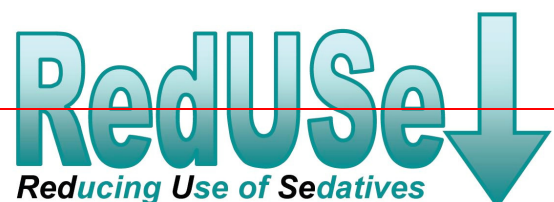




Australian Government
Department of Health and Ageing



The Pharmacy
Guild of Australia



Community Pharmacy promoting appropriate sedative use in Aged Care: the 'RedUse' project

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FULL FINAL REPORT

Acknowledgement

The RedUSE project was funded by the Australian Government Department of Health and Ageing – as part of the Fourth Community Pharmacy Agreement through the Fourth Community Pharmacy Agreement Grants Program managed by the Pharmacy Guild of Australia.

The researchers would like to thank Professor John Snowdon and Dr Martin Morrissey for their contributions at the launch event and for their ongoing support and advice. We would also like to acknowledge the contribution of Dr Jane Tolman, Liz Musgrove, and Dr Jonathon Isles for their enthusiastic participation at the pharmacist weekend educational session.

It should be acknowledged that the RedUSE launch event was supported financially, in part, by both the Pharmaceutical Society of Australia (Tasmanian Branch) and the Southern Division of General Practice.

Finally, we would like to thank the members of the advisory committee, the administration and nursing staff of all participant aged care homes, and the pharmacists serving those homes whose support and enthusiasm for the project made 'RedUSE' possible.

This report was produced with the financial assistance of the Australian Government Department of Health and Ageing. The financial assistance provided must not be taken as endorsement of the contents of this report.

The Pharmacy Guild of Australia manages the Fourth Community Pharmacy Agreement Research & Development which supports research and development in the area of pharmacy practice. The funded projects are undertaken by independent researchers and therefore, the views, hypotheses and subsequent findings of the research are not necessarily those of the Pharmacy Guild.

Acronyms

Acronym	Explanation
ACFI	Aged Care Funding Instrument
ACH	Aged Care Home
AIHW	Australian Institute of Health and Welfare
ATC	Anatomical Therapeutical Classification
BPSD	Behavioural and Psychological Symptoms of Dementia
DART-AD	Dementia Antipsychotic withdRawal Trial – Alzheimer’s Disease
df	degrees of freedom
DUE	Drug Use Evaluation
GP	General Practitioner
<i>M</i>	Mean
MAC	Medication Advisory Committee
NPS	National Prescribing Service
OPMHS	Older Person Mental Health Service
PBS	Pharmaceutical Benefits Scheme
PRN	‘Pro re nata’ or ‘as required’
QUM	Quality Use of Medicines
RACF	Residential Aged Care Facilities
RedUSE	‘Reducing the Use of Sedatives’
RMMR	Residential Medication Management Review
SD	Standard Deviation
UMORE	Unit for Medication Outcomes, Research and Education
WHO	World Health Organisation

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Abstract

Objective: To evaluate a pharmacy-led, multi-faceted, interdisciplinary intervention to reduce the use of benzodiazepines and antipsychotics in aged care homes: the 'RedUSE' (Reducing Use of Sedatives) project.

Methods: RedUSE was a controlled trial conducted in 25 Tasmanian aged care homes. A series of 'Quality Use of Medicines' (QUM) strategies were provided to intervention homes by community pharmacists, including two medication audit cycles, nursing staff education and interdisciplinary 'sedative review plans'. Data on psychotropic use at each home was collected utilising a customised software application at baseline, 12 and 26 weeks.

Results: An average of 1591 residents' medications was audited for each RedUSE measurement. Over the six month trial, there was a significant reduction in the percentage of intervention home residents regularly taking benzodiazepines (31.8% to 26.9%, $p < 0.005$) and antipsychotics (20.3% to 18.6%, $p < 0.05$), whereas overall control home use did not alter significantly. For residents taking benzodiazepines and antipsychotics at baseline, there were significantly more dose reductions/cessations in intervention than in control homes (benzodiazepines: 39.6% vs. 17.6%, $p < 0.0001$; antipsychotics: 36.9% vs. 20.9%, $p < 0.01$). Pharmacist and nursing staff participants reported a high degree of satisfaction with the project's interventions.

Conclusion: 'RedUSE' led to a significant reduction in the proportion of residents in aged care homes taking benzodiazepines and antipsychotics, and a significant increase in the number of dose reductions of these agents. The findings suggest that a multi-faceted program incorporating QUM strategies, coordinated through community pharmacy, can offer an effective approach in reducing sedative use in aged care homes.

Unit for Medication Outcomes, Research and Education (UMORE)

University of Tasmania

1. BACKGROUND AND RATIONALE

The RedUSE (Reducing Use of Sedatives) Project
September 2009

1.1 BACKGROUND

Aged Care Homes: an increasingly aged and frail population

The Australian Government funds Aged Care Homes (ACHs) to provide residential 'Aged Care' to older Australians whose care needs are such that they can no longer remain in their own homes. Homes provide suitable accommodation and services, and personal care services (such as assistance with the activities of daily living). Nursing care and specialised equipment are provided to residents requiring such assistance.

The number of older Australians living in ACHs is increasing. Although only a small proportion of older people over 70 (approximately 3%) live in ACHs, the lifetime probability of utilising such care is increasing, along with the average lifespan. Most people will live beyond 75 years of age and projections suggest that 43% of all Australians who attain this age will spend some portion of their remaining years in an ACH. At 30 June 2008, there were 175,472 aged care places in Australia, an increase of 5,401 compared with the numbers of residents in care as of 30 June 2007.¹ Older people are also staying longer in ACHs, with the average length of stay for permanent residents during 2007–08 amounting to 147.8 weeks; a span approaching three years.¹

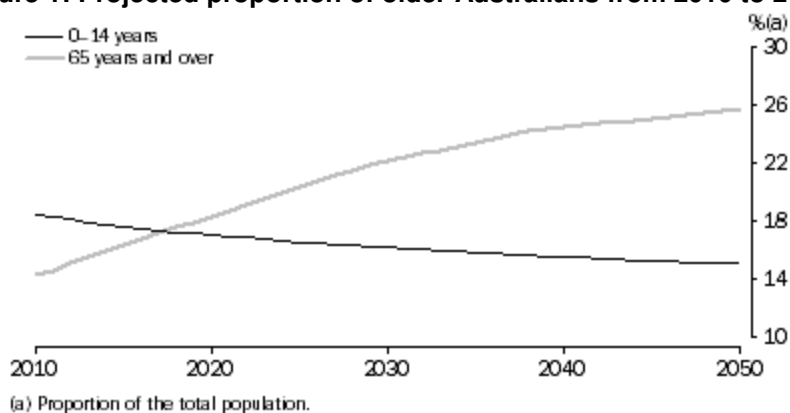
The AIHW (Australian Institute of Health and Welfare) 'Residential Aged Care in Australia' 2007-8 report notes that residents of ACHs are not only older but they are more infirm.¹ In June 2008, 55% of aged care residents were aged over 85 years of age and over one-quarter (27%) were over 90 years of age. These figures are higher than those recorded in June 2000; 50% of residents over 85 years of age and 23% of residents aged over 90 years.¹ With regards to the health status of the residents, from 20 March 2008 a new method of appraising the care needs of permanent residents was introduced, with the Aged Care Funding Instrument (ACFI) replacing the Resident Classification Scale (RCS).¹ The ACFI is designed to measure a resident's need for care rather than the care provided. Over three-quarters of residents (76%) in 2008 were classified as 'high care' using the ACFI. Ten years ago, the proportion of residents classified as high care was 58%.¹ In other words, ACHs have become the locations wherein the most impaired of older Australians will end their lives.²

Old age mental health conditions in aged care homes

Two eminent psychogeriatric researchers; Rovner and Katz, have referred to ACHs as 'modern mental institutions for the elderly' as they are places with a high incidence of psychiatric symptomatology and widespread prescription of psychotropic drugs.³

The Australian population is ageing rapidly. By 2021 there will be approximately 4 million Australians aged 65 years and over, and this figure is expected to rise to approximately 5.7 million in 2041.² By 2050, over a quarter (26%) of the population is projected to be aged 65 years and over; an almost doubling of the 2010 projected figure of 14% (Figure 1).⁴ The ageing of the population will increase the demand on the health care system overall, particularly on the aged care sector.⁵

Figure 1: Projected proportion of older Australians from 2010 to 2050⁴



Over a quarter of older adults over 65 years will experience a mental health disorder, with depression, anxiety and dementia the most prevalent of old age mental health diagnoses.⁶ In 2008, the total number of Australians with dementia exceeded 220 000, and it is projected by the year 2050, the total number of

dementia cases will exceed 730 000.⁷ Many of these cognitively impaired individuals will be cared for in ACHs. This high prevalence of dementia in ACHs is already evidenced and expected to increase. With the introduction of the ACFI appraisal, data can be collected on the health conditions of residents.¹ As of June 2008, almost half of ACH residents (48%) appraised by the new ACFI had a recorded diagnosis of dementia.¹

However, dementia is not the only mental health disorder confronting both the aged and ACHs. Depression and anxiety disorders are also prominent.² The average incidence of depression in Australian ACHs is thought to exceed 40% of residents, with anxiety regularly occurring as a co-morbid symptom.^{6,8} Although other mental illnesses, including schizophrenia and bipolar disorder, are found less frequently, they also represent a challenge to staff.²

One of the paradoxes of aged care is that despite the predominance of old age mental health conditions and predictions of an increase in the level and complexity of older age mental health conditions, there is a lack of psychiatric nursing staff with specialised training in the psychiatry of old age.² Ironically, while dependency levels in ACHs have increased markedly over the last decade, there has been a decline in the number of registered and enrolled nurses working in the sector.² Indeed, much of the front-line care within ACHs is typically done by staff who have no professional nurse training at all.²

Sleep disturbance in aged care homes

One of the common symptoms of old age mental health conditions is sleep disturbance. It is recognised that older people, in general, experience a different pattern of sleep than younger people.⁹ There is a reduction in the amount of time spent in deeper sleep and an increase in time spent in the lighter stages of sleep, from which they can easily aroused.⁹ This often means that older adults will awake more often during the night and they experience sleep fragmentation; factors which often lead to increased day time napping.⁹

For residents of ACHs, natural changes to sleep patterns are often exacerbated by environmental elements such as increased light and noise, and disruption to sleep by staff and other residents.⁹ Behavioural symptoms associated with mental health disorders also impact on sleep quality such as inactivity, increased time spent in bed, pacing and restlessness.¹⁰ Residents are commonly asleep intermittently, with one study reporting that ACH residents were awake for at least 14 minutes in every hour of the night and spent up to 17 hours per day in bed to achieve only eight hours total sleep time.¹¹

Although the causes of sleep disturbance vary from person to person, there are several common causes in ACHs.¹⁰ These include primary causes such as sleep apnoea and restless leg syndrome, and secondary causes, such as mental health disorders, medications that affect sleep, and inadequate pain management.¹⁰ Although comprehensive assessment and non-pharmacological techniques are recommended first-line, psycholeptic medications are frequently prescribed to treat sleep disturbance in ACHs.¹²

Psycholeptic medication use to treat mental health conditions in the elderly

Psycholeptic drugs are defined in the on-line medical dictionary 'MedTerms' as 'medications which have a calming effect'.¹³ They are classified under the code 'N05' in the World Health Organisation's Anatomical Therapeutic Chemical (ATC) Classification System¹⁴. Table 1 illustrates the three main psycholeptic drug groups, their ATC coding and provides key examples.

