effectiveness in treating BPSD and have serious side effects at a group level. On the other hand, research supports psychosocial and environmental interventions as first-line management for BPSD and they may help to reduce psychotropic medicine use (Birkenhager-Gillesse et al 2018).

However, there is evidence and concern that some prescribers are using antipsychotics inappropriately to manage BPSD (see Table 1 for a list of antipsychotics available in New Zealand). The reasons for this inappropriate use are complex, but a systematic review revealed five key concepts that influence decision-making around the use of antipsychotics:

- organisational capacity
- individual professional capability
- communication and collaboration
- attitudes
- regulations and guidelines.

Aspects of these five drivers may lead to a dysfunctional negative feedback loop of problematic antipsychotic prescribing (Walsh et al 2017).

Table 1: Antipsychotics available in New Zealand (March 2020)

Immediate acting	Depot injections
Amisulpride	Flupentixol decanoate
Aripiprazole	Fluphenazine decanoate
Chlorpromazine	Haloperidol decanoate
Clozapine	Olanzapine
Haloperidol	Paliperidone
Levomepromazine	Risperidone
Olanzapine	Zuclopenthixol decanoate
Pericyazine	
Quetiapine	
Risperidone	
Ziprasidone	
Zuclopenthixol	

Harms and benefits of antipsychotics in those with dementia

Antipsychotics may be harmful in those with dementia

Antipsychotic medications can cause harm and the older ARC population is particularly vulnerable to adverse medicine reactions and interactions. The potential harms from antipsychotics include: increased risk of stroke; adverse side effects in the central nervous system such as excessive sedation, worsened cognitive impairment or ‘confusion’, parkinsonism, akathisia and more subtle gait changes; postural hypotension; falls and serious fractures; urinary tract infections and pneumonia; deep vein thrombosis and pulmonary embolism; peripheral oedema; worsened diabetic or glycaemic control; cardiac changes including prolonged QT interval; and death (RANZCP 2016).

A systematic review and meta-analysis of placebo-controlled randomised trials found that second-generation antipsychotic medicines increased the risk of mortality in people with dementia (odds ratio (OR) 1.56; 95% CI 1.10–2.21) and in the elderly (OR 1.38; 95% CI

1·01–1.89) in the short term (Schneider-Thoma et al 2018). The absolute association of antipsychotics with mortality in elderly people with dementia is high and increases with dose (Maust et al 2015). For every 87 people treated with an antipsychotic for dementia, one will die. This means for every 1,000 residents treated, 11 or 12 will die – possibly as a direct result of treatment (Maher et al 2011).

Given this safety profile, the updated Beers Criteria of the American Geriatrics Society (AGS), as well as the STOPP/START criteria, strongly recommend avoiding the use of antipsychotics in the older population (AGS 2019; O'Mahony et al 2015). The US Food and Drug Administration has placed a black box warning on these medicines, specifying that they are not meant for residents with dementia and asking providers to review their treatment plans (FDA 2008). These medications offer some benefits; however, the evidence does not support antipsychotics as first-line treatment for BPSD.

Antipsychotics have only modest benefits in BPSD

A number of placebo-controlled trials and meta-analyses have examined the efficacy of antipsychotic medications to treat BPSD. Effect sizes are small, ranging from 0.13 to 0.20 (Schneider et al 2006). Notably, a Cochrane Review Protocol for an upcoming study aims to assess the evidence for antipsychotics for agitation and psychosis in people with Alzheimer's disease and vascular dementia (Muhlbauer et al 2019).

A 2019 systematic review and network meta-analysis found that non-pharmacologic interventions appear more effective than pharmacologic interventions in reducing aggression and agitation in adults with dementia (Watt et al 2019). Effective non-pharmacologic interventions were multidisciplinary care, massage and touch therapy, and music combined with massage and touch therapy.

An umbrella analysis of 16 meta-analyses found that antipsychotics are only modestly effective in treating psychosis, aggression and agitation in those with dementia and that their adverse effect profile often limits their use. The authors concluded that prescribers should reserve the use of antipsychotics for severe symptoms of BPSD that have failed to respond adequately to non-pharmacologic management strategies (Tampi et al 2016).

RANZCP (2016) does not recommend using antipsychotic medications for symptoms such as ‘wandering’, undressing, inappropriate voiding, verbal aggression or calling-out. In most cases, prescribers can undertake a trial of discontinuation.

A Cochrane systematic review and meta-analysis in 2018 found low-quality evidence from seven trials (n = 519) that stopping antipsychotics may make little or no difference to overall BPSD. However, two trials indicated that discontinuation may be associated with a worsening of BPSD in participants but only when they had more severe dementia at baseline. The authors concluded that long-term antipsychotic medicines for BPSD may be successfully discontinued in most adults aged 65 and older, although the evidence for this was of low quality (Van Leeuwen et al 2018).

In New Zealand, the balanced view of experts is that they can recommend discontinuing antipsychotic medicines after three to six months of stable treatment, no matter whether the antipsychotic was effective, provided **both** of the following conditions exist.

- Discontinuation is a monitored and gradual process and is a trial **rather than** a sudden process without consent and without monitoring.
- The indication for the antipsychotic was not one of the core indications for these medications (especially psychotic illness or bipolar disorder).

Current practice

International practice

A protocol for a forthcoming Cochrane review on antipsychotics for agitation and psychosis reports in its rationale that prescribers often prescribe these medicines inappropriately in situations where no clear indication exists, contra-indications are present, chronic use continues longer than is necessary or indicated, and/or little monitoring occurs (Muhlbauer et al 2019).

A number of studies have shown high levels of prescribing of antipsychotics for BPSD in ARC facilities. A meta-analysis has shown the prevalence of any antipsychotic use among people with dementia was 27.5 percent overall, but rose to 37.5 percent in long-term care settings in particular (Kirkham et al 2017).

The problem is global. Prescribing rates had approached 50 percent in the United States during the 1990s (Kirkham et al 2017). This led to federal regulation. In Europe a systematic review of 37 studies on antipsychotic medicine use in 12 different European countries found that antipsychotic use in nursing homes ranged from 12 percent to 59 percent (Janus et al 2016).

Facilities vary significantly in their practice based on their particular characteristics (Cioltan et al 2017). Reasons for overuse include poor clinician knowledge of prescribing and administration and the cost associated with alternative non-pharmacologic treatments for BPSD. However, as described below, stopping antipsychotics may in fact save costs overall because it leads to a reduction in the number of falls. In some settings, relatives have identified that inadequate levels of regular staff and the use of agency staff was associated with antipsychotic medication use on their relative (De Bellis et al 2017).

A cross-sectional survey of staff perceptions of caring for people with BPSD found that these symptoms impact negatively on staff directly responsible for their care, leading to absenteeism, turnover and a cycle of increasing BPSD due to poor staffing. The study concluded that it may be beneficial to provide more education for enrolled nurses and caregivers (direct-care staff) on appropriate administration and potential risks of psychotropic medication for BPSD (Roe et al 2019).

New Zealand practice

In New Zealand, a study measured psychotropic medicine use in older people from 2005 to 2013 (Ndukwe et al 2014). The defined daily dose per 1,000 older people per day showed a 22.5 percent increase over the study period. Use of antipsychotics rose from 6.8 to 8.7 defined daily doses per 1,000 older people per day. An important finding was that the use of atypical antipsychotics had increased.

The use of second-generation antipsychotics over older agents is occurring in New Zealand as well as around the world. One reason for the clinical shift to second-generation agents is

a desire to reduce the risk of extra-pyramidal side effects such as parkinsonism, akathisia and dystonia, which is evidence-based. Another reason for the change, however, is fashion. Data shows that the second-generation antipsychotics are not safer in respect of any other side effect, and often worse than first-generation agents in terms of metabolic side effects. Nevertheless, with the exception of using antipsychotics in palliative care and for short-term treatment of delirium, second generation agents are recommended as first line because of their lower risk of extra-pyramidal side effects.

In a cross-sectional study of New Zealand ARC, nurse managers self-reported that staff received education on dementia management soon after they started work at the facility, and three-monthly reviews of residents on antipsychotic medicine were common. However, the study also found that wider use of behavioural assessment tools might improve the care of residents with dementia and the quality of antipsychotic medicines use (Ndukwe et al 2016).

Analysis of the New Zealand Atlas of Healthcare Variation showed the dispensing of antipsychotic medicines varies across New Zealand (not specifically in ARC). Rates of antipsychotic dispensing rise with age, and females are more likely to receive this treatment than males. On average, 24 per 1,000 people aged 65 years and over in New Zealand from 2008/09 to 2011/12 were dispensed an antipsychotic in any quarter. The dispensing of antipsychotics varied by up to 1.8 times between DHBs (Jackson et al 2014). These authors concluded that clinicians involved in the care of the elderly should document the purpose for the treatment and the length of time to trial the medicine. It would be useful to audit administration of antipsychotics in New Zealand ARC because dispensing data does not capture ‘as required’ medications that residents do not take.

Up-to-date analysis on dispensing for mental health in New Zealand, including data on older adults prescribed antipsychotics can be found in the Atlas of Healthcare Variation mental health in primary care landing page.

A report that the Pharmaceutical Management Agency Ltd (PHARMAC) commissioned found that the main barriers to reducing antipsychotic use in New Zealand were the desire to keep the resident in their current residential facility or home and a lack of specialised dementia beds in the community. Delay in accessing psychogeriatric services was another barrier (Thornley 2015).

Finally, we note that a very significant target for prescribing of antipsychotics is end-of-life palliative care and it appears that no authors or agencies internationally have claimed this is inappropriate. Moreover, most antipsychotics prescribed to older New Zealanders are not prescribed for BPSD in dementia, nor are they prescribed for people living in ARC. However, a number of older people in ARC are likely to be receiving antipsychotics for ‘off-label’ indications outside of BPSD. This aspect of prescribing antipsychotics could be further investigated but is not the focus of this report.

Managing BPSD in ARC – what the evidence indicates

Two effective approaches for reducing inappropriate use of antipsychotics are to:

- use first-line non-pharmacologic strategies preferentially
- deprescribe antipsychotics that residents are currently taking.

To implement these approaches successfully, facilities need to embrace the knowledge, environments and resources appropriate to deliver non-pharmacologic approaches.

Using antipsychotics where residents have severe, dangerous and/or urgent BPSD may still be appropriate. In such cases, start them at the same time as non-pharmacologic measures in the hope that once the urgency has passed, you can cautiously withdraw them.

Some BPSD may remain difficult to manage even with appropriate first-line non-pharmacologic strategies and specialist assessment; in these cases, eventually second-line and third-line approaches may be needed. However, the focus in this report is on first-line management of BPSD and deprescribing antipsychotics for those residents with stable symptoms.

Goals of care for severe dementia

The person-centred dementia care model holds that the most important principles related to someone living with dementia are that:

- they are a person
- all human behaviour occurs in response to an environmental and social context and represents an attempt to meet a need
- the key human needs driving the responsive behaviours that challenge the people who someone living with dementia comes into contact with are universal, and often their care environments are not meeting those needs.

Under the person-centred model, 'management' should therefore focus on optimising the wellbeing of people on both macro and micro levels simultaneously rather than minimising the so-called 'BPSD' (Kitwood 2019; Power 2014).

In parallel with person-centred care, there is a medicalised model of dementia care that is more focused on preventing BPSD through approaches including regular communication as well as purposeful rounding (structured hourly rounding to check pain, position, comfort, toileting and other needs), and evaluation for reversible risk factors such as medication, infection, dehydration, metabolic derangements and agitation. The medicalised model also supports non-pharmacologic approaches to mitigate BPSD including:

- therapeutic activities such as relaxation, massage, music and rocking chairs
- the management of pain with heat or cold or massage
- training for family, whānau and caregivers.