Table 1: Psycholeptic drug groups¹⁴

Psycholeptic drug group	ATC code	Key examples
Antipsychotics	N05A	Risperidone, haloperidol, olanzapine, chlorpromazine
Anxiolytics	N05B	Oxazepam, diazepam, alprazolam, lorazepam
Hypnotics/Sedatives	N05C	Temazepam, nitrazepam, zopiclone

A 'psychotropic' drug, on the other hand, has a broader definition as 'a chemical substance that acts primarily upon the central nervous system where it alters brain function, resulting in changes in perception, mood, consciousness and behavior'.¹³ Psychotropic medications include psycholeptic medications, however, they

also include drug groups such as antidepressants and stimulants. It should be noted that many researchers and government agencies employ the term 'psychotropics' to refer to what are essentially 'psycholeptic' medications; antipsychotics and anxiolytic/hypnotics.

Psycholeptic medications are often prescribed to manage older age mental health conditions and sleep disturbance.^{15,16} Antipsychotic drugs are primarily prescribed in the geriatric population to treat behavioural and psychological symptoms of dementia (BPSD) such as aggression, verbal outbursts and delusions which occur in up to 90% of residents with dementia.^{15,17} Antipsychotic use in dementia offers limited efficacy and is associated with adverse effects such as movement disorders, cognitive decline and, more disturbingly, recent meta-analyses have reported a three-fold increase in the risk of stroke and an almost doubling of all-cause mortality.¹⁸⁻²⁰ In view of their considerable risks and modest benefits, guidelines stress that antipsychotics should be reserved as second-line therapeutic options to treat BPSD after potential contributing factors have been addressed and non-pharmacological techniques, such as environmental modification or the provision of recreational activities, are trialled.^{5,15,21} Antipsychotic therapy should be reserved for patients with distressing agitation or psychosis that have not responded adequately to such non-drug strategies.²¹ When these agents are used in older people with dementia, national and international guidelines stress the importance of regularly reviewing usage and trialling dose reduction/cessation every 6 -12 weeks.^{5,21,22}

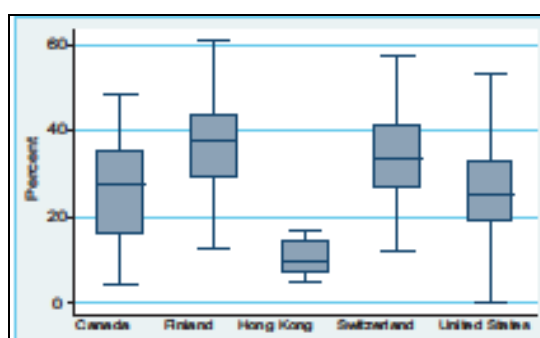
Benzodiazepines are prescribed in older people primarily to treat anxiety and sleep disturbance, despite the drug groups uncertain long-term efficacy and potentially serious adverse effects, including confusion, memory impairment, falls and resultant hip fracture.^{23,24} These agents are also commonly prescribed to treat BPSD despite a limited evidence base.²⁵ Tolerance to hypnotic effects develops within a few weeks of use, whereas tolerance to the anxiolytic effects of benzodiazepines develops over a few months.¹² Many users become dependent on benzodiazepines so that when they attempt to stop taking these agents they experience withdrawal symptoms such as acute anxiety, insomnia, dizziness and tremor.¹² In light of their tolerance and dependence characteristics, General Practitioners (GPs) are advised to reserve benzodiazepines for short-term use (< 2-4 weeks) in minimal dosage and encourage long term users to reduce use at regular intervals.²⁴

Psycholeptic medication use in aged care homes

Research evidence suggests that 'good practice' guidance regarding psycholeptic medication is not followed in the majority of ACHs, with high rates of antipsychotic and benzodiazepine use, as reflected in the proportion of residents taking the drugs regularly, reported over the past ten years.^{17,26,27} Internationally, researchers have expressed concern about the high rate of use of psycholeptic medication in this frail, vulnerable population, with 33%-80% of ACH residents prescribed at least one psycholeptic drug.²⁸

There is considerable variation in the rates of ACH psycholeptic use between countries, a variation which may be due, at least in part, to differences in health care systems and resident case-mix.²⁹ A recent international comparative study found that the average proportion of residents taking antipsychotics in nursing homes ranged from 11% in Hong Kong to 38% in Finland (See Figure 2).²⁹ Australian researchers have reported prevalence rates of antipsychotic use ranging from 24-29%, and benzodiazepine rates ranging from 15%-37% of ACH residents.^{17,26,27}

Figure 2: Variation in antipsychotic use rates across facilities, by country (2002-2006).²⁹



Apart from the high usage rates in ACHs, concern has also been expressed about the appropriateness of psycholeptic prescribing in this setting.^{17,30,31} An American nursing home study published in 2005 concluded that 'most antipsychotic medications were prescribed outside prescribing guidelines and for doses and indications without strong clinical evidence'.³⁰ Similarly, a study conducted in 40 nursing homes in Sydney during 2003 noted that although over a quarter of residents were taking antipsychotics, more than 80% of residents were taking these agents for non-PBS indications.³¹

Several researchers have also found that the majority of residents remain on psycholeptic medications for much longer periods than recommended.³²⁻³⁴ A research team from Canada found that 7% of antipsychotic prescriptions, and only 2% of benzodiazepine prescriptions, in 24 ACHs were stopped or showed an attempt made for dose reductions during 2002 and 2003.³² Likewise, 65% of residents taking psychotropic medications in 38 Sydney ACHs during 1993 were taking exactly the same agents, at exactly the same dose, nine months later.³⁴ The rate of psycholeptic review does not appear to differ markedly from state to state. Nor has the rate of psycholeptic review altered over the past 15 years. In background research to this project, we found that more than 60% of residents taking antipsychotics or benzodiazepines in a sample of 33 Tasmanian ACHs were taking the same agent, at the same dosage, in 2007 as they were in 2006. In findings almost identical to the Sydney study fourteen years earlier, less than a quarter of residents taking these medications in our sample had their dose reduced or agent ceased, as advised, in the year between data collections.³⁴

Australian Government reports regarding psycholeptic use

In 1995, a Senate committee report, 'Psychotherapeutic Medication in Australia', suggested that the main reason for high rates of sedative use was because: 'the lack of monitoring, or review of psychotropic agents, led to high levels of antipsychotics and benzodiazepines being prescribed for excessive periods, for little apparent benefit'.³⁵ One of the report's recommendations was that pharmacists become more involved in the monitoring and review of psychotropic medication.³⁵

Shortly after the Senate committee finding, the NSW Department of Health, established the 'Ministerial Taskforce on Psychotropic medication in Nursing homes', in response to adverse publicity resulting from Snowden's study of psychotropic use in Sydney nursing homes.³⁶ Professor Snowden's research paper reported one of the highest rates of psychotropic use reported in the world.³⁶ The final report published by the NSW taskforce recommended that community pharmacist project funding be used to promote the appropriate use of psychotropic drugs in ACHs with the institution of regular medication reviews and nurse education by pharmacists.³⁷

In 2008, the Department of Health and Ageing released the 'Report on residential care and people with psychogeriatric disorders'.³⁸ Although the report did not focus specifically on psycholeptic use or refer to the role of pharmacists in psychogeriatric management, a consultant interviewed for the report noted there appeared to have been a reduction in physical methods of restraint in favour of pharmacological restraint.³⁸ In essence, the report recognised the need for strategies to support residential service providers to more effectively manage residents with psychiatric conditions or BPSD.³⁸

Community pharmacists supplying medication to ACHs are ideally placed to provide much needed training and other strategies to promote quality use of sedative medicines to treat old age mental health disorders.

The Residential Medication Management Review (RMMR) Program and associated Quality Use of Medicines (QUM) services

In Australia, each ACH is assessed against 'The Standards for Aged Care Facilities' which reflect the quality management and services expected in aged care homes.³⁹ These standards determine a home's suitability for accreditation by the Aged Care Standards and Accreditation Agency. Contrary to the United States' regulatory approach, the influence of the 'Standards for Aged Care Facilities' on the rate of psycholeptic use is limited as they do not specify exact levels or indications for use of psycholeptic medication. Moreover, inspections do not audit appropriate medication use.⁴⁰

The standards do, however, include the accreditation standard 2.7 – Medication management. The Commonwealth Department of Health and Ageing supports and funds the Residential Medication Management Reviews (RMMR) program and associated 'Quality Use of Medicines' (QUM) services which enables pharmacists to assist ACHs in meeting accreditation standard 2.7, with the potential to meet other accreditation standards such as standard 2.17 (sleep) and standard 2.13 (behaviour management).³⁹

In Australia, a federally funded service to provide pharmacist-conducted RMMRs to all ACH residents has been available since 1997 as an initiative of the Second Community Pharmacy Agreement.^{39,41} In the Fourth Community Pharmacy Agreement, implemented from March 2007, the model was revised to promote greater cooperation between pharmacists and General Practitioners (GPs) with the introduction of Collaborative RMMRs.³⁹ The aim of Collaborative RMMRs is to provide a structured and collaborative review of a resident's medications to optimise the benefits from medicine use and enhance quality of life.⁴¹ Comprehensive information about the resident and their medicine use is obtained from the resident's GP and assessed in order to identify and meet medication-related needs and to identify, prevent and resolve medication-related problems.³⁹

In 2002, national standards for medication use in aged care homes were developed by the Australian Pharmaceutical Advisory Council (APAC) which endorse pharmacy-led services designed to promote QUM, including nursing staff education and medication audit and feedback cycles, also referred to as a Drug Usage Evaluations (DUEs).^{41,42} The APAC standards also call for the establishment of interdisciplinary Medication Advisory Committees for ACHs.⁴⁰ It should be noted that not all ACHs have these in place.⁴⁰ For example, in a representative sample of 12 South Australian ACHs in 2003 only two of the homes had functional MACs.⁴³

Increasingly, pharmacists are being recognised as an important health professional in the ACH setting with a vital role of optimising medication management.⁵ In March 2007, as part of the Fourth Community Pharmacy agreement, an emphasis and increased accountability was applied to QUM services provided to ACHs by pharmacists.⁴¹ The provider of RMMR services to ACHs must now negotiate a set of QUM services, as well as the frequency of these services, with the home itself and ensure that such quality improvement activities are conducted.⁴¹

In summary, pharmacists providing services to ACHs should focus on two broad issues:

- Resident-focused activities, such as pharmacist and collaborative RMMRs; and
- Facility-focused activities, such as establishing and implementing policies and procedures for medication use and other QUM services.³⁹

An important question to consider in the context of this project is: Have the RMMR program and associated QUM services impacted on the rates of antipsychotic and benzodiazepine prescribing in Australian ACHs?

While these practice developments represent a step forward, measurable effects are not yet possible owing to a complete lack of national data on medication use in ACHs.⁴⁰ There are only a few surveys of psycholeptic use in different states of Australia, and the results of follow-up studies of psycholeptic use vary. For example, a recent survey of ACHs in Sydney demonstrated a marked reduction in benzodiazepine use since previous comparable surveys in 1995 and 1998.⁴⁴ However, high levels (25%) of antipsychotic use were still observed.⁴⁴ Our 2006 Tasmanian survey of 40 ACHs conducted in 2006 found continued high benzodiazepine (42%) and slightly lower rates of antipsychotic use (21%) compared to previous studies.^{37,45} It appears that additional interventions or refinements to the present RMMR and QUM system are required to improve psycholeptic prescribing in ACHs.

In order to design an effective intervention aimed at reducing antipsychotic and benzodiazepine use in ACHs it is important to look at other interventions in the literature and examine the factors influencing prescribing of these agents.

Effectiveness of interventions to reduce psycholeptic use in ACHs

Two recent reviews have evaluated the effectiveness of interventions to improve medication use in aged care homes.^{28,46} The first review conducted by Verrue et al assessed the effectiveness of pharmacist-led clinical intervention studies to improve prescribing.⁴⁶ A total of eight controlled studies fitted inclusion criteria, five of which were conducted in Australia.⁴⁶ Just three studies evaluated the rates of antipsychotic and hypnotic/anxiolytic use, with significant reductions reported in two interventions that were interdisciplinary, involving pharmacists, GPs and nursing staff.

Verrue et al's review concluded that pharmacist involvement had the potential to reduce inappropriate prescribing in ACHs and increase GP and nurses' knowledge about medication.⁴⁶ In addition, they felt that as there was a scarcity of published research there was a need for further trials which 'should focus on interdisciplinary cooperation and communication between pharmacists, GPs and nurses'.⁴⁶

The second review, conducted by Nishtala et al from the University of Sydney's Faculty of Pharmacy aimed to evaluate the impact of medication reviews and/or educational interventions on psychotropic use in ACHs.²⁸

Eleven studies met the inclusion criteria: four of these studies combined medication reviews with education of nursing staff and seven studies focused principally on educational strategies.²⁸ Notably, seven of the included studies involved pharmacists, including Roberts et al's Queensland/NSW study which adopted the combined strategies of medication review and education for nursing staff (amounting to over 26 hours per ACH), and a Swedish study incorporating interdisciplinary pharmacist-led case conferencing.^{26,47}

Nishtala et al concluded that combination interventions of medication review and staff education, or interventions involving education as the main strategy, were effective at reducing psychotropic use in ACHs, although admittedly, the number of studies was limited.²⁸ Another key observation in the review was that the involvement of nursing staff was crucial as nurses have a 'key role in influencing therapeutic decisions and patient management'.²⁸ This statement appears to be confirmed as interventions relying solely on GP-targeted strategies, such as one-on-one educational visits ('academic detailing') have shown limited impact on psychotropic prescribing rates.^{48,49}

To sum up the findings of recent literature reviews, the key elements of successful interventions to reduce ACH psycholeptic use were that interventions must be:

- Interdisciplinary, involving all the health professionals involved with psychotropic drug use, namely nursing staff, GPs and pharmacists;
- Multifaceted, involving a combination of several strategies, including medication audit and feedback and the development of practice guidelines;
- Focused principally on the ACH nursing staff whose involvement is crucial for success; and
- Educationally based.

Nursing staff influence on psycholeptic use in ACHs

There are many influences on prescribing practices in the aged care home setting. Some of these influences are externally imposed (external factors) such as restrictions on quantity or indication imposed by the Pharmaceutical Benefits Scheme.^{50,51} Other influences, or 'internal factors', specifically resident, GP and facility characteristics, can also affect prescribing practices.⁵⁰

The availability of GPs to attend ACHs in Australia is an issue of growing concern.⁵² In spite of escalating numbers of residents in ACHs with increasingly complex medical needs, the number of GP attendances to ACHs has been decreasing over recent times due to factors such as workforce shortages, high GP workloads, and part-time work preferences.⁵ A national 2004 survey found that over half (56%) of ACHs sometimes had difficulty obtaining GP input for routine services such as writing and reviewing medication charts and prescriptions.⁵³ As a consequence, assessment and prescribing in the aged care home setting may occur without direct contact between the GP and resident.

Several international studies have found that nursing staff played the central role in decisions to prescribe antibacterials for urinary tract infections.^{54,55} GPs in these studies also reported that they accepted the nursing staff's assessment of the resident and seldom visited a patient in a ACH in relation to a urinary tract infection.⁵⁵ Whether this would apply to other clinical decision making scenarios, especially those relating to the treatment of mental health conditions has not been the subject of published research. However; in qualitative research performed prior to this project most of the GPs and nurses interviewed referred to antipsychotic and benzodiazepine medications often being prescribed by 'phone or by fax' and that nurses were relied upon heavily for assessment of the residents' mental health status.⁵⁶

It appears that nursing staff in ACHs have a significant role in the management of mental health symptoms, in particular those related to sleep management, anxiety and BPSD. This situation raises concerns regarding the quality of assessment and prescribing in the absence of a defined diagnosis.⁵⁰ It also raises questions as to whether nursing staff are equipped with adequate knowledge about the risks and limited benefit associated with psycholeptic medication, to be qualified to recommend treatment with such agents.

A literature review conducted in 2004 found that very few studies had been undertaken to assess nursing staff knowledge of the mental health needs of older people.⁵⁷ The studies that have been conducted, nonetheless suggest that many of the nursing staff providing mental health services to ACHs lack specialised training and adequate knowledge and skills.⁵⁷ The review concluded that on-going education was an effective way to increase knowledge levels of health care staff.⁵⁷ It could be argued that pharmacists, as experts on medication use, are ideally placed to provide this much-needed education to ACH staff.

Effectiveness of RMMRs and QUM strategies to reduce psycholeptic use in Australian ACHs

As mentioned previously, there are few studies to evaluate the direct impact of the current RMMR program and associated QUM services on reducing the rate of psycholeptic use in ACHs.⁴⁰ However, high rates of use continue to be reported in both Tasmania and Sydney since the introduction of these services.^{44,45} It appears that additional strategies and/or refinement of existing RMMR and QUM services may be required to reduce the high rates of antipsychotic and benzodiazepine use in ACHs.

The current pharmacist RMMRs and collaborative RMMRs involve communication between GPs and pharmacists; however, nursing staff have little formal involvement in this review process. As outlined, there is strong evidence to suggest that nursing staff are very influential when it comes to the prescribing of psycholeptic medications in ACHs. The involvement of nursing staff, in all likelihood, will increase further given reducing GP attendance and the growing incidence of old age mental health conditions. To effectively reduce the use of psycholeptic medication in ACHs, a review process is required which actively involves nursing staff.

QUM services are intended to promote quality use of medicines in ACHs, including sedative medicines.³⁹ The current Fourth Community Pharmacy Agreement has increased the emphasis and accountability of QUM services provided to ACHs by pharmacists. However, research is required to quantify the amount of QUM provided by community pharmacists or assess the quality of QUM services offered since the added emphasis was placed on QUM provision.

From interim discussions with local community pharmacies supplying ACHs in Tasmania, it is evident that the quantity and quality of QUM strategy provision is inconsistent. Pharmacists told us that one of the main reasons for this inconsistency were related to limited instruction, support and funding for pharmacists to facilitate effective delivery of QUM strategies, including nurse education or quality improvement measures.^{5,42}

The provider of QUM services can be different to the RMMR Service Provider, and it is critical to note that accreditation, or additional therapeutic training, is not required for a pharmacist to deliver QUM services.³⁹ Further, many pharmacists are unaware of current good practice in relation to the use of psycholeptic agents so may lack the knowledge and overall understanding of some QUM strategy processes to effectively deliver those QUM services aimed at promoting the appropriate use of sedative agents.