Pharmacologic measures to use along with non-pharmacologic measures include non-opioid analgesia, and sedation only for severe agitation (Metzger et al 2018).

Together these patient-centred, non-pharmacologic, and, where needed, pharmacologic measures, can represent a patient-centred, individualised, humanistic approach to care for those with severe dementia

Psychosocial interventions are effective in improving BPSD

The Australian and New Zealand Society for Geriatric Medicine conducted a review of evidence on the use of non-pharmacologic interventions for BPSD. Relevant studies identified show that effective interventions were supervised person-centred care, dementia care mapping, behavioural management and communication skills through paid caregivers (Livingston et al 2014). They also found sensory therapy activities and structured music therapies reduce agitation. A Cochrane systematic review found potential beneficial effects

of multi-component interventions that use functional analysis and exploration of the purpose of an individual's behaviour to resolve distress and BPSD (Moniz Cook et al 2012). Exercise and music may also be beneficial. All these strategies are preferable to antipsychotics.

A 2018 report on a cluster randomised trial found that one hour a week of social interaction, along with a small amount of personalised care, can improve the quality of life of people with dementia in ARC. Although their effect size was small in contributing to the benefits of quality of life, agitation and neuropsychiatric symptoms, these behavioural interventions saved costs in a model that could be readily implemented (Ballard et al 2018).

Psychosocial interventions are effective in reducing antipsychotic use

A Cochrane systematic review based on four heterogeneous cluster-randomised studies concluded that psychosocial interventions are effective in reducing antipsychotic medication in care home residents. The interventions took educational approaches. Three studies involved education and training for nurses. One study centred on multidisciplinary team meetings as the main component. All studies showed their approaches reduced antipsychotic use (Richter et al 2012).

Another systematic review and meta-analysis of nine studies found that psychosocial interventions appear to substantially reduce antipsychotic medicine prescription, especially when targeting cultural change and in studies that involved prescribing physicians (relative risk 0.71; 95% CI 0.59–0.88) (Birkenhager-Gillesse et al 2018).

Consider deprescribing antipsychotics for those with dementia

Deprescribing is a possible intervention when someone is already taking antipsychotics. It is the planned and supervised process of reducing the dose and/or stopping a medication that may not be providing benefit or could cause harm. Whenever prescribing antipsychotics for BPSD, prescribers should have a plan to stop them.

Moderate-quality evidence supports a strong recommendation to taper and stop antipsychotics for adults with BPSD after at least three months of treatment where their symptoms have stabilised or there has been no response (Bjerre et al 2018). The authors developed this guidance using Delphi methods and argue that patients and caregivers might be more amenable to deprescribing by tapering if they understand the rationale and potential harms, and if clinicians give them behavioural advice and take a shared approach to decision-making.

Psychosocial management rather than medicine substitution is important

While the evidence suggests that deprescribing can be a good strategy, there are concerns around the use of alternative medications once residents stop taking antipsychotics. It is important to substitute person-centred, behavioural and environmental interventions for antipsychotics, rather than substituting alternative medications such as benzodiazepines or prn psychotropics, because these substitutions can be just as dangerous (Westbury et al 2019).

Effective antipsychotic reduction programmes

Systematic reviews show that interventions to reduce inappropriate prescribing of antipsychotic medications to ARC residents with dementia are effective. One review found beneficial effects in 9 of 11 studies that had the most robust study design. Strategies that were successful in randomised studies included education programmes, medication review by specially trained pharmacists, and multicomponent interventions They reduced antipsychotic prescribing levels by 12–20 percent (Thompson Coon et al 2014).

Case study – RedUSe

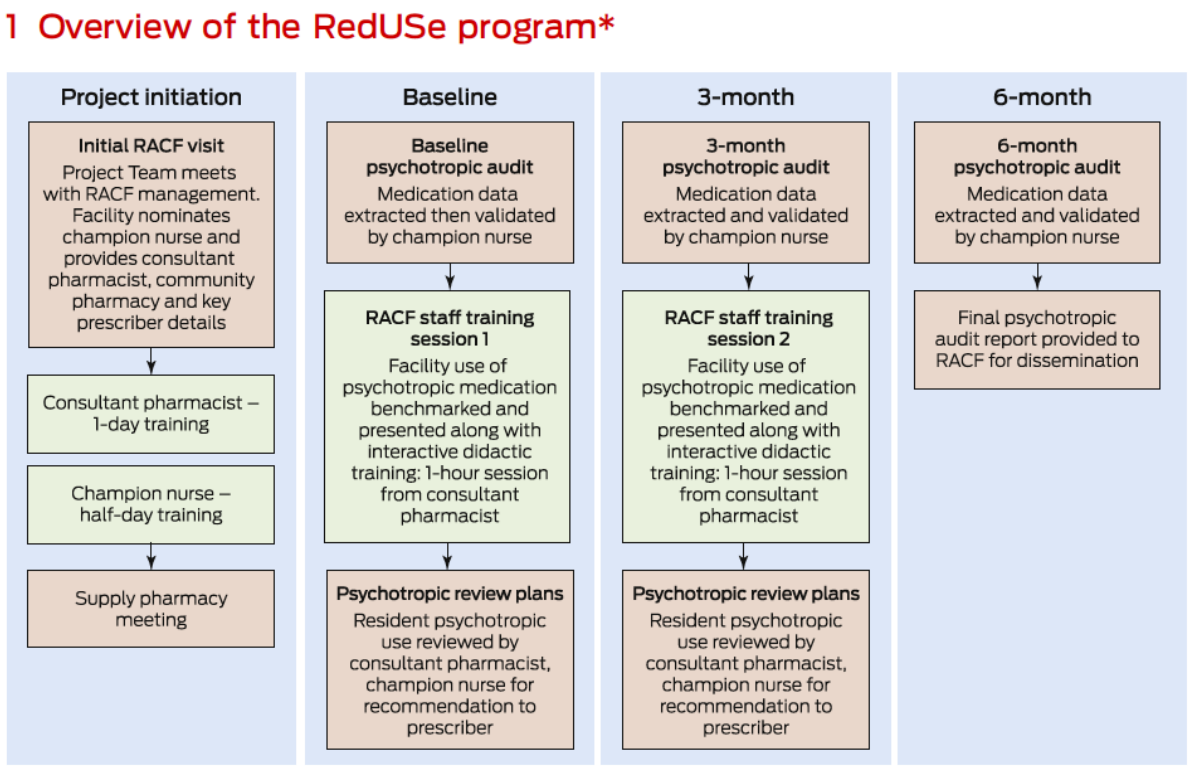
An Australian multi-strategic programme combined medication audit and benchmarking with feedback, staff education (challenging beliefs about antipsychotics and benzodiazepines, as well as providing information about non-pharmacologic strategies) and interdisciplinary case review. Trials of this 'RedUSe' (reducing use of sedatives) programme have found significant reductions in the use of antipsychotics and benzodiazepines at six months. For 38 percent of ARC residents prescribed antipsychotics at baseline, staff stopped or reduced the agents without substitution (Westbury et al 2018). Additionally, the programme involved designing pamphlets with consumer representatives for residents and relatives. Importantly, care of residents with serious mental illness including schizophrenia was left to mental health specialists.

Information on resident clinical outcomes and the economics of this intervention is available in a comprehensive full report (Westbury et al 2016). Figure 4 summarises the RedUSe Programme.

Cost-effectiveness – the CFHI programme

Behavioural interventions may be a more efficient use of money than antipsychotics in the long run. This is because the adverse effects of antipsychotics often require treatment, and this cost to the health system may outweigh the benefits. For example, in 2015 the Canadian Foundation for Healthcare Improvement (CFHI) implemented an antipsychotic programme in long-term care facilities. The programme targeted residents with dementia who were receiving potentially inappropriate antipsychotics. Results of the programme showed that 36 percent had discontinued the medications and 18 percent had moved to a lower dosage. In addition, falls reduced by 20 percent and aggressive behaviours did not increase (CFHI 2020). A report that CFHI commissioned indicated that the reduced use of antipsychotics and reduced incidence of harms would save $39 million (Canadian dollars) annually if scaled up across Canada (RiskAnalytica 2016).

Figure 4: The RedUSe programme – using audit and feedback, staff education and interdisciplinary case review to reduce the use of antipsychotics for BPSD



Note: RACF: residential aged care facility

Source: Westbury 2018.

How organisations have interpreted the evidence in their guidance

Organisations have interpreted the evidence outlined above to develop their own guidance. The following are some examples of that guidance.

NICE

In the United Kingdom, the National Institute for Health and Care Excellence (NICE) reviewed the evidence and noted the risks and limited benefits of using antipsychotics for managing agitation, aggression, distress and psychosis in people living with dementia. Based on this review, it recommended that a person living with dementia should only try an antipsychotic if they are at risk of harming themselves or others, or if they are severely distressed. In such cases, prescribers should try the antipsychotic alongside other activities aimed at helping their distress (NICE 2015). They should also conduct a structured assessment to identify and address any underlying causes, as well as medicines optimisation.

Among other NICE resources, a 'NICE bite' document on dementia has a useful section on managing non-cognitive symptoms, agitation, aggression, distress and psychosis. It gives clear guidance on when to start antipsychotics and when to stop them. NICE also provides a

decision aid to help when discussing the benefits and harms of antipsychotics with the person and their family or carers as appropriate.

ANZSGM

The Australian and New Zealand Society for Geriatric Medicine (ANZSGM) has published a Position statement on the management of BPSD. This statement emphasises the effectiveness of providing person-centred dementia care and involving caregivers. The ANZSGM reiterates that services should first use non-pharmacologic strategies. It cites several expert consensus guidelines recommending pharmacotherapy only as second-line treatment and then only for more severe and persistent BPSD that is not responding to non-pharmacologic measures alone. It also emphasises the importance of regularly reviewing treatment.

The ANZSGM highlights the practical distinction between emergent and non-emergent BPSD. People with emergent BPSD are in severe distress, present an imminent danger to themselves or caregivers and/or exhibit severely disruptive behaviours. People with non-emergent BPSD do not have such severe symptoms but their symptoms nevertheless impact on daily routine or quality of life. Emergent BPSD warrants immediate pharmacologic and non-pharmacologic measures. In contrast, non-emergent BPSD warrants non-pharmacologic measures only while health professionals conduct ongoing evaluations (ANZSGM 2016).

Finally the ANZSGM identifies the need to gain consent for antipsychotic treatment either from the resident or their nominated representative after discussing the modest likely benefit and serious potential adverse effects of the treatment.

bpac^{nz}

In New Zealand, bpac^{nz} has published guidance on managing BPSD. This guidance emphasises the need to identify target behaviours, record the problem and monitor the response to treatment. It is important to assess underlying causes and contributing factors.

The bpac^{nz} guidance emphasises that pain occurs in up to an estimated 83 percent of patients with dementia, is often poorly recognised and undertreated due to communication difficulties. Calling out, agitation and restlessness can be efforts to communicate about undertreated pain or other needs.

If prescribing an antipsychotic, start at a low dose and raise it only slowly. Give it on a trial basis for up to four weeks for aggression or agitation and up to three months for psychosis. Regularly review the patient's response and monitor for adverse effects (bpac^{nz} 2013).

RANZCP

The RANZCP, together with PHARMAC, released clinical recommendations for using antipsychotics in ARC in 2008 (reviewed in 2011). These recommendations include an algorithm for their use and emphasise having an appropriate culture of care, identifying the target problems, setting realistic treatment aims and taking both general and specific non-pharmacologic approaches (Croucher et al 2008).