Drug Use Evaluation (DUE)

A suggested QUM service is the use of DUEs, which are a quality assurance/management activity for drug therapy to promote rational and economical drug use and to improve therapy outcomes.³⁹ DUEs are essentially a medication audit and feedback cycle where baseline use is measured and presented back to the ACH. Ideally, the audit results should be benchmarked against other homes or historical data and measures taken by the home to improve the results when the audit is repeated. The aim of the DUE cycle is to improve resident care by improving drug use. Success can be measured by comparing revised practice with best practice standards and guidelines.³⁹

Although DUEs have proved to be a successful strategy to reduce benzodiazepine use in the hospital setting, there has been no evaluation of their application in aged care homes.⁵⁸ The National Prescribing Service (NPS) has developed two separate ACH DUEs on antipsychotic and benzodiazepine use, however, there has been limited appraisal of their acceptance, relevance to practice and effectiveness.⁵⁹ Moreover, the NPS DUEs involve an intensive paper-based data collection process and are thus time-intensive to conduct. There is also no remuneration provided to perform the NPS DUE, although pharmacists may list participation in a DUE in their quarterly report for 'Medication Reviews in residential care services' which is required for payment of their RMMR QUM component.³⁹

Benefits of reducing and withdrawing sedative use in aged care homes

There have been several trials where sedative use has been withdrawn and impact of the intervention on residents assessed. The impact of reduction of sedative treatment has been positive in the majority of these trials. For instance, a UK study examined the effect of ceasing antipsychotic treatment in 100 aged care home residents, with stable behaviour, who had been treated for at least 3 months. The researchers found that over two thirds of the residents experienced no deterioration of behaviours when assessed at 1 month and 3 months after discontinuation.⁶⁰ Of greater significance are the findings reported from the recent DART-AD trial where residents were allocated into either an antipsychotic treatment group or treatment was ceased and residents were treated with placebo.²⁰ Those residents continuing antipsychotic treatment had significantly increased mortality rates compared to those residents ceasing antipsychotic therapy.²⁰ It appears that ceasing

antipsychotic treatment in ACH residents is likely to have the benefit of increasing lifespan without impacting on the management of behaviour.

When Gilbert et al conducted a benzodiazepine withdrawal trial in a South Australian ACH, over half of residents in the 60-bed ACH were encouraged to reduce or cease use in the intervention which involved education and relaxation training for patients, and education of prescribers and caregivers.⁶¹ The proportion of participants using benzodiazepines declined significantly (from 70% to 35%), and the reduction was maintained over the subsequent three months.⁶¹ No adverse consequences were associated with cessation of benzodiazepine use. Benefits following successful reduction in rates of benzodiazepine included increased mobility and alertness, reduced incontinence and improved well-being.⁶¹

1.2 RATIONALE OF THE REDUSE (REDUCING USE OF SEDATIVES) PROJECT

The 'RedUSE' (Reducing the Use of Sedatives) project is the first Australian intervention trial to assess the effectiveness of pharmacist-led QUM strategies in reducing psycholeptic use in aged care homes. If the project succeeds in achieving a successful reduction of prevalence rates and decreases in doses of antipsychotic and benzodiazepine medication there are likely to be multiple flow-on benefits for older people, including increased mobility and alertness, decreased fall rate and improved well-being.⁶²

The RedUSE project was designed to address the need for a co-ordinated package of QUM strategies, including DUE cycles, staff education and interdisciplinary review, that equips and trains community pharmacists to promote appropriate antipsychotic and benzodiazepine use in aged care homes. The RedUSE project was also designed to be interdisciplinary, multifaceted and educational in content, recognising that intervention projects were more likely to be successful if they involved nursing staff, GPs and pharmacists, and included several strategies, in particular the education of nursing staff.²⁸

Research is also lacking on the benefits of interventions in reducing psycholeptic use in ACHs on health care costs.²⁸ For this reason, a basic costing study was sought to evaluate the potential healthcare cost savings of the project.

The term 'sedatives' was adopted in this project as a more understandable or 'layman's' term for 'psycholeptic medications'. The on-line medical dictionary, 'MedTerms' definition of the term 'sedatives' is : 'A drug that calms a patient down, easing agitation and permitting sleep'.⁶³ Antipsychotic and anxiolytic/hypnotic medications, principally benzodiazepines, also known as psycholeptic medications, aptly fit this definition.¹³

1.3 KEY OBJECTIVES

- The main objective of the RedUSE (Reducing the Use of Sedatives) project was to promote the appropriate use of benzodiazepines and antipsychotics in ACHs. To achieve this objective, the 'RedUSE' project aimed to develop, trial and evaluate a co-ordinated intervention program delivered by community pharmacy that specifically targets the use of these medications.
- Community pharmacies were provided with a well developed package of several QUM strategies addressing the use of sedatives in ACHs. The key strategies involved DUE measures, nursing staff education and a dedicated sedative review plan. 'RedUSE' also aimed to equip pharmacists, in particular, pharmacists that were not accredited, with the generic skills and expertise to effectively perform QUM strategies, which can be subsequently applied to many other therapeutic areas. The strategies of the project were primarily targeted at ACH nursing staff, although GP, resident and relative involvement was encouraged.
- The main outcome measures of the RedUSE project were the proportions of residents taking antipsychotic and benzodiazepine agents in the participant ACHs. However, variation in psychotropic rates of use alone is not enough indication of improvement in psychotropic management in aged care homes.³⁷ Information is also needed on the extent of dose reduction of antipsychotic and benzodiazepine medications in residents and the percentage of new prescriptions for these medications. Additionally, the efficacy of the nurse training requires evaluation, as does the cost benefit of the intervention. Finally, it is important to gauge the overall acceptance of the project by key participants; in this case, the pharmacists delivering the strategies, and the nursing staff working at the ACHs.

UMORE, University of Tasmania

2. METHODOLOGY

The RedUSE (Reducing Use of Sedatives) Project
September 2009

2.1 METHODOLOGY

Research design

The 2006 'psychotropic medication use in aged care homes study' provided information on psychotropic use which was used to calculate the number of aged care homes (ACHs) required for the study to be sufficiently powered to detect statistical significance.⁴⁵ In this study the use of benzodiazepine medications was three times the rate found in a recent Sydney study.¹⁵ To detect a 10% reduction, with an average benzodiazepine prevalence rate of 42% of residents (SD 8), a total of at least 12 homes were required in each group for a pre and post-intervention comparison (at a power of 80%; $p = 0.05$).

The study design was a controlled trial conducted in 25 ACHs in Tasmania. The intervention group included 13 Hobart homes and the 12 control homes were located in Launceston (the two cities are geographically 180 km apart). This trial structure was chosen as it was likely that if intervention and control aged care homes were in the same locality, pharmacists, nurses and GPs involved with intervention homes may service control homes as well, with the associated risk of intervention information spreading to control homes and causing contamination of the control sites. After recruitment, the two groups were statistically compared to ensure matching of baseline variables. In order to gauge the level of pharmacy services provided to each ACH group, each participant pharmacy was also asked to provide data regarding the number of RMMRs conducted six months prior to, and during, the RedUSE trial. Community pharmacies were also asked to provide details about the QUM strategies provided to each ACH throughout 2008.

The primary outcome measure in the RedUSE project was the aged care home prevalence rates of regular use of antipsychotics and benzodiazepines.

Secondary measures were:

- prevalence rates of psychotropic agents overall,
- multiple psychotropic rates,
- antidepressant rates,
- the number of dosage reductions/cessations of antipsychotics and benzodiazepines,
- the variance in the dosage equivalents of chlorpromazine and diazepam, and
- the number of new antipsychotic or benzodiazepine agents initiated throughout the trial.

All outcome measures were obtained from the medication audit which formed the initial measurement of each DUE cycle. The DUE measurements were performed at baseline, three months and 6 months after trial commencement. To assess the acceptability of the project for key participants, two focus groups were conducted by an independent qualitative researcher with intervention home ACH staff and pharmacists upon project completion.

Cholinesterase inhibitors such as donepezil, anticonvulsants and clonazepam can be prescribed for their sedative effects but were excluded from our psychotropic measures as the indication for use was often uncertain. Cholinesterase inhibitors are more commonly prescribed as cognitive enhancers rather than to treat BPSD and anticonvulsants and clonazepam are also indicated for seizure control. Clozapine and lithium carbonate were also excluded from analysis as these agents are restricted for schizophrenia and/or bipolar disorder management, with dose reduction and non-drug therapy not generally promoted.

Data Measurement

In response to feedback from the Advisory Committee, nursing staff, pharmacists and other key stakeholders a dedicated computerised medication audit, referred to as the 'RedUSE Drug Usage Evaluation (DUE) program' was developed as an integral part of the RedUSE project. Current paper-based audits were considered to be time consuming. As time and staff to collect data are in short supply in both ACHs and community pharmacies, alternative methods of data collection were sought. The research team were aware through previous research project experience that detailed information about medication utilisation already existed within community pharmacy dispensing programs. Consequently, a dedicated programmer designed a program to **specifically** access sedative medication data.

This program was based on an existing program termed 'NHDMS' which assimilated community pharmacy ACH prescribing information from the 'Webstercare Meditrax'® medication packing program. Community pharmacies supplying ACHs use these packing programs to prepare and label resident medications into individualised blistered packs, which are delivered to the homes and subsequently administered to residents by nursing staff. The customised 'RedUSE' DUE computer program also assimilated community pharmacy ACH prescribing information from 'FredPak'®.

The RedUSE DUE program was installed at each community pharmacy supplying the participating ACHs and efficiently collated information about psychotropic prescribing. If the medication was prescribed as a 'prn' medication, or if liquid and 'quickmelt' preparations were prescribed, most of the pharmacies omitted to record these medications in the packaging programs. For this reason each of the resident's medication charts were checked by the pharmacists at ACHs to identify any 'prn' or liquid/quickmelt preparations and enter these dosing details into the RedUSE program. If 'prn' psychotropic agents were administered four or more days per week over the past month, they were considered to be 'regular' medication and were included in prevalence counts. A sample data entry page of the RedUSE DUE program is shown at Appendix A. The outcome measures for the project were all calculated utilising de-identified data obtained from the three RedUSE DUE program measurements conducted at each ACH. All data within the program was stored in a Microsoft Access® relational database.

An important feature of the RedUSE DUE program was its capacity to generate a five page customised report for each participant ACH. The RedUSE DUE report not only listed psychotropic prevalence rates but the program also 'benchmarked' results graphically alongside antipsychotic and benzodiazepine prevalence rates reported in the most recent Sydney and Tasmanian studies.^{27,45} A RedUSE DUE report was produced for each participating ACH after each DUE measure, and a sample page from the report is attached at Appendix B.

The RedUSE project's ACH baseline DUE measurements were taken mid-August to early September 2008, the three month measure was taken during November 2008, with the last 6 month measurement completed in late February 2009.