Successful New Zealand interventions

In New Zealand, one residential care provider undertook an audit (n = 228 residents) across 13 dementia and psychogeriatric units from July to September 2011 and repeated it in 2013. It used a modified bpac^{nz} tool to examine antipsychotic prescribing, prn antipsychotic doses and documentation of items such as 'target behaviour' and the 'need to monitor for adverse effects'. Between these audits, the provider implemented a range of educational, managerial, environmental, recreational and resident-specific interventions. Use of both regular and prn antipsychotics decreased by about a quarter from 2011 to 2013 (from 50.4 to 38.2 and from 49.1 to 36.5 percent respectively). Documenting of target behaviour increased significantly from 54.3 to 71.2 percent. Unfortunately, the study design did not allow the researchers to identify which interventions were effective (Tordoff et al 2016).

Possible interventions and recommendations

Prescribers must weigh carer burnout and family distress against the potentially positive and negative effects of medicines, including the risks to the ARC resident and to others if they do not receive effective treatment. However, prescribers should only use any treatments in the frail elderly when that treatment has clear benefit, at an appropriate threshold for initiation, and the resident (or family or whānau) has given consent (NSW Agency for Clinical Innovation 2019).

The published evidence suggests that non-pharmacologic measures to manage BPSD are more effective (Watt et al 2019) and safer than antipsychotics – with fewer adverse events such as falls (CFHI 2020) and deaths (Maust et al 2015). Furthermore, psychosocial measures improve quality of life (Ballard et al 2018) and appear to be more cost-effective than antipsychotics (RiskAnalytica 2016). Professional guidelines are clear that antipsychotics are not the first-line management for BPSD (ANZSGM 2016) and, given the FDA black box warning (FDA 2008), should be a treatment of last resort. Consider having a trial of deprescribing where possible (Bjerre et al 2018). A key message is that even if you decide to use an antipsychotic, do not prescribe it long term and document a plan for regularly review with a view to stopping the trial if needed.

The expert panel consulted when preparing this report emphasised that reducing antipsychotic use in those with dementia requires a big-picture approach and should involve a multidisciplinary campaign with sustained messaging for all involved. A key change will be moving the culture and model of care towards a wellbeing-focused and person-centred approach and away from an approach that is primarily concerned with care and protection and medicalised harm minimisation.

To move to a model of care that prioritises non-pharmacologic measures, providers could use strategies such as those that have proven successful in large programmes in Australia and Canada. In this section, we focus on these measures:

- audit and feedback
- education, including through promoting other approaches that prove successful in local trials
- improved documentation
- mandatory, time-limited review of prescriptions
- multidisciplinary team review

- environmental and psychosocial supports, including sufficient dementia beds
- evaluation.

Audit and feedback

We do not yet know the extent of antipsychotic overuse in New Zealand. To gather this data, a first step would be to engage ARC management and boards and require them to conduct a quarterly audit of antipsychotic use (including 'as required' use) with mandatory reporting to a named board member. If this step is to be effective, it may be necessary to improve audit methods because administrative data from electronic records will not capture data from any facilities still using paper records. Another important part of this initiative would be to set an achievable aim, such as a 10 percent reduction in antipsychotic use. Providers could report by care type and include important information such as staffing levels, adverse events, substitute medicines and the success of withdrawal attempts. This data will help focus quality improvement efforts, especially if prescribers receive the audit information along with the proportion of prescribing that is within guidelines (including approved target durations of use).

Another possibility is to audit and evaluate the organisational factors in ARC that can lead to high prescribing levels – for example, teamwork and safety climate, and staff assumptions and values. Researchers are producing audit tools to support these kinds of assessments for specific domains such as antipsychotic prescribing (Sawan et al 2019).

Education

People who interact with residents living with dementia often lack the knowledge to identify the triggers of BPSD and de-escalate behaviour. Education and coaching of multidisciplinary teams has been a critical component of successful interventions in other countries.

Education should be available for prescribers (general practitioners and nurse practitioners) in ARC as well as carers, nurses, facility support staff, families and whānau. They could receive that education from specially trained pharmacists on-site or by completing '(massive) open online courses' (MOOCs), which are a way to deliver training consistently when staff turnover is high. Prescribers could have personalised education based on their prescribing rate. Coaching for multidisciplinary teams could aim to nudge ARC culture towards drawing on the skills and knowledge of pharmacists more often.

Education could cover: the harms and marginal benefits of antipsychotics; the limited, specific indications for use; appropriate documentation, including objective behavioural assessment; the need for review; the need for consent; the evidence for non-pharmacologic approaches, including interventions for managing sexual disinhibition and aggression; and the cost-effectiveness of non-pharmacologic approaches. The issue of acute restraint, and its legal status, is an entirely separate topic that we do not discuss here in detail but thinking around restraint will need to dovetail with this work across the ARC sector.

Education could emphasise the importance of person-centred care, which views people living with dementia first and foremost as people. That is, they are valued and unique individuals with experiences that others must understand. Moreover, considering their unmet psychosocial needs is usually the most effective way of offering care. The South Island Alliance report *Dementia Is Everybody's Business* (Kerr et al 2017) describes person-centred care and a framework for dementia care in New Zealand. The framework

encourages services to follow a person-centred approach at all stages of the dementia journey in addition to providing best-practice medical care and disability-support services.

In New Zealand, there are several formal approaches to moving the dementia workforce (including in ARC) towards a person-centred model of care:

- Walking in Another's Shoes – offered free by Southern, Canterbury, West Coast, Nelson Marlborough, MidCentral and Whanganui DHBs
- the Eden Alternative, Spark of Life, Butterfly Effect and Dementia Care Mapping approaches – overseas-based, fee-for-service models that various ARC providers use to some extent
- ad hoc training from a range of other providers such as Three Spirit
- in-house programmes that some ARC groups (notably Ryman Group) are developing.

An assessment of a care facility's culture of psychotropic prescribing could help to tailor education to its particular environment. ARC management may be interested in using the surveys available for this purpose (Sawan et al 2019).

Documentation and mandatory review of prescriptions

Documentation is essential to ensure that all team members have a shared understanding of the antipsychotic care plan and when to review prescriptions. Facilities may already have an antipsychotic care plan or charts that they could return to using more rigorously. As the expert panel noted, in some sites that have antipsychotic charts, use of those charts has declined due to staff and manager turnover.

Antipsychotics for BPSD are not lifelong medications. Therefore, a useful chart would have a prominent date of review and plan to deprescribe, as well as details of appropriateness criteria for the use of antipsychotics in BPSD. For example, the chart could state that staff should only use antipsychotics where a resident has psychotic symptoms, where there is a strong risk of danger to the resident or others, and where potentially reversible medical causes have been ruled out. In addition, it could include a section where staff must document the non-pharmacologic strategies they are trialling.

Documentation should include:

- the targeted symptoms and the goal of treatment
- monitoring needs such as lying and standing blood pressure
- a behavioural record at baseline to allow for objective review of whether the intervention made a difference. Staff could then use universal electronic prescribing systems for this review.

One expert panel member suggested using an integrated document that includes a behaviour chart, with bowel chart, pain chart, and 'as required' medication administration and cares, along with the times that each of these occurs. This approach would make it easier for staff to assess patterns of behaviour and could be the focal point of multidisciplinary team (MDT) discussions, ensuring a common team mental model.

Well-designed electronic documentation can include elements of education and guidelines and facilitate data capture for audit. It can also be a focus for MDT decision-making and automatically create alerts to trigger review.

Multidisciplinary team review

Both the successful programmes described above (RedUSe and the CFHI programme) had a focus on MDT coaching and/or MDT review. Notably the Australian Residential Medication Management Review for aged care residents has Australian Government funding. Additional resourcing could be considered in New Zealand to enable pharmacists to become more involved in medication management. Regular MDT review of those on antipsychotics could involve an older person's specialist doctor or nurse, which may reduce some of the inappropriate prescribing. Good documentation could support MDT review so that decisions are objective and informed.

Environmental and psychosocial supports

If first-line management with non-pharmacologic approaches are to succeed, the appropriate resources need to be in place. This means that appropriately trained carers and staff need to be available to implement person-centred and other psychosocial interventions. Facilities should ensure staffing levels are appropriate, environments are appropriate for dementia care, and those residents who need dementia beds or psychogeriatric specialists have access to them. Educating other residents about dementia and spending time with people with dementia are likely to be important as well.

Evaluation

Whatever interventions staff trial, the MDT will need to evaluate them. The summary box sets out metrics that the MDT could choose from in its evaluation.

Summary

BPSD are associated with rapid decline and poor quality of life, and are often an expression of unmet need. Therefore, early diagnosis and management are important along with good communication, carer education and support.

- Tailor management of BPSD to the individual, understanding behaviour as communication, targeting unmet needs and using the severity of symptoms to guide decisions.
- Try non-pharmacologic individualised strategies in the first instance. Spending time with people with dementia also seems to be important.
- Antipsychotic medications have marginal benefit and are also associated with significant risks of morbidity and mortality. They are only a recommended treatment for very specific BPSD indications.
- Antipsychotic medications may be necessary as an adjuvant therapy or when non-pharmacologic management has failed. The people with expertise in this area should make this decision and should gain consent for administering the medication.
- Carefully monitor the resident for adverse effects of antipsychotic medications.
- An effective programme to reduce antipsychotic use consists of audit and feedback, an agreed guideline and criteria for appropriate prescribing, environmental and culture changes, education about efficacy, harms and how to manage BPSD, as well as mandated medication review. Initial testing of the programme could focus on small clusters of diverse clinical settings.
- Where a programme is successful, consider promoting it and disseminating information about it and its accompanying resources.
- Support and resourcing to educate people who interact with residents living with dementia are important.

Metrics to evaluate the effect of this approach could include some or all of the following:

- adding antipsychotic use in ARC residents to the Atlas of Healthcare Variation (for long-term trends, as the latest data in this resource is always about two years old)
- incidence of aggression at each facility
- incidence of falls (or other adverse events such as pulmonary embolism, deep vein thrombosis, fractures, pneumonia, UTIs and death) in those with dementia
- duration of antipsychotic use when prescribed
- proportion of residents among those trying deprescribing who end up stopping antipsychotics
- total antipsychotic use at each facility by level of care
- total use of substitute medicines such as benzodiazepines
- staffing levels at each facility to correlate with outcomes
- resident quality of life.

Using fentanyl to manage pain in aged residential care | Te whakamahi fentanyl hei whakamauru mamae i te wāhi tiaki kaumātua

Overview

Key messages

- Fentanyl is a powerful opioid that has caused deaths and prescribers must only prescribe it with caution. The elderly are particularly susceptible to the adverse effects of fentanyl.
- Regions across New Zealand vary significantly in their levels of prescribing of fentanyl (minimal use in some DHBs, high levels in others). Its use has risen in ARC since 2011; researchers should conduct studies aimed at understanding why.
- Guidance recommends using fentanyl patches only for residents that are already accustomed to opioids. Do not use the patches for acute pain.
- A Cochrane systematic review found that fentanyl patches are beneficial in treating chronic cancer pain.
- There is a lack of evidence to support the use of fentanyl patches for chronic non-cancer pain. Guidance recommends against using opioids in this context.
- Using validated metrics to score pain in ARC residents would help to make objective assessments of the effectiveness of fentanyl patches.
- Improvements in documentation might help to prompt timely review of fentanyl use, discontinue it when it is not effective and avoid adverse events.

Resources for further reading (full text)

- Faculty of Pain Medicine of the Royal College of Anaesthetists: Opioids Aware resource (for consumers and health professionals).
- Guidance on how to use fentanyl patches safely:
  - bpac^{nz}. 2008. Fentanyl patches
  - Health Quality & Safety Commission. 2013. Fentanyl transdermal patches
  - Health Quality & Safety Commission. 2019. Alert: Transdermal patches
  - National Health Service Oxfordshire Clinical Commissioning Group. 2018. Good practice guidelines: use of fentanyl transdermal patches

Background

This section examines the appropriate use of fentanyl in ARC residents in managing pain. It focuses on acute, chronic non-cancer, and chronic cancer pain but does not cover end-of-life or palliative care.

Fentanyl is a strong opioid and as such is classed as step 3 on the World Health Organization (WHO) analgesic ladder. In New Zealand, the following strong opioids are subsidised: fentanyl, methadone, morphine, oxycodone and pethidine. In the New Zealand ARC setting, according to members of the expert panel, almost all use of fentanyl for care other than end-of-life care appears to be in the form of fentanyl patches. But use varies greatly by region (see below).

Both undertreatment and overtreatment of pain in people with advanced dementia occurs. Effective pain treatment may require opioids. However, in the ARC setting it is also important to properly assess pain, consider using a validated pain metric to document it, and reassess pain after treatment has begun. Commonly analgesics, including strong analgesics like opioids, will not completely eliminate chronic pain. Some literature has reported a 90–100 percent failure rate for strong opioids in treating chronic non-cancer pain (Moore et al 2013). In many cases, treatment should focus on reducing pain as much as possible and improving quality of life (NICE 2017).

Evidence for the use of opioids in many contexts is sparse and evolving, the indications for use can be ambiguous, individuals may differ in the way they interpret the evidence, and residents may not understand the limits of what opioids can offer. In this context, there is a risk of wide variation in prescribing practice (Davis et al 2016). Below we describe New Zealand data that confirms this variation is occurring.

Indications for fentanyl patches

In New Zealand, the only approved indications for fentanyl patches are in the management of:

1. chronic cancer pain
2. 'opioid-responsive chronic severe pain of non-malignant origin **in opioid tolerant patients, after other conservative methods of analgesia have been tried**' (Medsafe, New Zealand data sheet for fentanyl sandoz patch) [emphasis added].

Harms and benefits of fentanyl

Fentanyl is a very powerful medicine, even at the lowest dose. It is not indicated in residents who have not already been taking opioids.

Harms

Despite being important for many people who suffer from moderate to severe pain, for acute or chronic pain, and for end-of-life care, long-acting opioids carry known risks including overdose and respiratory depression as well as additive sedation. The Institute for Healthcare Improvement classes opioids as one of four groups of medicines (along with anticoagulants, insulin and sedatives) that can cause harm, even when used as intended. The New Zealand Health Quality & Safety Commission also considers opioids to be high-risk medicines.

In ARC, opioids are among the top five medicines that lead to adverse drug events (Gurwitz et al 2005). The use of opioids is associated with an increase in falls in older people: one additional fall-related trauma is expected for every 29 opioid prescriptions (Daoust et al 2018). In some cases, staff have not removed a fentanyl patch before applying a new one, which leads to a risk of overdose. A long time passes before the analgesic effect for fentanyl patches begins and staff need to understand the pharmacokinetics involved.

One of the issues with fentanyl patches is that the dosing is in a per hour format. Given that fentanyl is 100 times as potent as morphine, converting back to morphine equivalent may help prescribers reflect on a starting dose. For example, 12.5 micrograms per hour patch is equivalent to 300 micrograms per day of fentanyl, which is equivalent to 30 milligrams of morphine.

Fentanyl is recommended for chronic cancer pain as an alternative option after trying morphine. However, this medicine can have severe adverse effects such as significant respiratory depression in those who are opioid-naïve or those with chronic obstructive pulmonary disease (COPD) and prescribers should only use it with caution in those with hepatic or renal impairment, or bradyarrhythmias. The elderly have increased sensitivity to these effects (Davis et al 2016).

The Health Quality & Safety Commission warned in 2013 about an increasing number of incidents involving fentanyl transdermal patches that resulted in patient harm and death. A 2009 international review of 3,291 incidents related to fentanyl patches found that 271 resulted in harm, including 8 deaths (Institute for Safe Medication Practices Canada 2009). Major risk factors were that clinical staff, carers and residents and their families lacked knowledge of indications, potency and pharmacokinetics. Dosing complexity, poor communication and product design also contributed to harms (Health Quality & Safety Commission 2013).

Benefits

Although some consider that many ARC residents have long-term pain that is non-malignant and responds to opioids, the literature does not support this view. Limited evidence indicates that opioids are effective for treating chronic non-cancer pain in the long term. Opioids were no more effective than non-opioids or non-pharmacologic interventions for chronic pain according to a meta-analysis (Reinecke et al 2015). bpac^{nz} recommends that opioids are not indicated for chronic non-cancer pain (bpac^{nz} 2018b).

For cancer pain, however, a Cochrane systematic review of fentanyl patches found that patches placed on the skin produced good pain relief for most people with moderate or severe cancer pain. It concluded that the evidence pointed to a useful and significant reduction in complaints about constipation for transdermal fentanyl compared with oral morphine (Hadley et al 2013).

Interpreting the evidence base – existing guidance

Review of guidelines

A 2014 review analysed 13 guidelines on the use of opioids for chronic pain. The authors found that despite their limited evidence and the variable methods in their development, guidelines on chronic pain agree that prescribers should several strategies to mitigate opioid

risk. These strategies include adhering to upper dosing thresholds; being cautious with certain other medications; paying attention to drug–drug and drug–disease interactions; and using risk assessment tools (Nuckols et al 2014). The guidelines also suggest caution for doses greater than 90 mg of morphine equivalents per day, recognising risks associated with fentanyl patches, titrating with caution and reducing doses by at least 25 to 50 percent when switching from one opioid to another to avoid overdose.

The review reports on eight guidelines that recommend caution with the fentanyl patch, including limiting use of patches to those who are opioid-tolerant and being aware that unpredictable absorption can occur with fever, exercise or exposure to heat. Various consensus-based guideline statements suggest using a trial period, individualising therapy, engaging multidisciplinary pain management teams, increasing doses slowly and scheduling regular follow-up. Ten guidelines agreed that benzodiazepines and opioids are a high-risk combination, particularly in elderly adults, and seven guidelines cited COPD as a risk factor for overdose (Nuckols et al 2014).

NICE guidance on chronic pain

NICE notes that prescribers often use the WHO analgesic ladder as a guide to the treatment of chronic pain. However, WHO developed this tool specifically for cancer-related pain and has not validated it for non-cancer-related chronic pain. NICE also notes the lack of good-quality evidence to support the long-term use of opioids in non-cancer pain. Inappropriate prescribing may result from using the WHO ladder for people with chronic pain, unless the prescriber takes into account the complexity of the person's individual needs, preferences for treatments, health priorities and lifestyle (NICE 2017). NICE recommends prescribers understand the content of the Opioids Aware resource, which we describe below.

Opioids Aware resource

This online resource synthesises the evidence on opioids and chronic pain and is freely available online. The following are some of its key messages.

- There is little evidence that opioids are helpful for long-term pain.
- A small proportion of people may get good pain relief with opioids in the long term if the dose can be kept low and they use it only intermittently.
- The risk of harm increases substantially at doses above an oral morphine equivalent of 120 mg per day while these doses achieve no increased benefit.
- If a resident has pain that remains severe despite opioid treatment, then the opioids are not working and should be stopped, even if no other treatment is available.
- Chronic pain is very complex. If residents have refractory and disabling symptoms, a detailed assessment of the many emotional influences on their pain experience is essential.
- Residents who do not achieve useful pain relief from opioids within two to four weeks are unlikely to gain benefit in the long term.
- Residents who may benefit from opioids in the long term will respond favourably within two to four weeks.
- Short-term efficacy does not guarantee long-term efficacy.
- Data on whether quality of life improves with long-term opioid use is inconclusive.

bpac^{nz} (2008–18)

bpac^{nz} advised in 2008 that fentanyl patches are appropriate for those with chronic pain, who have stable opioid requirements, and who are unable to take oral morphine or have intolerable side-effects from morphine. It advised prescribers to administer carefully to the elderly due to prolonged elimination half-life (bpac^{nz} 2008). Then in 2018 bpac^{nz} reviewed the evidence for the use of opioids for chronic pain and reported that meta-analysis of randomised controlled trials of treatments for chronic non-malignant pain had found no significant difference between opioids, non-opioids and non-pharmacologic interventions for improving pain. Furthermore, opioids – including oxycodone, morphine, fentanyl, tramadol and codeine – were associated with modest short-term analgesic benefits, but showed no evidence that they were effective in the long term. For chronic low back pain, there was no difference between opioids, non-steroidal anti-inflammatories (NSAIDs) and antidepressants and no evidence that opioids had long-term effectiveness. bpac^{nz} suggests a range of non-pharmacologic and pharmacologic management options and emphasises the importance of discussing with the resident why opioids are not at the centre of chronic pain management (bpac^{nz} 2018b).

ANZCA: slow release opioids are not for acute pain

The Australian and New Zealand College of Anaesthetists (ANZCA) reiterates the approved indications for slow-release opioids that regulatory authorities – including the Therapeutic Goods Administration in Australia, Medsafe in New Zealand, and the US Food and Drug Administration – have listed. It does not recommend using slow-release opioids to manage acute pain and fentanyl patches are specifically contraindicated in those who are opioid-naïve due to the risk of life-threatening hypoventilation. ANZCA also notes that there is no safe maximum dose of opioids (ANZCA 2018).

Current practice

Available evidence suggests that much current practice is inconsistent with the above recommendations.

International practice

A systematic review of global trends in analgesic use in ARC found that the use of analgesics has increased by a modest amount over time. Many countries have shifted away from NSAID use, and other analgesics may be prescribed instead. In Australia, 2005 national prescribing guidelines emphasised good practice in ARC, which may have led to increased prescribing (Veal et al 2014), and the United Kingdom licensed fentanyl for non-cancer pain in 2002. Because studies have identified undertreatment of pain in individuals with dementia, this finding may have led to greater use of assessment tools and increased analgesia (La Frenais et al 2018).

In the United States, 9.4 percent of nursing home residents who were prescribed a slow-release opioid within 30 days of being admitted to the home lacked a prescription drug claim for a short-acting opioid in the previous 60 days. The most common long-acting opioid was fentanyl patch. It appears that new initiation of fentanyl patches persists in ARC despite safety concerns (Pimentel et al 2016). Another US study of 17,052 nursing home residents found that most who initiated fentanyl patches did not have persisting pain and 36.3 percent were opioid naïve (Fain et al 2017).

In Norway, although prescribing of strong opioids was common (in 19.3 percent of residents with advanced dementia), the average dosage was relatively low and 80 percent of the residents with prescribed strong opioids still showed signs of pain when assessed with the MOBID-2 Pain Scale (which leads to high nursing staff awareness of pain) (Griffioen et al 2019). These authors concluded that proper pain treatment is challenging and there is need for regular evaluation of pain and pain management.

The report on safety of opioid patch initiation in Australian residential aged care found that an opioid patch was initiated in 596 of 5,297 residents (11.3 percent: 2.6 percent fentanyl, 8.7 percent buprenorphine) across 60 ARC facilities. The average age at initiation was 87 years, and three-quarters of recipients were women. Most patches were initiated at the lowest available strength, with the dose being up-titrated. Around 15 percent of fentanyl users needed additional regular opioids after patch initiation. However, consistent with data from the United States above, one-third of recipients of fentanyl patches were opioid naïve, which goes against recommendations (Gadzhanova et al 2015).