Recruitment of participants

After full ethical approval was granted by the Tasmania Health and Medical Human Research Ethics Committee in April 2008, all ACHs in Hobart and Launceston, were invited to participate in the RedUSE project. Two specialised homes, one catering for dementia patients with challenging behaviour and the other for patients with severe mental health and drug abuse issues, were excluded as these homes were known to have disproportionate use of psychotropic medication and the residents at these homes were also closely managed by specialist health professionals from the Tasmanian Department of Health and Human Services Older Persons Mental Health Service (OPMHS).

When an ACH expressed interest in participating, the community pharmacy supplying medications to the ACHs was then approached by the research team and invited to participate. Homes serviced by more than one pharmacy, and pharmacies not employing a computerised medication packaging system, were excluded due to the data collection methodology. Both ACH and community pharmacy were required to participate before the ACH was accepted into the project. Recruitment continued until sufficient numbers of homes entered the trial. After permission to participate in the RedUSE trial was obtained, the project manager visited each of the homes and community pharmacies during May and June 2008 to outline the key strategies of the 'RedUSE' project to management representatives. All participant ACHs were recruited by mid-June 2008.

Advisory Committee

The RedUSE project was a collaborative, interdisciplinary program involving various professional bodies in the planning and operational phases. An advisory committee was established for 'RedUSE' in April 2008, involving key representatives from the University of Tasmania, the aged care home sector, Alzheimer's Australia, consumer groups, the local Division of General Practice, the Tasmanian Pharmacy Board, the Pharmaceutical Society of Australia (Tasmanian Branch), Pharmaceutical Services (Department of Health and Human Services) and the Pharmacy Guild (Tasmanian Branch). The role of this committee was to provide input on the project strategies and facilitate the delivery of 'RedUSE' to ACHs. The Advisory Committee met on four separate occasions during the development of the project.

The RedUSE Advisory Committee was directly responsible for the modification and introduction of one of the project's key strategies; the 'Sedative Review Plan' form. Initially the research team proposed that community pharmacists set up interdisciplinary case conferences to discuss and review the medication of those residents taking sedative medication for extended periods; a strategy choice based on the success of several intervention models overseas.^{47,64} However; members of the Advisory Committee were not supportive of this proposal. Mindful of current GP and nursing staff shortages, the committee felt it was not feasible to set aside a period of time where the three health professionals could meet in the majority of ACHs. The Nursing and GP representatives on the committee put a strong case forward that the research team reconsider this strategy. As an alternative to face-to-face meetings, a paper-based 'sedative review plan' form was proposed where pharmacists, nursing staff and GPs could each comment on the sedative use of a particular resident. This revised strategy of a 'sedative review plan' was approved by both the RedUSE Advisory Committee and the Ethics Committee.

Intervention strategies

A flowchart illustrating the key strategies of RedUSE utilised in all intervention ACHs is shown in Figure 3. The main strategies of the RedUSE project were its computerised DUE program with associated feedback and benchmarking provided to ACH nursing staff, two staff educational sessions and the interdisciplinary sedative review plan prepared for each resident receiving long-term antipsychotic or benzodiazepine therapy. The community pharmacy supplying the aged care home were directly responsible for the provision of all three main 'key' strategies of RedUSE to intervention homes.

Other supporting strategies of the RedUSE project involved academic detailing of GPs, promotion for the project, newsletters and resident and relative information pamphlets. These 'minor' strategies were delivered or provided by the research team.

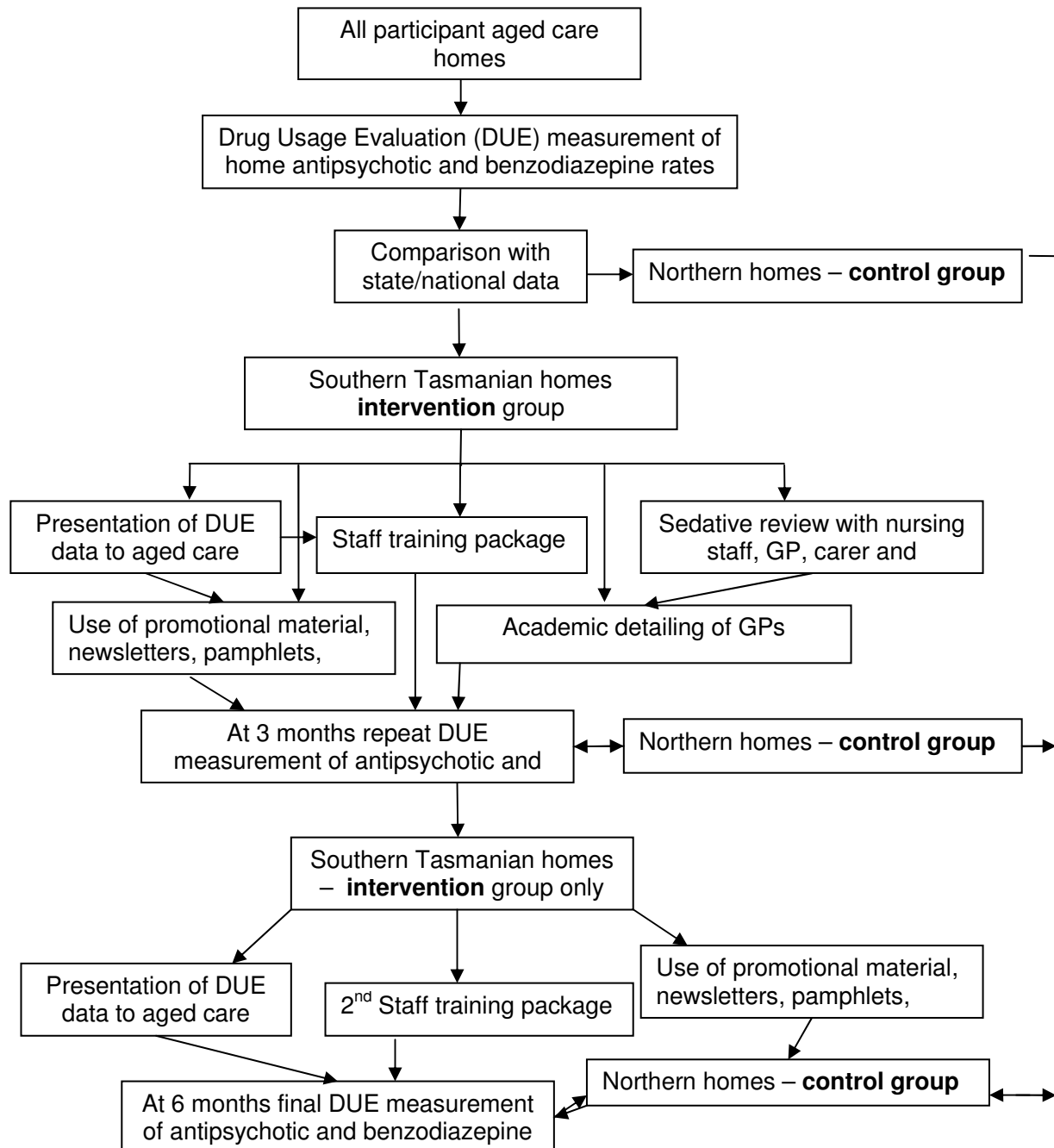
Guideline development and distribution

At the project's onset, RedUSE Guidelines were produced with the assistance of a local geriatrician and psychogeriatrician. These guidelines (Appendix C) were based on recommended best practice for antipsychotic and benzodiazepine use from the International Psychogeriatric Association and the Royal Australian College of General Practitioners.^{22,24}

After recruitment, the intervention ACHs were asked to provide the names of all GPs attending their facility, along with the number of residents each GP was responsible for. With this information, a list of 147 GPs servicing the 13 intervention homes was produced. Each of these GPs was sent project information and a copy of the RedUSE Guidelines. These Guidelines were also sent to all pharmacists and pharmacies involved with the project. In addition, all intervention ACHs were sent several laminated RedUSE guideline 'posters' to affix to notice boards in nursing stations and medication trolleys.

The primary focus of the RedUSE project was on informing health professionals and other participants about the significant risks and modest benefits associated with using antipsychotics for dementia, and benzodiazepines for sleep disturbance and anxiety management in older people, and promoting regular review of these agents. Non-pharmacological approaches for managing behavioural and psychological symptoms of dementia (BPSD), sleep disturbance and anxiety were advocated as first-line options for management.

Figure 3: The 'RedUSE' trial strategy implementation flowchart



Consciousness-raising activities

The RedUSE project was promoted at a large conference for ACH staff held by Alzheimer's Australia in Hobart in January 2008. Over 200 nursing staff from Tasmania's ACHs attended the conference. A total of 100 fliers outlining the project were distributed to attendees throughout the two day event. The local Division of General Practice was also informed about the project.

All of the intervention ACH Directors of Nursing and Registered Nurses in charge of clinical services, participating pharmacists, GPs serving these homes and advisory group members were invited to the official launch of the RedUSE project, which adopted an evening seminar format. At this event the project was introduced and a guest speaker, leading psychogeriatrician, Professor John Snowdon, presented information about best practice use of antipsychotics and benzodiazepines in ACHs. Professor Snowdon also discussed the reduction of benzodiazepine use which had occurred in Sydney homes over the past decade.²⁷ A total of 91 health professionals attended the launch; specifically, 18 GPs, 31 pharmacists and 42 ACH nursing staff. All intervention ACH and community pharmacies were represented. Continuing Professional Educational (CPE) recognition was applied for, and granted by, the Pharmaceutical Society of Australia and the Royal Australian College of General Practitioners. Nursing staff were advised to record the event in their continuing education register. All attendees were asked to complete an evaluation form at the conclusion of the evening.