New Zealand practice

The New Zealand Atlas of Healthcare Variation (opioid domain) indicates that strong opioid use continues to increase and some of this increase is occurring in ARC. Rates of fentanyl use have more than doubled since 2011 (see Figure 5) and variation between DHBs has also increased to the point that rates differ by more than 15 times. The reason for this variation is unclear although it does explain why DHBs differ in their views of whether fentanyl prescribing is a problem. Increases in fentanyl dispensed to residents for palliative care (in their last six months of life) cannot explain all of the increase in opioid use and it is not clear why ARC facilities in some DHBs have high fentanyl use when facilities in other DHBs manage with little or no fentanyl use.

The Atlas tells us that:

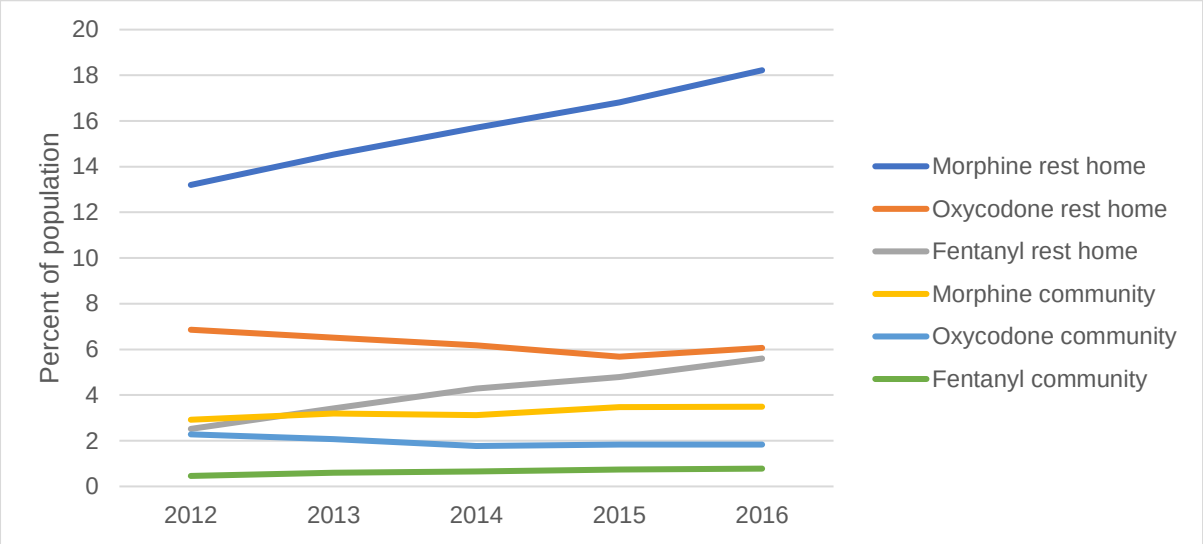
- in 2017, an average of 1.8 per 1,000 people received fentanyl, which was a significant increase from 2011 (0.8 per 1,000) but was the same as in 2016
- use varied dramatically by over 15 times between DHBs
- fentanyl use significantly increased with age from 4.8 per 1,000 aged 65–79 years to 22.4 per 1,000 people aged 80 years and over
- of those given fentanyl, 22 percent took it for six or more weeks
- the rate of opioid dispensing is higher in people of European/Other ethnicity, women, and people aged 80 years and over, even though adverse effects of strong opioids are more frequent in the older population.

Oxycodone use is reducing at a similar rate in both rest homes and the community. It may be that some regions are using fentanyl instead of oxycodone as awareness grows of the dangers of the latter but not the former. Also, anecdotal evidence suggests some nurses encourage the use of patches as applying a patch every three days is easier and less time consuming than 4-hourly or 12-hourly oral dosing.

This data begs the question of whether prescribers are prescribing strong opioids in New Zealand in line with best-practice evidence.

Up-to-date analysis on the dispensing of strong opioids including dispensing of fentanyl can be found on the Atlas of Healthcare Variation opioid landing page.

Figure 5: Dispensing of strong opioids, including fentanyl, in New Zealand aged residential care, 2012–16



Possible interventions and recommendations

Given the above evidence, it is likely that fentanyl patches are of limited benefit for non-cancer pain but may be appropriate as a last resort for those who cannot take oral medication, who have swallowing difficulty or who have specific individual indications (such as unstable pelvic fracture requiring long-term analgesia). However, any such prescribing has strict limits: it should only be for residents who are already opioid tolerant and only for a time limited trial of efficacy such as 10–14 days, with strict review for objective impact (eg, the resident was immobile and is now walking). It should also involve appropriate monitoring and have informed consent (from the resident or their nominated representative).

To transition to this model of care with the appropriate use of fentanyl, consider the following interventions:

- auditing fentanyl use and giving feedback to prescribers
- providing education for all staff on the harms and indications for fentanyl patches
- improving documentation around fentanyl patch use
- using objective measures of pain to allow prescribers to assess the impact of treatment.

Audit and feedback

Data collection should seek to understand:

- how many residents are using fentanyl and for what indication
- where fentanyl was initiated (eg, in hospital)
- how often a weaning plan is in place for fentanyl use that is not intended to be ongoing
- reasons for discontinuing fentanyl patches when this happens

- why prescribing varies so much across DHBs
- whether the rate for non-palliative use is increasing.

Feeding back the results of an audit to prescribers allows them to understand their own practice in the context of regional variation.

Education

Evidence and guidelines suggest that education should discourage using fentanyl for chronic non-cancer pain and in opioid naïve residents. Education could also emphasise the need to measure pain using validated metrics, with regular review and appropriate documentation when prescribing fentanyl. It could cover the pharmacokinetics of fentanyl patches, the importance of a low starting dose and the time until steady state effect.

Part of the education initiative should be to make resources available for all staff to consult. In the National Health Services, Clinical Commissioning Groups give detailed practical instructions for using fentanyl patches in ARC, such as Oxfordshire's Good practice guidelines: use of fentanyl transdermal patches. NPS MedicineWise Australia provides guidance for weaning off opioids.

Documentation

The expert panel consulted when preparing this report indicated that fentanyl patch charts are not in common use in ARC in New Zealand, but could be a helpful tool. These charts could provide a useful focus for multidisciplinary care if they included the following details: indication for the patch; objective assessment of pain using a validated metric; location of the patch; instructions for when to change and remove patches; record of such changes; guidance about not cutting patches, and when the dose delivered can change (eg, fever, heat); monitoring plan and observations such as respiratory rate, confusion, pupils and falls; date for review; and instructions for when to revert to previous analgesia (eg, if pain gets worse).

Avoid double documentation. Staff can record 'See fentanyl patch chart' in the clinical notes.

Education could emphasise the importance of documentation for audit and also for establishing a shared mental model for MDT case review.

Pain assessment

Some evidence indicates that pain in residents with dementia is undertreated. This underscores the need to reassess pain, using a validated pain scale for residents with dementia (eg, MOBID-2, PAINAD or Abbey).

The Health Quality & Safety Commission's useful frailty care guide, Pain assessment and management, explains the PAINAD tool. Using it involves noting key behaviours such as walking, engaging in activities, sleepiness, bowels, food and fluid intake. Staff should raise issues around pain and titrate pain medication or stop it if it is not effective. This tool can encourage the use of non-pharmacologic measures or non-opioid approaches.

Summary

Fentanyl is a powerful medicine that is associated with a range of adverse events, including death. There is evidence that it can benefit cancer pain, but a lack of evidence for its effectiveness with non-cancer pain. Do not use fentanyl patches for residents in acute pain or for opioid naïve residents.

Evidence suggests that much current practice is inconsistent with guidelines for fentanyl use.

Quality improvement approaches could focus on achieving the following.

- Prescribers only prescribe fentanyl patches for non-malignant pain in the ARC setting after conducting a thorough benefit-to-harm evaluation, including a history, physical examination and full diagnosis, and then evaluation is ongoing.
- The resident or their nominated representative gives their consent to the use of strong opioids.
- The ARC facility follows a model of care that includes audit and feedback, staff education, and use of clinical aids such as fentanyl patch charts and pain assessment tools.
- Prescribers use fentanyl only as a last resort and at the lowest possible dose.
- Staff do not cut patches – this can lead to dangerous overdose.
- Staff carry out appropriate monitoring for adverse effects.
- Prescribing involves a time-limited trial of efficacy (eg, 10–14 days).
- Prescribers establish a plan to review and stop the medicine if the pain assessment does not change.
- Documentation includes (ideally on a fentanyl patch chart):
  - indication for fentanyl patch
  - baseline pain assessment (ideally a validated pain tool)
  - site of patch
  - when to change (and document removal)
  - plan for and date of review
  - record of ongoing pain and activity level
  - bowel assessment.

Metrics to evaluate the effect of a quality improvement approach could include:

- frequency of fentanyl patch use in each ARC facility
- indication for use (eg, hip fracture pain, cancer pain, end-of-life care)
- reason for discontinuing use
- adverse events in residents on fentanyl.

Overall discussion | He kōrerorero whānui

This review of the literature around three areas of prescribing in ARC, and evidence for current practice in New Zealand, suggests that not all use of antibiotics for UTI, antipsychotics for BPSD or fentanyl for chronic pain follows evidence-based guidance.

It is important to ask why this inappropriate prescribing is happening. Some issues include: inadequate staffing levels, inadequate knowledge or training among ARC staff, and placing residents with dementia in facilities not capable of providing appropriate dementia care. It may be that addressing some inadequacies of the ARC system may be necessary before it is possible to achieve the ideals of appropriate medicine use. ARC may need to be seen more as an integral and integrated part of primary care.

We note calls for a new funding model that an Ernst & Young review has recommended. The review concluded that the existing ARC funding model relies too heavily on a broad-based average pricing approach and that 'an improved pricing approach would be more strongly connected to evolving evidence-based care models and would distribute funding based on the mix of resources required to deliver these care models at a facility level' (Ernst & Young 2019). ARC is also likely to need a skilled and stable workforce, including strong leadership, teamwork, communication and critical thinking, to support such change.

This report has outlined some areas to target for intervention to reduce the use of inappropriate prescribing and in that way also contribute to a decrease in problematic polypharmacy in the ARC population.

The review of all three areas of prescribing indicates that:

- further audit data would be informative
- all disciplines need well-resourced education
- clear ways of improving documentation are evident
- staff would benefit from clinical decision aids such as: diagnostic and appropriateness criteria; algorithms; and objective assessment of resident characteristics, such as pain or behaviour.

Further audit and research could aim to understand issues such as:

- the reasons behind any discrepancy in prescribing across ethnicities
- the reasons behind any discrepancy in prescribing across DHBs
- the indications documented for prescribing antibiotics, antipsychotics and fentanyl
- how often 'as required' charting actually results in medicine use
- staff teamwork and safety culture in the ARC setting
- the possible value of a National Older Persons' Pain Strategy.

Education should focus on the size of benefits and harms for potentially harmful medication and, where possible, on understanding the proportion of residents who will benefit and the proportion who will be harmed. With this information, staff can understand the implications of using potentially harmful medicines.

Having **medication charts** on specific problematic medications would increase transparency around the indications for medicines and the review plan for each resident.

Prescribers should record the rationale for non-evidence-based prescriptions and avoid handwritten medication charts. Appropriate medication documentation along with resident monitoring information could be a focus for MDT review and empower individual staff to raise issues.

Consent was another common theme. Prescribers must only prescribe potentially harmful medicines, such as opioids and antipsychotics, after discussing the risks and benefits with the resident and/or their nominated representative and gaining their consent.

Multidisciplinary team review is one recommended approach to ensuring that continuing to prescribe medicines such as antipsychotics or fentanyl is appropriate. More than that, regular, scheduled MDT review can be an opportunity to review all of a resident's medications, not just antibiotics, antipsychotics and fentanyl, and in that way to address problematic polypharmacy. A well-resourced ARC pharmacy service could coordinate this process and bring about cost savings and increased quality of care. This approach would be consistent with the Ministry of Health's Healthy Ageing Strategy, which guides providers to improve medicines management through models of care and contractual arrangements that provide equitable access to medicines management services targeting people receiving high-risk medicines and/or polypharmacy, people in aged residential care and older people with complex health needs.

Deprescribing is an important phase of use for many medicines that residents, carers and clinical staff alike should understand. The King's Fund report concluded that many people stay on medicines past the point where they gain optimal benefit. Health professionals should review medications and consider if they can stop a resident's treatment. In many cases, 'end-of-life' considerations may apply to many chronic diseases, not just cancer-related conditions, and the benefit of prescribing a number of medicines could be minimal (Duerden et al 2013). Much advice on when to initiate a medicine is available, but there is far less information and evidence to support decisions about whether to stop therapy.

Inequities in health outcomes between different ethnic groups exist across the spectrum of clinical care and there is no reason to think the ARC setting would be any different. Due to the nature of this review and literature available, we have not reported on inequities that may exist between different groups in ARC. However, the sector needs to think about equity issues in designing and implementing interventions as well as in conducting future audits.

Achieving some of the improvements listed above will involve the alliance partnerships required across sectors, with the DHBs, primary care and the ARC sector working more closely together when they are designing and funding service provision.

References | Ngā tohutoro

ACSQHC. 2019. Antimicrobial Prescribing and Infections in Australian Aged Care Homes: Results of the 2018 Aged Care National Antimicrobial Prescribing Survey. Sydney: Australian Commission on Safety and Quality in Health Care.

AGS. 2019. American Geriatrics Society 2019 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society* 67(4): 674–94. DOI: 10.1111/jgs.15767 (accessed 3 April 2020).

ANZCA (Australian and New Zealand College of Anaesthetists). 2018. Position statement on the use of slow-release opioid preparations in the treatment of acute pain. *ANZCA Bulletin* March: 14–16. URL: http://www.anzca.edu.au/resources/endorsed-guidelines/position-statement-on-the-use-of-slow-release-opio (accessed 4 April 2020).

ANZSGM. 2016. Position statement 26: Management of behavioural and psychological symptoms of dementia (BPSD). Australian and New Zealand Society for Geriatric Medicine. URL: http://medi-guide.meditool.cn/ymtpdf/58CD986C-613D-8AC8-1CC6-61ED4D6EC394.pdf (accessed 4 April 2020).

Ballard C, Corbett A, Orrell M, et al. 2018. Impact of person-centred care training and person-centred activities on quality of life, agitation, and antipsychotic use in people with dementia living in nursing homes: a cluster-randomised controlled trial. *PLOS Medicine* 15(2): e1002500. DOI: 10.1371/journal.pmed.1002500 (accessed 5 April 2020).

Biggel M, Heytens S, Latour K, et al. 2019. Asymptomatic bacteriuria in older adults: the most fragile women are prone to long-term colonization. *BMC Geriatrics* 19(1): 170. DOI: 10.1186/s12877-019-1181-4 (accessed 5 April 2020).

Birkenhager-Gillesse EG, Kollen BJ, Achterberg WP, et al. 2018. Effects of psychosocial interventions for behavioral and psychological symptoms in dementia on the prescription of psychotropic drugs: a systematic review and meta-analyses. *Journal of the American Medical Directors Association* 19(3): 276.e271–276.e279. DOI: 10.1016/j.jamda.2017.12.100 (accessed 4 April 2020).

Bjerre LM, Farrell B, Hogel M, et al. 2018. Deprescribing antipsychotics for behavioural and psychological symptoms of dementia and insomnia: evidence-based clinical practice guideline. *Canadian Family Physician* 64(1): 17–27.

bpac^{nz}. 2008. Fentanyl patches. *Best Practice Journal* (16): 30–33. URL: https://bpac.org.nz/BPJ/2008/September/docs/bpj16_fenanyl_pages_30-33.pdf (accessed 4 April 2020).

bpac^{nz}. 2013. Managing patients with dementia: what is the role of antipsychotics? *Best Practice Journal* (57): 26–36. URL: https://bpac.org.nz/BPJ/2013/December/dementia.aspx (accessed 4 April 2020).

bpac^{nz}. 2015. A pragmatic guide to asymptomatic bacteriuria and testing for urinary tract infections (UTIs) in people aged over 65 years. *Best Practice Journal* (July): 14–25. URL: https://bpac.org.nz/BT/2015/July/guide.aspx (accessed 4 April 2020).

bpac^{nz}. 2017a. Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use within human health and healthcare in New Zealand. URL: https://bpac.org.nz/guidelines/3/ (accessed 4 April 2020).

bpac^{nz}. 2017b. The bpac^{nz} antibiotic guide: 2017 edition. URL: https://bpac.org.nz/2017/abguide.aspx (accessed 4 April 2020).

bpac^{nz}. 2017c. An update on the use of nitrofurantoin in patients with renal impairment. *Best Practice Journal* (71): 41–2. URL: https://bpac.org.nz/BPJ/2015/October/docs/BPJ71-news-nitrofurantoin.pdf (accessed 5 April 2020).

bpac^{nz}. 2018a. Antibiotics: the future is short. *Best Practice Journal* (June): 1–7. URL: https://bpac.org.nz/2018/antibiotics.aspx (accessed 5 April 2020).

bpac^{nz}. 2018b. Understanding the role of opioids in chronic non-malignant pain. *Best Practice Journal* (October). URL: https://bpac.org.nz/2018/docs/opioids-chronic.pdf (accessed 5 April 2020).

Brown KA, Daneman N, Schwartz KL, et al. 2019. The urine culturing cascade: variation in nursing home urine culturing and association with antibiotic use and *Clostridiodes difficile* infection. *Clinical Infectious Diseases* ciz482. DOI: 10.1093/cid/ciz482 (accessed 5 April 2020).

CFHI. 2020. Reducing antipsychotic medication use in long term care. Canadian Foundation for Healthcare Improvement. URL: https://www.cfhi-fcass.ca/WhatWeDo/recent-programs/reducing-antipsychotic-medication-use-collaborative (accessed 5 April 2020).

Cioltan H, Alshehri S, Howe C, et al. 2017. Variation in use of antipsychotic medications in nursing homes in the United States: a systematic review. *BMC Geriatrics* 17(1): 32. DOI: 10.1186/s12877-017-0428-1 (accessed 5 April 2020).

Cooper FP, Alexander CE, Sinha S, et al. Policies for replacing long-term indwelling urinary catheters in adults. *Cochrane Database of Systematic Reviews* 2016, Issue 7, Art. No. CD011115. DOI: 10.1002/14651858.CD011115.pub2 (accessed 5 April 2020).

Crnich CJ, Drinka PJ. 2014. Improving the management of urinary tract infections in nursing homes: it's time to stop the tail from wagging the dog. *Annals of Long-Term Care* 2(9): 32–6.

Croucher M, Duncan C, Fisher M, et al. 2008. The use of antipsychotics in residential aged care: Clinical recommendations developed by the RANZCP Faculty of Psychiatry of Old Age (New Zealand). URL: https://bpac.org.nz/a4d/resources/docs/RANZCP_Clinical_recommendations.pdf (accessed 5 April 2020).

D'Agata E, Loeb MB, Mitchell SL. 2013. Challenges in assessing nursing home residents with advanced dementia for suspected urinary tract infections. *Journal of the American Geriatrics Society* 61(1): 62–6. DOI: 10.1111/jgs.12070 (accessed 5 April 2020).

Daoust R, Paquet J, Moore L, et al. 2018. Recent opioid use and fall-related injury among older patients with trauma. *Canadian Medical Association Journal* 190(16): E500–E506. DOI: 10.1503/cmaj.171286 (accessed 5 April 2020).

Das R, Towle V, Van Ness PH, et al. 2011. Adverse outcomes in nursing home residents with increased episodes of observed bacteriuria. *Infection Control and Hospital Epidemiology* 32(1): 84–6. DOI: 10.1086/657664 (accessed 6 April 2020).

Davis A, Davis K, Gerard C, et al. 2016. Opioid rain: opioid prescribing is growing and practice is diverging. *New Zealand Medical Journal* 129(1440): 11–7.

De Bellis A, Bradley S, Xiao L, et al. 2017. Antipsychotic use for behaviours by persons with dementia in residential aged care: the relatives' perspectives. *Australian Journal of Advanced Nursing* 35(1): 23–32.

Dowson L, Bennett N, Buising K, et al. 2019. Urinary tract infections in Australian aged care homes: antibiotic prescribing practices and concordance to national guidelines. *American Journal of Infection Control* 48(3): 261–6. DOI: 10.1016/j.ajic.2019.08.034 (accessed 6 April 2020).

Drekonja DM, Grigoryan L, Lichtenberger P, et al. 2019. Teamwork and safety climate affect antimicrobial stewardship for asymptomatic bacteriuria. *Infection Control and Hospital Epidemiology* 40(9): 963–7. DOI: 10.1017/ice.2019.176 (accessed 6 April 2020).

Duerden M, Avery T, Payne R. 2013. Polypharmacy and Medicines Optimisation: Making it safe and sound. London: The King's Fund.

Ernst & Young. 2019. *Aged Residential Care Funding Model Review*. Wellington: Ernst & Young NZ.

Fain KM, Castillo-Salgado C, Dore DD, et al. 2017. Inappropriate fentanyl prescribing among nursing home residents in the United States. *Journal of the American Medical Directors Association* 18(2): 138–44. DOI: 10.1016/j.jamda.2016.08.015 (accessed 6 April 2020).

Falcone M, Paul M, Yahav D, et al. 2019. Antimicrobial consumption and impact of antimicrobial stewardship programmes in long-term care facilities. *Clinical Microbiology and Infection* 25(5): 562–9. DOI: 10.1016/j.cmi.2018.07.028 (accessed 6 April 2020).

FDA. 2008. Food and Drug Administration alert: antipsychotics. URL: http://www.canhr.org/newsroom/newdev_archive/2009/FDA-Alert-on-Antipsychotics.pdf (accessed 4 April 2020).

Finucane TE. 2017. 'Urinary tract infection' —requiem for a heavyweight. *Journal of the American Geriatrics Society* 65(8): 1650–5. DOI: 10.1111/jgs.14907 (accessed 6 April 2020).

Fleet E, Gopal Rao G, Patel B, et al. 2014. Impact of implementation of a novel antimicrobial stewardship tool on antibiotic use in nursing homes: a prospective cluster randomized control pilot study. *Journal of Antimicrobial Chemotherapy* 69(8): 2265–73. DOI: 10.1093/jac/dku115 (accessed 6 April 2020).

Gadzhanova S, Roughead EE, Pont LG. 2015. Safety of opioid patch initiation in Australian residential aged care. *Medical Journal of Australia* 203(7): 298. DOI: 10.5694/mja15.00174 (accessed 7 April 2020).

Gauld NJ, Zeng IS, Ikram RB, et al. 2016. Treatment of uncomplicated cystitis: analysis of prescribing in New Zealand. *New Zealand Medical Journal* 129(1437): 55–63.

Genao L, Buhr GT. 2012. Urinary tract infections in older adults residing in long-term care facilities. *Annals of Long-Term Care* 20(4): 33–8.