Education of participant pharmacists

Community pharmacists from the participating community pharmacies entering the intervention arm of the study received one and a half days of education in July 2008. The educational sessions were delivered by the RedUSE research team and several guest presenters, notably, the Director of Aged Care and Rehabilitation Medicine at the Royal Hobart Hospital, the Director of Nursing at an ACH specialising in the management of BPSD and a psychiatrist at the Hobart Alcohol and Drug Service. The first day covered antipsychotic and benzodiazepine therapeutics and also reinforced recommended best practice for the management of challenging behaviour in dementia and sleep disturbance. On the second day, pharmacists were given instruction on the strategies of the DUE cycles, delivery of nurse education and the sedative review plan. A local GP, Director of Nursing at a ACH and an accredited consultant pharmacist also discussed potential enablers and barriers of the project with the participant pharmacists. Nine hours of CPE recognition was allocated for the training by the Pharmaceutical Society of Australia and the pharmacist training program was evaluated by a short questionnaire that the pharmacists were asked to complete. The full pharmacy training program schedule is attached as Appendix D.

Educational strategies of RedUSE

Two educational sessions, each lasting an hour, were developed for the nursing staff at the intervention ACHs by university educators and an external reviewer. The first educational session was scheduled at each home approximately 2-4 weeks after the baseline RedUSE DUE measure. Trained community pharmacists from the ACH supply pharmacies delivered all nursing staff education at the homes guided by a Microsoft PowerPoint® presentation developed by the research team. Aside from promoting evidence-based use of antipsychotics and benzodiazepines, the individual DUE results for each home were presented as part of the session. Discussion between the nursing staff members about sedative use was encouraged. A filmed case study was also included as part of the presentation. Pharmacists presenting the RedUSE educational session reported that the first session was of 40 minutes to an hour's duration.

The second educational session was held 2-4 weeks after the second DUE measure (performed at 3 months). This session re-enforced information from the first session and the results of the second follow-up DUE were presented to staff, as in the first session. The second session was a little shorter than the first session, with a recorded duration of 30 to 45 minutes.

An evaluation of all the educational programs of RedUSE was performed by asking participants to complete evaluation forms in the format of an anonymous survey utilising a standard visual analogue questionnaire. In order to gauge the effectiveness of the nursing staff education, a ten item multiple-choice question validated 'psychotropic medication' educational knowledge quiz was devised and validated, and is shown at Appendix E. The nurses were asked to complete the quiz at the beginning of the first nurse educational session and the same quiz was completed at the end of the second session. All nurses were asked to complete the quiz anonymously but participants were coded to allow matching of results from the pre and post quizzes.

The GPs providing services to the intervention ACHs were ranked according to the number of residents they provided medical services for. GPs responsible for eight or more residents in intervention homes were invited to participate in an academic detailing session with a researcher. A total of 17 GPs out of 32 GPs approached, participated in this single session, lasting 10 to 15 minutes, where 'good practice' principles for antipsychotic and benzodiazepine use in older people and the key strategies of the RedUSE project were outlined.

Other educational/promotional materials included three customised RedUSE newsletters which were distributed to all intervention ACH and steering group members every two months, and educational pamphlets for relatives and residents about benzodiazepines. The RedUSE newsletters contained guideline-based information about antipsychotics and benzodiazepines, details of the latest research in the management of old person's mental health conditions and also gave additional feedback to participant homes regarding project outcomes. Each of the one-page, double-sided RedUSE newsletters was reviewed by research staff and an external reviewer. A Sample page of the newsletter is attached as Appendix F.

The resident and relative pamphlets presented information about the problems associated with long term use of benzodiazepines and also included guidance on alternative methods to manage sleep disturbance and anxiety in clear, non-medical language. The educational pamphlet was developed in conjunction with Alzheimer's Australia and a consumer representative and a page of the pamphlet is attached as Appendix G.

Sedative Review Plan Forms

One of the original QUM strategies proposed for the RedUSE project was multidisciplinary case conferencing. As discussed earlier, the advisory group felt that it was not possible to schedule a time where the GP, nursing staff and pharmacist could meet face-to-face to discuss a resident's medication use. They also pointed out that interdisciplinary meetings were not only difficult to coordinate, but that many GPs were not supportive of them as they felt they offered little benefit.

As an alternative strategy, a written 'sedative review plan' form was proposed by the Advisory Committee with the specific aim of encouraging interdisciplinary communication and providing a prompt for the review of individual residents' long-term antipsychotic and benzodiazepine use. It should be noted that case conferences are an established, funded 'enhanced medical service' for GPs. Case conferences must include a GP and at least two other participants, one being a health professional. Consent is not required from a resident or their enduring guardian (usually a relative) to discuss the medical needs of a resident in a case conference. On the other hand, consent is legally required from the relevant party before the medical treatment of a resident is altered.

The sedative review forms were intended to highlight and promote discussion about the long term sedative use of residents amongst the health professionals involved with medication use; specifically the GP, nursing staff and pharmacist. As the sedative review forms contained identifiable patient data they were not able to be analysed or sighted by the research team. This condition was emphasized in the ethics amendment granted for this revised strategy of the RedUSE project.

When the first DUE measure was conducted for the intervention ACHs, the RedUSE DUE program was programmed to automatically generate an individual 'sedative review plan' for each resident prescribed regular doses of antipsychotics and/or benzodiazepines for periods longer than recommended (3 months for antipsychotics and 4 weeks for benzodiazepines). The sedative review plan outlined resident details, psychotropic doses currently taken and included three sections; one for pharmacist recommendations, another for nurse recommendations and a final section for GP comments.

The Sedative Review Plan generated by the RedUSE program included pre-programmed comments in the pharmacist section regarding sedative medications. These comments were based on best practice use of antipsychotics and benzodiazepines. If, for example, a resident was taking long-term benzodiazepines, the pharmacist recommendation box was printed with:

'Tolerance develops to the hypnotic effects of benzodiazepines within two weeks. May I suggest a gradual reduction in dose as per attached RedUSE sheet.'

It should be noted that the pharmacists had the capacity to override these comments and write their own recommendations. The sedative review plan form was generated in the community pharmacy supplying the intervention ACH. After the pharmacist added their comments, two copies of the form were delivered to the ACH where the nursing staff added their comments. One copy of the sedative review form was then filed in the resident's notes and the other copy was sent to the resident's GP for their assessment and comment. It should be stressed that these forms were primarily intended to highlight those resident's in need of sedative

review. Responses on the form were not able to be analysed or collated by the research team as the forms contained identifiable ACH resident data. The sedative review plan form is shown as Appendix H.

Analysis

The antipsychotic, benzodiazepine, overall psychotropic, multiple psychotropic and antidepressant prevalence rates of all participant ACHs at baseline, 3 months and 6 months were calculated, grouped and then statistically analysed. Similarly, the dosage variance, or the number of antipsychotic and benzodiazepine doses decreased, ceased, increased or unaltered, for each ACH and group were calculated and statistically analysed.

To examine the dosage variance throughout the trial quantitatively, all antipsychotic doses were converted into chlorpromazine equivalents. Likewise, all benzodiazepine dosages were converted into diazepam equivalents. The equivalent doses for psycholeptic medications were calculated using the WHO International classification of Primary Care and several other key references.⁶⁵⁻⁶⁷ Where more than one agent in the same psychotropic class was taken by the same resident the dose equivalents were added together. Mean equivalent doses for each home were calculated by adding the equivalent doses of each resident together and dividing the total by the number of residents in each ACH. Residents in each home not taking either an antipsychotic or benzodiazepine medication were assigned a nil value.

Finally, the number of psychotropic medications initiated throughout the trial from baseline to week 26 was examined.

Independent-samples t-tests and the Fishers exact test were used to determine significant differences in nursing home characteristics between control and intervention homes.

Information regarding the provision of RMMRs prior to and during the RedUSE project was collected and data recorded on QUM services provided to all 25 participant ACHs. A ratio of RMMR provision was calculated for both the intervention and control ACH groups by adding the total number of RMMR services conducted throughout 2008, dividing this figure by the number of ACHs in each group, and then, finally, by dividing this number by the average number of residents in the intervention or control group.

Paired t-tests and repeated measures analysis of variance (R-ANOVA) were used to test for differences in continuous level outcome variables for baseline, 3 months and 6 months comparisons between control and intervention nursing homes.

The dose variations of antipsychotics and benzodiazepines were tracked in those residents taking these medications at baseline and who were included in each of the three DUE measurements. Dose variations were tested with a 2-way, chi-squared test. Chi-squared tests were also used to compare the difference between the number of residents reducing/ceasing and starting antipsychotics and benzodiazepines in the intervention and control home groups.

The validated older persons mental health quiz given to nurses to complete during the nursing staff training sessions was used to assess the effectiveness of the training in terms of knowledge improvement. The results of nursing staff completing the quiz before and after the educational sessions were statistically compared using a paired t-test. The pharmacist training session, two nursing staff training sessions and the initial RedUSE launch were evaluated by evaluation surveys.

Analyses were performed using StatView, v 5.0 (SAS Institute Inc., Cary, NC). All tests were two-sided and p -values < 0.05 were considered statistically significant.

In order to gauge the acceptability of the RedUSE project, two focus groups were held in Hobart two weeks after the final DUE measure; one with nursing staff and the other with participating pharmacists. To minimise bias and allow open feedback about the RedUSE project, both groups were conducted by an independent qualitative facilitator. The focus group interviews were recorded, transcribed and analysed according to the principles of grounded theory whereby key themes are identified as they emerge from the data.

Costing study

A qualified health economist was recruited in April 2009 to examine the basic costing of the RedUSE project. Details of all antipsychotic and benzodiazepine medications and doses taken by both intervention and control ACH residents at baseline and at week 26 were recorded. These medications were then costed using the Pharmaceutical Benefits Schedule (PBS) pricing schedule from February 2009.⁶⁸ The same pricing to medications at baseline and week 26 was allocated rather than applying the scheduled cost at the time of dispensing. This decision was made because one of the most popularly prescribed antipsychotics, risperidone, was taken off patent at the end of December 2008 resulting in a considerable drop in overall costs of several of the newer, more expensive antipsychotics. Using the actual antipsychotic costing at the time of dispensing would have overstated the potential cost benefits of the intervention.

Trial Registration and Ethics

The RedUSE project was registered as a controlled trial at the Australian New Zealand Clinical Trials Registry: registration number: ACTRN12608000221358 in April 2008.

Approval for the trial was granted by the Human Research Ethics Committee (Tasmania) Network in April 2008: approval number H0009858.