Gharbi M, Drysdale JH, Lishman H, et al. 2019. Antibiotic management of urinary tract infection in elderly patients in primary care and its association with bloodstream infections and all cause mortality: population based cohort study. *BMJ* 364: l525. DOI: 10.1136/bmj.l525 (accessed 7 April 2020).

Griffioen C, Husebo BS, Flo E, et al. 2019. Opioid prescription use in nursing home residents with advanced dementia. *Pain Medicine* 20(1): 50–7. DOI: 10.1093/pm/pnx268 (accessed 7 April 2020).

Gurwitz JH, Field TS, Judge J, et al. 2005. The incidence of adverse drug events in two large academic long-term care facilities. *American Journal of Medicine* 118(3): 251–8. DOI: 10.1016/j.amjmed.2004.09.018 (accessed 7 April 2020).

Haaijman J, Stobberingh EE, van Buul LW, et al. 2018. Urine cultures in a long-term care facility (LTCF): time for improvement. *BMC Geriatrics* 18(1): 221. DOI: 10.1186/s12877-018-0909-x (accessed 7 April 2020).

Hadley G, Derry S, Moore RA, et al. Transdermal fentanyl for cancer pain. *Cochrane Database of Systematic Reviews* 2013, Issue 10, Art. No. CD010270. DOI: 10.1002/14651858.CD010270.pub2 (accessed 7 April 2020).

Health Quality & Safety Commission. 2013. Fentanyl transdermal patches. *Medication Safety Watch* 8: 1. URL: https://www.hqsc.govt.nz/assets/Medication-Safety/Watch-Updates/Medication-Safety-Watch-8-Nov-2013.pdf (accessed 7 April 2020).

Health Quality & Safety Commission. 2019. *Atlas of Healthcare Variation*. Wellington: Health Quality & Safety Commission. URL: https://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/ (accessed 7 April 2020).

High KP, Bradley SF, Gravenstein S, et al. 2009. Clinical practice guideline for the evaluation of fever and infection in older adult residents of long-term care facilities: 2008 update by the Infectious Diseases Society of America. *Clinical Infectious Diseases* 48(2): 149–171. DOI: 10.1086/595683 (accessed 7 April 2020).

Hutton DW, Krein SL, Saint S, et al. 2018. Economic evaluation of a catheter-associated urinary tract infection prevention program in nursing homes. *Journal of the American Geriatrics Society* 66(4): 742–7. DOI: 10.1111/jgs.15316 (accessed 7 April 2020).

Institute for Safe Medication Practices Canada. 2009. Analysis of international findings from incidents involving fentanyl transdermal patches. *ISMP Canada Safety Bulletin* 9(10): 1–2.

Jackson G, Gerard C, Minko N, et al. 2014. Variation in benzodiazepine and antipsychotic use in people aged 65 years and over in New Zealand. *New Zealand Medical Journal* 127(1396): 67–78.

James I, Jackman L. 2017. Understanding Behaviour in Dementia that Challenges: A guide to assessment and treatment: Jessica Kingsley Publishers.

Janus SI, van Manen JG, IJzerman MJ, et al. 2016. Psychotropic drug prescriptions in Western European nursing homes. *International Psychogeriatrics* 8(11): 1775–90. DOI: 10.1017/s1041610216001150 (accessed 7 April 2020).

Jump RLP, Crnich CJ, Mody L, et al. 2018. Infectious diseases in older adults of long-term care facilities: update on approach to diagnosis and management. *Journal of the American Geriatrics Society* 66(4): 789–803. DOI: 10.1111/jgs.15248 (accessed 7 April 2020).

Kales HC, Gitlin LN, Lyketsos CG. 2015. Assessment and management of behavioral and psychological symptoms of dementia. *BMJ* 350: h369. DOI: 10.1136/bmj.h369 (accessed 7 April 2020).

Kerr C, Heyward R, Large J, Croucher M. 2017. *Dementia Is Everybody's Business: Working together to achieve a shared South Island model of care.* The South Island Health of Older People Service Level Alliance. URL: https://www.sialliance.health.nz/UserFiles/SouthIslandAlliance/File/twice%20reduced%20size%20Model%20of%20care%20v7%203%20Oct.pdf (accessed 6 April 2020).

Kirkham J, Sherman C, Velkers C, et al. 2017. Antipsychotic use in dementia. *Canadian Journal of Psychiatry* 62(3): 170–81. DOI: 10.1177/0706743716673321 (accessed 7 April 2020).

Kistler CE, Zimmerman S, Scales K, et al. 2017. The antibiotic prescribing pathway for presumed urinary tract infections in nursing home residents. *Journal of the American Geriatrics Society* 65(8): 1719–25. DOI: 10.1111/jgs.14857 (accessed 7 April 2020).

Kitwood T (original author), Brooker D (ed). 2019. *Dementia Reconsidered Revisited. The person still comes first.* London: Open University Press.

La Frenais FL, Bedder R, Vickerstaff V, et al. 2018. Temporal trends in analgesic use in long-term care facilities: a systematic review of international prescribing. *Journal of the American Geriatrics Society* 66(2): 376–82. DOI: 10.1111/jgs.15238 (accessed 7 April 2020).

Lean K, Nawaz RF, Jawad S, et al. 2019. Reducing urinary tract infections in care homes by improving hydration. *BMJ Open Quality* 8(3): e000563. DOI: 10.1136/bmjoq-2018-000563 (accessed 7 April 2020).

Lee C, Phillips C, Vanstone JR. 2018. Educational intervention to reduce treatment of asymptomatic bacteriuria in long-term care. *BMJ Open Quality* 7(4): e000483. DOI: 10.1136/bmjoq-2018-000483 (accessed 7 April 2020).

Lemoine L, Dupont C, Capron A, et al. 2018. Prospective evaluation of the management of urinary tract infections in 134 French nursing homes. *Médecine et Maladies Infectieuses* 48(5): 359–364. DOI: 10.1016/j.medmal.2018.04.387 (accessed 7 April 2020).

Lim CJ, Stuart RL, Kong DC. 2015. Antibiotic use in residential aged care facilities. *Australian Family Physician* 44(4): 192–6.

Livingston G, Kelly L, Lewis-Holmes E, et al. 2014. A systematic review of the clinical effectiveness and cost-effectiveness of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia. *Health Technology Assessment* 18(39): 1–226, v–vi. DOI: 10.3310/hta18390 (accessed 7 April 2020).

Loeb M, Bentley DW, Bradley S, et al. 2001. Development of minimum criteria for the initiation of antibiotics in residents of long-term-care facilities: results of a consensus conference. *Infection Control and Hospital Epidemiol*ogy 2(2): 120–4. DOI: 10.1086/501875 (accessed 7 April 2020).

Loeb M, Brazil K, Lohfeld L, et al. 2005. Effect of a multifaceted intervention on number of antimicrobial prescriptions for suspected urinary tract infections in residents of nursing homes: cluster randomised controlled trial. *BMJ* 331(7518): 669. DOI: 10.1136/bmj.38602.586343.55 (accessed 7 April 2020).

McGeer A, Campbell B, Emori TG, et al. 1991. Definitions of infection for surveillance in long-term care facilities. *Am J Infect Control* 19(1): 1-7. DOI: 10.1016/0196-6553(91)90154-5

Maher AR, Maglione M, Bagley S, et al. 2011. Efficacy and comparative effectiveness of atypical antipsychotic medications for off-label uses in adults: a systematic review and meta-analysis. *Journal of the American Medical Association* 306(12): 1359–69. DOI: 10.1001/jama.2011.1360 (accessed 7 April 2020).

Maust DT, Kim HM, Seyfried LS, et al. 2015. Antipsychotics, other psychotropics, and the risk of death in patients with dementia: number needed to harm. *JAMA Psychiatry* 72(5): 438–45. DOI: 10.1001/jamapsychiatry.2014.3018 (accessed 7 April 2020).

Meddings J, Saint S, Krein SL, et al. 2017. Systematic review of interventions to reduce urinary tract infection in nursing home residents. *Journal of Hospital Medicine* 12(5): 356–68. DOI: 10.12788/jhm.2724 (accessed 7 April 2020).

Metzger ED, Racine AM, Inouye, SK. 2018. Advanced dementia in long-term care: avoiding the pitfalls of fall prevention. *American Journal of Geriatric Psychiatry* 6(4): 416–8. DOI: 10.1016/j.jagp.2017.12.007 (accessed 7 April 2020).

Mody L, Greene MT, Meddings J, et al. 2017. A national implementation project to prevent catheter-associated urinary tract infection in nursing home residents. *JAMA Internal Medicine* 177(8): 1154–62. DOI: 10.1001/jamainternmed.2017.1689 (accessed 8 April 2020).

Mody L, Krein SL, Saint S, et al. 2015. A targeted infection prevention intervention in nursing home residents with indwelling devices: a randomized clinical trial. *JAMA Internal Medicine* 175(5): 714–23. DOI: 10.1001/jamainternmed.2015.132 (accessed 8 April 2020).

Moniz Cook ED, Swift K, James I, et al. Functional analysis-based interventions for challenging behaviour in dementia. *Cochrane Database of Systematic Reviews* 2012, Issue 2, Art. No. CD006929. DOI: 10.1002/14651858.CD006929.pub2 (accessed 8 April 2020).

Moore A, Derry S, Eccleston C, et al. 2013. Expect analgesic failure; pursue analgesic success. *BMJ* 346: f2690. DOI: 10.1136/bmj.f2690 (accessed 8 April 2020).

Muhlbauer V, Luijendijk H, Dichter M, et al. Antipsychotics for agitation and psychosis in people with Alzheimer's disease and vascular dementia: protocol. *Cochrane Database of Systematic Reviews* 2019, Issue 4, Art. No. CD013304. URL: https://www.cochrane.org/CD013304/DEMENTIA_antipsychotics-agitation-and-psychosis-people-alzheimers-disease-and-vascular-dementia (accessed 8 April 2020).

Ndukwe HC, Nishtala PS, Wang T, et al. 2016. Quality use of antipsychotic medicines in residential aged care facilities in New Zealand. *Journal of Primary Health Care* 8(4): 335–43. DOI: 10.1071/hc15054 (accessed 8 April 2020).

Ndukwe HC, Tordoff JM, Wang T, et al. 2014. Psychotropic medicine utilization in older people in New Zealand from 2005 to 2013. *Drugs & Aging* 31(10): 755–68. DOI: 10.1007/s40266-014-0205-1 (accessed 8 April 2020).

NICE. 2015. Antipsychotics in people living with dementia: key therapeutic topic. National Institute for Health and Care Excellence. URL: https://www.nice.org.uk/advice/ktt7 (accessed 5 April 2020).

NICE. 2017. Medicines optimisation in chronic pain: key therapeutic topic. National Institute for Health and Care Excellence. URL: www.nice.org.uk/guidance/ktt21 (accessed 8 April 2020).

Nicolle LE. 2016. Urinary tract infections in the older adult. *Clinics in Geriatric Medicine* 32(3): 523–38. DOI: 10.1016/j.cger.2016.03.002 (accessed 8 April 2020).

Nicolle LE, Bradley S, Colgan R, et al. 2005. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clinical Infectious Diseases* 40(5): 643–54.DOI: 10.1086/427507 (accessed 8 April 2020).

NSW Agency for Clinical Innovation. 2019. Over-diagnosis and over-treatment in the frail elderly. Sydney: New South Wales Government. URL: https://www.aci.health.nsw.gov.au/resources/aged-health/other/over-diagnosis-and-over-treatment-in-the-frail-elderly (accessed 8 April 2020).

Nuckols TK, Anderson L, Popescu I, et al. 2014. Opioid prescribing: a systematic review and critical appraisal of guidelines for chronic pain. *Annals of Internal Medicine* 160(1): 38–47. DOI: 10.7326/0003-4819-160-1-201401070-00732 (accessed 8 April 2020).

O'Mahony D, O'Sullivan D, Byrne S, et al. 2015. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age and Ageing* 44(2): 213–8. DOI: 10.1093/ageing/afu145 (accessed 8 April 2020).

Orr PH, Nicolle LE, Duckworth H, et al. 1996. Febrile urinary infection in the institutionalized elderly. *American Journal of Medicine* 100(1): 71–7. DOI: 10.1016/s0002-9343(96)90014-5 (accessed 8 April 2020).

Pimentel CB, Gurwitz JH, Tjia J, et al. 2016. New initiation of long-acting opioids in long stay nursing home residents. *Journal of the American Geriatrics Society* 64(9): 1772–8.

Power GA. 2014. *Dementia beyond Disease: Enhancing well-being*. Baltimore, MD: Health Professions Press.

Public Health Ontario. 2018. *Urinary Tract Infection (UTI) Program: Implementation guide, second edition: Reducing antibiotic harms in long-term care*. URL: https://www.publichealthontario.ca/-/media/documents/uti-implementation-guide.pdf?la=en (accessed 8 April 2020).

RANZCP. 2016. Professional Practice Guideline 10: Antipsychotic medications as a treatment of behavioural and psychological symptoms of dementia. Royal Australian and New Zealand College of Psychiatrists. URL: https://www.ranzcp.org/files/resources/college_statements/practice_guidelines/pg10-pdf.aspx (accessed 8 April 2020).

Reinecke H, Weber C, Lange K, et al. 2015. Analgesic efficacy of opioids in chronic pain: recent meta-analyses. *British Journal of Pharmacology* 172(2): 324–33. DOI: 10.1111/bph.12634 (accessed 8 April 2020).

Richter T, Meyer G, Mohler R, et al. Psychosocial interventions for reducing antipsychotic medication in care home residents. *Cochrane Database of Systematic Reviews* 2012, Issue 12, Art. No. CD008634. DOI: 10.1002/14651858.CD008634.pub2 (accessed 8 April 2020).

RiskAnalytica. 2016. *Modelling the CFHI Reducing Antipsychotic Medication Use Collaborative: National and provincial analysis final report*. Ottawa: Canadian Foundation for Healthcare Improvement. URL: https://www.cfhi-fcass.ca/sf-docs/default-source/work-with-us/ap-riskanalytica-e.pdf?sfvrsn=f004d344_4 (accessed 5 April 2020).

Roe J, Coulson S, Ockerby C, et al. 2019. Staff perceptions of caring for people exhibiting behavioural and psychological symptoms of dementia in residential aged care: a cross-sectional survey. *Australasian Journal of Ageing*. DOI: 10.1111/ajag.12734 (accessed 8 April 2020). [Epub ahead of print.]

Rosello A, Hayward AC, Hopkins S, et al. 2017. Impact of long-term care facility residence on the antibiotic resistance of urinary tract *Escherichia coli* and *Klebsiella*. *Journal of Antimicrobial Chemotherapy* 72(4): 1184–92. DOI: 10.1093/jac/dkw555 (accessed 5 April 2020).

Royal New Zealand College of General Practitioners. 2015. Antibiotics and antimicrobial resistance: avoiding a post-antibiotic era. URL: https://www.rnzcgp.org.nz/gpdocs/New-website/Advocacy/05.2015-Antibiotics-and-antimicrobial-resistance-Policy-brief-1.pdf (accessed 8 April 2020).

Sadler S, Holmes M, Ren S, et al. 2017. Cost-effectiveness of antibiotic treatment of uncomplicated urinary tract infection in women: a comparison of four antibiotics. *BJGP Open* 1(3): bjgpopen17X101097. DOI: 10.3399/bjgpopen17X101097 (accessed 8 April 2020).

Salem-Schatz S, Griswold P, Kandel R, et al. 2019. A statewide program to improve management of suspected urinary tract infection in long-term care. *Journal of the American Geriatrics Society* 68(1): 62–9. DOI: 10.1111/jgs.16261 (accessed 8 April 2020).

Sawan M, Jeo, Y-H, Chen T. 2019. Psychotropic medicines use in Residents And Culture: Influencing Clinical Excellence (PRACTICE) tool©: a development and content validation study. *Research in Social and Administrative Pharmacy* 15: 691–700.

Schneider LS, Dagerman K, Insel PS. 2006. Efficacy and adverse effects of atypical antipsychotics for dementia: meta-analysis of randomized, placebo-controlled trials. *American Journal of Geriatric Psychiatry* 14(3): 191–210. DOI: 10.1097/01.JGP.0000200589.01396.6d (accessed 8 April 2020).

Schneider-Thoma J, Efthimiou O, Huhn M, et al. 2018. Second-generation antipsychotic drugs and short-term mortality: a systematic review and meta-analysis of placebo-controlled randomised controlled trials. *The Lancet Psychiatry* 5(8): 653–63. DOI: 10.1016/s2215-0366(18)30177-9 (accessed 8 April 2020).

Schulz L, Hoffman RJ, Pothof J, et al. 2016. Top ten myths regarding the diagnosis and treatment of urinary tract infections. *Journal of Emergency Medicine* 51(1): 25–30. DOI: 10.1016/j.jemermed.2016.02.009 (accessed 8 April 2020).

Stone ND, Ashraf MS, Calder J, et al. 2012. Surveillance definitions of infections in long-term care facilities: revisiting the McGeer criteria. *Infect Control Hosp Epidemiol* 33(10): 965–77. DOI:10.1086/667743

Sundvall PD, Ulleryd P, Gunnarsson RK. 2011. Urine culture doubtful in determining etiology of diffuse symptoms among elderly individuals: a cross-sectional study of 32 nursing homes. *BMC Family Practice* 12: 36. DOI: 10.1186/1471-2296-12-36 (accessed 8 April 2020).

Tampi RR, Tampi DJ, Balachandran S, et al. 2016. Antipsychotic use in dementia: a systematic review of benefits and risks from meta-analyses. *Therapeutic Advances in Chronic Disease* 7(5): 229–45. DOI: 10.1177/2040622316658463 (accessed 8 April 2020).

Thomas MG, Smith AJ, Tilyard M. 2014. Rising antimicrobial resistance: a strong reason to reduce excessive antimicrobial consumption in New Zealand. *New Zealand Medical Journal* 127(1394): 72–84.

Thompson Coon J, Abbott R, Rogers M, et al. 2014. Interventions to reduce inappropriate prescribing of antipsychotic medications in people with dementia resident in care homes: a systematic review. *Journal of the American Medical Directors Association* 15(10): 706–18. DOI: 10.1016/j.jamda.2014.06.012 (accessed 8 April 2020).

Thompson ND, Penna A, Eure TR, et al. 2020. Epidemiology of antibiotic use for urinary tract infection in nursing home residents. *Journal of the American Medical Directors Association* 21(1): 91–6. DOI: 10.1016/j.jamda.2019.11.009 (accessed 8 April 2020).

Thornley L. 2015. Qualitative research on 'Antipsychotic use in dementia'. Quigley and Watts. URL: https://www.pharmac.govt.nz/assets/qualitative-research-on-antipsychotic-use-in-dementia.pdf (accessed 4 April 2020).

Tordoff JM, Ailabouni NJ, Browne DP, et al. 2016. Improvements in the prescribing of antipsychotics in dementia and psychogeriatric units in New Zealand. *International Journal of Clinical Pharmacy* 38(4): 941–9. DOI: 10.1007/s11096-016-0318-1 (accessed 5 April 2020).

Upton A, McEwan M, Williamson D. 2016. Urinalysis requests on the elderly residing in the Auckland community: tick box requesting? *New Zealand Medical Journal* 129(1429): 64–70.

Van Leeuwen E, Petrovic M, van Driel ML, et al. 2018. Discontinuation of long-term antipsychotic drug use for behavioral and psychological symptoms in older adults aged 65 years and older with dementia. *Journal of the American Medical Directors Association* 19(11): 1009–14. DOI: 10.1016/j.jamda.2018.06.023 (accessed 8 April 2020).

Veal, FC, Bereznicki LR, Thompson AJ, et al. 2014. Pharmacological management of pain in Australian aged care facilities. *Age and Ageing* 43(6): 851–6. DOI: 10.1093/ageing/afu072 (accessed 8 April 2020).

Wagner B, Filice GA, Drekonja D, et al. 2014. Antimicrobial stewardship programs in inpatient hospital settings: a systematic review. *Infection Control and Hospital Epidemiology* 35(10): 1209–28. DOI: 10.1086/678057 (accessed 8 April 2020).

Walsh KA, Dennehy R, Sinnott C, et al. 2017. Influences on decision-making regarding antipsychotic prescribing in nursing home residents with dementia: a systematic review and synthesis of qualitative evidence. *Journal of the American Medical Directors Association* 18(10): 897.e891–897.e812. DOI: 10.1016/j.jamda.2017.06.032 (accessed 8 April 2020).

Warren JW, Damron D, Tenney JH, et al. 1987. Fever, bacteremia, and death as complications of bacteriuria in women with long-term urethral catheters. *Journal of Infectious Diseases* 155(6): 1151–8. DOI: 10.1093/infdis/155.6.1151 (accessed 8 April 2020).

Watt JA, Goodarzi Z, Veroniki AA, et al. 2019. Comparative efficacy of interventions for aggressive and agitated behaviors in dementia: a systematic review and network meta-analysis. *Annals of Internal Medicine*. DOI: 10.7326/m19-0993 (accessed 8 April 2020). [Epub ahead of print.]

Westbury J, Gee P, Ling T, et al. 2016. Reducing the Use of Sedative medication in Aged Care Facilities: Implementation of the 'RedUSe' project into everyday practice: Final Report Executive Summary. Hobart: Wicking Dementia Research & Education Centre, University of

Tasmania. URL: https://www.utas.edu.au/__data/assets/pdf_file/0020/1100765/Reducing-the-Use-of-Sedative-Medication-in-Aged-Care-Facilities-executive-summary.pdf (accessed 5 April 2020).

Westbury J, Gee P, Ling T, et al. 2018. RedUSe: reducing antipsychotic and benzodiazepine prescribing in residential aged care facilities. *Medical Journal of Australia* 208(9): 398–403.

Westbury J, Gee P, Ling T, et al. 2019. More action needed: psychotropic prescribing in Australian residential aged care. *Australian and New Zealand Journal of Psychiatry* 53(2): 136–47. DOI:10.1177/0004867418758919 (accessed 5 April 2020).

Whyler N, Tomlin A, Tilyard M, et al. 2018. Ethnic disparities in community antibacterial dispensing in New Zealand, 2015. *New Zealand Medical Journal* 131(1480): 50–60.

Wilson A, Kelly M, Henderson E, et al. 2019. Reducing inappropriate urine testing at Hutt Valley District Health Board using Choosing Wisely principles. *New Zealand Medical Journal* 132(1488): 11–20.

Zalmanovici Trestioreanu A, Lador A, Sauerbrun-Cutler MT, et al. Antibiotics for asymptomatic bacteriuria. *Cochrane Database of Systematic Reviews* 2015, Issue 4, Art. No. CD009534. DOI: 10.1002/14651858.CD009534.pub2 (accessed 8 April 2020).

Zurmehly J. 2018. Implementing a nurse-driven protocol to reduce catheter-associated urinary tract infections in a long-term acute care hospital. *Journal of Continuing Education in Nursing* 49(8): 372–7. DOI: 10.3928/00220124-20180718-08 (accessed 8 April 2020).