UMORE, University of Tasmania

3. RESULTS

The RedUSE (Reducing Use of Sedatives) Project
September 2009

3.1 RESULTS

Sampling

Out of 27 aged care homes in Hobart, 18 homes expressed interest in participating. Four homes were excluded as they had multiple community pharmacies supplying medications or they were not using a computerised medication packing system. One ACH was not able to participate as their community pharmacy declined to be involved. (This pharmacy had recently covered benzodiazepine use in their aged care home and did not want to 'upset' their GPs by reconsidering the topic). Although the study design called for 12 homes in each group, a group of 5 ACHs requested to join the intervention arm of the trial after 8 homes had already signed on. As the ACH management specifically requested that all their Hobart homes be involved, the additional home was allowed to participate. This led to a total of thirteen ACH in the intervention arm of the trial. All but one of the community pharmacies approached in the intervention arm agreed to participate in the RedUSE trial, giving a total of 8 participant pharmacies.

Out of 19 ACHs in Launceston, 13 homes expressed interest in participating. However, one of the homes changed community pharmacies just before the trial started meaning prescribing data was inaccessible, resulting in the home's exclusion from the trial. All 7 pharmacies supplying the 12 control ACHs agreed to participate.

The RedUSE program was installed at all fifteen pharmacies in the trial. In total, 75 DUE measures of psychotropic use were obtained from all 25 ACHs. At two control pharmacies difficulty was experienced installing the RedUSE program due to internal complex programming adjustments made to their main server. The final DUE measure at one of these pharmacies had to be manually entered into a laptop computer at the ACH itself because the pharmacy was experiencing problems with their computer system.

Facility characteristics

The average number of residents in the 13 intervention and 12 control nursing homes over the three data collection periods was 898 and 693 residents, in each group, respectively; resulting in a total of 1591 residents, on average, per measure (range 1575-1605).

Table 2 outlines the characteristics of the participating ACHs and mean baseline psychotropic use for both groups. There were no statistically significant differences found between control and intervention home characteristics or psychotropic use at baseline.

Existing RMMR program and QUM services supplied by participant ACHs

Each of the 15 community pharmacies supplying the 25 participant ACHs were asked to provide details about their RMMR program, the number of medication review services performed before and during the trial, and associated QUM service provision. These details are summarised in Table 3 for both intervention and control ACHs.

All of the participant homes had a RMMR agreement in place throughout 2008 and all homes received RMMR services during 2008. Four ACHs in the intervention group and 3 ACHs in the control group did not have RMMR services performed in the 6 months prior to the RedUSE project. In the latter half of 2008, all of the homes except two control ACHs received RMMR services. These two control ACHs were unable to continue RMMRs in the latter half of 2008.

When the ratios of RMMRs performed per home, per resident during 2008, in the intervention and control groups were compared, the two groups were found to be almost identical, with the calculated ratio of 0.862 in intervention ACHs and 0.864 in control ACHs. It can be seen, however, that a greater proportion of RMMR services were undertaken in the first half of 2008 in the control homes (23% of RMMR services were conducted prior to the RedUSE project as compared to 14% of RMMR services conducted in the first half of 2008 in intervention homes). However, this difference was not significant when tested with a Chi-squared test (23% vs. 14%, $\chi^2 = 2.1$, (df=1), $p = 0.15$).

Table 2: Baseline characteristics of participating nursing homes

NURSING HOME CHARACTERISTIC	INTERVENTION AGED HOMES (n = 13)	CONTROL AGED HOMES (n = 12)	TEST FOR SIG. DIFFERENCES*
Mean size (range) (number of beds)	69.1 (34-116)	57.3 (19-96)	$t(23) = 1.2$, $p = 0.3$ (two-tailed)
Mean proportion of high-care residents	73.52	76.97	$t(23) = -0.4$, $p = 0.7$ (two-tailed)
Proportion (number) of rural aged homes	23.1 (3)	33.3 (4)	$p = 0.7$ Fishers exact test
Mean proportion of residents taking psychotropics	61.1	62.4	$t(23) = -0.3$, $p = 0.6$ (two-tailed)
Mean proportion of residents taking 2+ psychotropics	29.0	27.4	$t(23) = 0.5$, $p = 0.9$ (two-tailed)
Mean proportion of residents taking 3+ psychotropics	8.2	6.2	$t(23) = 1.5$, $p = 0.5$ (two-tailed)
Mean proportion of residents taking antipsychotics	20.3	21.9	$t(23) = 0.5$, $p = 0.4$ (two-tailed)
Mean proportion of residents taking benzodiazepines	31.9	30.4	$t(23) = 0.4$, $p = 0.5$ (two-tailed)
Mean proportion of residents taking antidepressants	39.5	37.3	$t(23) = 0.6$, $p = 0.3$ (two-tailed)
Mean Chlorpromazine Equivalence Dose (mg)	20.9	24.9	$t(23) = -0.8$, $p = 0.4$ (two-tailed)
Mean Diazepam Equivalence Dose (mg)	3.7	2.9	$t(23) = 1.7$, $p = 0.1$ (two-tailed)

*None of the differences were statistically significant ($p < 0.05$)

QUM Services

The provision of QUM services was compared between the intervention and control groups, with 62% of the intervention ACHs receiving QUM services (aside from RedUSE) in 2008, contrasting with 83% of control homes. For those 18 ACHs receiving services, all reported QUM activity that included educational sessions for nursing staff. Most of the community pharmacies stated that the educational sessions were, on the whole, unstructured talks by one of their pharmacists, although one control pharmacy presented the PSA 'dementia' kit to their ACH. A consultant group of accredited pharmacists prepared and delivered educational sessions at four of the intervention ACHs and two of the control homes. Four of the intervention homes and six of the control ACHs were represented by their pharmacy at Medication Advisory Committees. Of note is the finding that only two medication audits were conducted in two of the control homes throughout the 25 ACH sample.

Table 3. RedUSE home data: no. of residents, RMMR and QUM services provided

Intervention ACH no	average number residents (8/08-3/09)	RMMR service agreement 08 ?	No of RMMR services conducted Jan-Jul 2008	No of RMMR services conducted Aug08-Feb09	QUM services provided during 2008 except RedUSE	QUM services by accredited pharmacist?
1	34	yes	8	3	nil	Yes
2	54.7	yes	19	47	1 talk	Yes
3	91	yes	3	102	4 education sessions, MAC	Yes
4	100.7	yes	2	106	2 talks at MAC	No
5	96	yes	13	95	2 talks at MAC	No
6	55	yes	22	51	1 talk	Yes
7	112.3	yes	26	18	nil	No
8	89	yes	3	106	4 ed sessions MAC	Yes
9	70	yes	0	19	4 ed sessions	Yes
10	79	yes	0	63	nil	No
11	44.7	yes	0	40	nil	No
12	36	yes	0	17	4 ed sessions	Yes
13	35.7	yes	9	2	Nil	Yes
average	69.1/ACH		105 (8.1/ACH)	669 (51.6/ACH)		
Control ACH no	average number residents(8/08-3/09)	RMMR service agreement 08?	No of RMMR services conducted Jan-Jul 2008	No of RMMR services conducted Aug08-Feb09	QUM services provided 2008 except RedUSE	QUM services by accredited pharmacist?
14	46.7	yes	22	30	2 talks, MAC NPS DUE	Yes
15	93.3	yes	11	91	2 educational sessions, MAC	Yes
16	76.3	yes	14	82	3 talks + MAC	No
17	66.0	yes	34	38	2 educational sessions, audit	Yes
18	19.3	yes	0	21	2 ed sessions	No
19	62.0	yes	5	71	1 talk + MAC	No
20	78.3	yes	2	47	1 talk + MAC	No
21	73.7	yes	25	0	nil	Yes
22	63.7	yes	4	65	2 ed sessions MAC	Yes
23	39.7	yes	0	8	2 QUM sessions	Yes
24	33.3	yes	0	5	2 QUM sessions	Yes
25	35.7	yes	19	0	nil	Yes
average	57.3/ACH		136 (11.3/ACH)	458 (38.2/ACH)		

Rates of Antipsychotic and Benzodiazepine use

The psycholeptic prevalence rates of the individual intervention ACHs are listed in Table 4 and the prevalence rates of the control homes are listed in Table 5 below. Both antipsychotic and benzodiazepine prevalence rates decreased in the intervention aged care homes over the trial period, whereas the prevalence rates of both agents increased in control homes.

Table 4: Intervention ACH size, antipsychotic and benzodiazepine prevalence at baseline (wk 0), week 12 and week 26.

Home code	no. of residents			average no. residents	antipsychotic rate			benzodiazepine rate		
	wk0	wk12	wk26		wk0	wk12	wk26	Wk0	wk12	wk26
1	34	34	34	34	5.9%	2.9%	0.0%	23.5%	17.6%	14.7%
2	55	55	54	54.7	27.3%	25.5%	25.9%	47.3%	36.4%	37.0%
3	92	94	87	91	16.3%	16.0%	14.9%	30.4%	25.5%	24.1%
4	98	104	100	100.7	22.4%	18.3%	23.0%	31.6%	25.0%	29.0%
5	100	97	91	96	22.0%	21.6%	22.0%	34.0%	28.9%	30.8%
6	56	55	54	55	30.4%	27.3%	29.6%	35.7%	45.5%	38.9%
7	106	116	115	112.3	30.2%	26.7%	27.0%	26.4%	25.0%	20.0%
8	93	88	86	89	15.1%	19.3%	16.3%	38.7%	34.1%	32.6%
9	70	70	70	70	15.7%	14.3%	12.9%	45.7%	38.6%	32.9%
10	78	79	80	79	15.4%	13.9%	13.8%	25.6%	27.8%	26.3%
11	44	45	45	44.7	29.5%	22.2%	24.4%	29.5%	28.9%	31.1%
12	29	40	39	36	27.6%	20.0%	23.1%	27.6%	25.0%	23.1%
13	36	38	33	35.7	5.6%	7.9%	9.1%	16.7%	13.2%	9.1%
Total % of residents				69.1	20.3%	18.1%	18.6%	31.8%	28.6%	26.9%

Table 5: Control ACH size, antipsychotic and benzodiazepine prevalence at baseline (wk 0), week 12 and week 26.

Home code	no. of residents			average no. residents	antipsychotic rate			benzodiazepine rate		
	wk0	wk12	wk26		wk0	wk12	wk26	wk0	wk12	wk26
14	48	46	46	46.7	25.0%	30.4%	32.7%	14.6%	19.6%	26.5%
15	96	92	92	93.3	27.1%	29.3%	28.3%	26.0%	28.3%	23.9%
16	75	77	77	76.3	9.3%	10.4%	12.0%	41.3%	35.1%	32.5%
17	68	65	65	66.0	17.6%	16.9%	18.2%	29.4%	32.3%	36.4%
18	20	19	19	19.3	20.0%	21.1%	26.3%	25.0%	36.8%	36.8%
19	64	61	61	62.0	21.9%	16.4%	15.6%	32.8%	32.8%	31.3%
20	77	79	79	78.3	27.3%	29.1%	27.3%	22.1%	22.8%	29.9%
21	71	75	75	73.7	29.6%	28.0%	21.4%	38.0%	37.3%	38.6%
22	63	64	64	63.7	20.6%	20.3%	25.0%	33.3%	34.4%	34.4%
23	37	41	41	39.7	24.3%	26.8%	33.3%	45.9%	43.9%	48.9%
24	32	34	34	33.3	6.3%	5.9%	7.5%	37.5%	32.4%	37.5%
25	33	37	37	35.7	33.3%	29.7%	38.9%	18.2%	27.0%	19.4%
Total % of residents				57.3	21.9%	22.0%	23.9%	30.4%	31.9%	33.0%

Nine out of the 13 intervention ACHs (70%) reported a decrease in antipsychotic use over the 6 month trial, and over three quarters of intervention homes (77%) reported a reduction in benzodiazepine use. In contrast, only 2 of the control ACHs (16%) recorded a reduction in antipsychotic use, and only a quarter (25%) of control homes recorded a decrease in benzodiazepine prevalence.

When students' two way t-tests were applied to the ACH prevalence data, there was a statistically significant decrease in the mean proportion of benzodiazepines used in intervention aged care homes from baseline ($M = 31.8\%$ residents, $SD = 8.6$) to time 26 weeks ($M = 26.9\%$ residents, $SD = 8.6$), $t(12) = 3.7$, $p < 0.005$ (two-tailed). The decrease in the mean proportion of antipsychotic use in intervention homes from baseline ($M = 20.3\%$ residents, $SD = 8.7$) to time 26 weeks ($M = 18.6\%$ residents, $SD = 8.4$), was also significant: $t(12) = 2.2$, $p < 0.05$ (two-tailed). Results of the 2-way, repeated measures ANOVA for the intervention group ACH data showed a statistically significant effect of the intervention on benzodiazepine use ($p < 0.001$) and also on antipsychotic use ($p < 0.05$).

The changes in the mean proportion of residents taking antipsychotic and benzodiazepine therapy in intervention and control nursing homes are shown graphically over time at Figure 4a and Figure 4b. N.B. The error bars on the bar graphs in the results pages represent the confidence intervals (CIs) for each mean.

Figure 4a: Mean proportion of benzodiazepine use in intervention vs. control aged care homes over time.

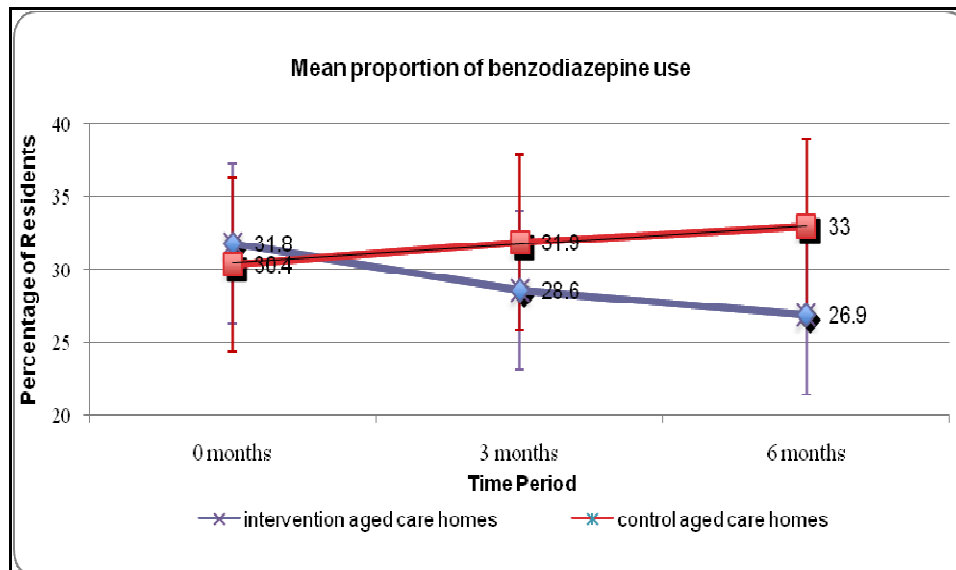
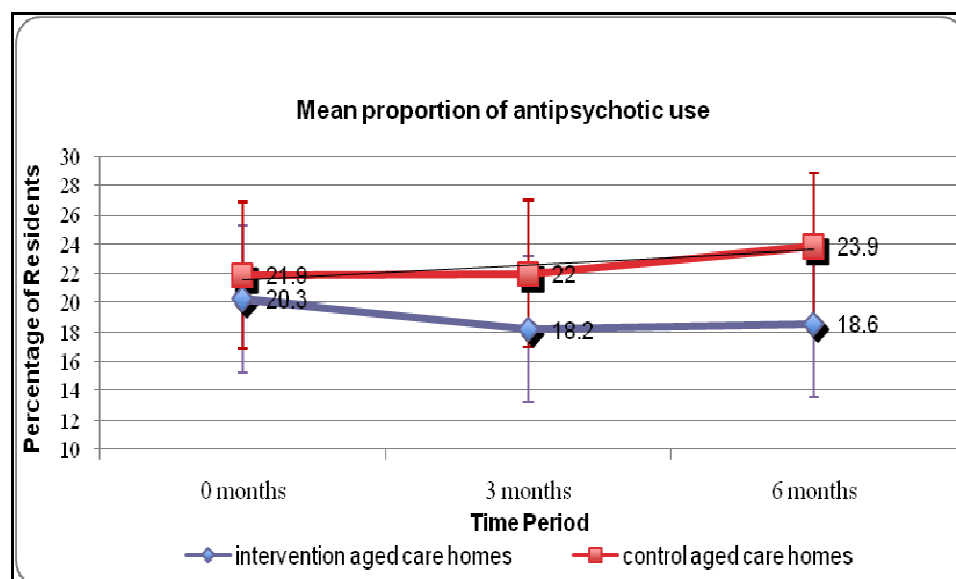


Figure 4b: Mean proportion of antipsychotic use in intervention vs. control aged care homes over time

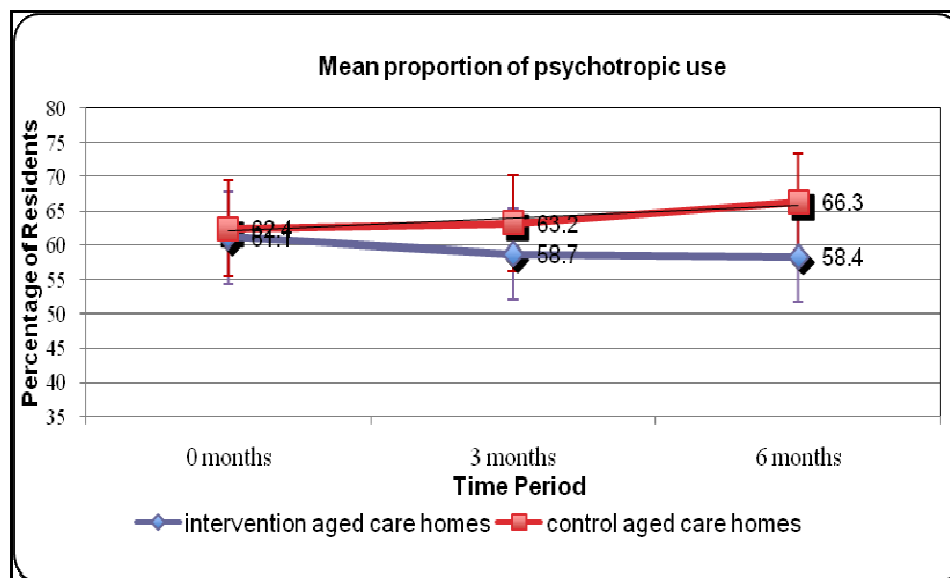


There were no statistically significant differences in either benzodiazepine or antipsychotic prevalence rates in the control nursing homes from baseline to time 26 weeks; Baseline mean (*M*) benzodiazepine use: (*M* = 30.4% residents, *SD* = 9.6 to time 26 (*M* = 33.0% residents, *SD* = 7.7), *t* (11) = -1.5, *p* = 0.2 (two-tailed); baseline mean antipsychotic use: (*M* = 21.9% residents, *SD* = 7.9) to time 26 weeks (*M* = 23.9% residents, *SD* = 9.3), *t* (11) = -1.3, *p* = 0.2 (two-tailed).

Rates of overall psychotropic and multiple psychotropic use

Both overall psychotropic and multiple psychotropic agent use decreased in the intervention homes, whereas both values increased in control homes over the trial period. These results are shown as Figures 5 and 6. The Mean proportion of residents taking three or more psychotropic agents was also evaluated. (See Figure 7).

Figure 5: Mean proportion of psychotropic use in intervention vs. control aged care homes over time.



There was a statistically significant decrease in the Mean (*M*) proportion of residents taking any psychotropic agent in intervention homes from baseline (*M* = 61.1% residents, *SD* = 11.9) to time 26 weeks (*M* = 58.4% residents, *SD* = 12.3), *t* (12) = 2.4, *p* < 0.05 (two-tailed). A 2-way R-ANOVA test confirmed a statistically significant effect of the intervention on overall psychotropic use (*p* < 0.005). The decrease in the mean proportion of multiple psychotropic use (i.e. use of two or more psychotropic agents) in intervention homes from baseline (*M* = 29.0% residents, *SD* = 9.3) to time 26 weeks (*M* = 25.5% residents, *SD* = 7.6) was also significant: *t* (12) = 2.7, *p* < 0.05. Results of the 2-way, repeated measures ANOVA confirmed a statistically significant effect of the intervention on the use of two or more psychotropic agents (*p* < 0.01).

A significant decrease was also noted in the proportion of residents taking three or more psychotropic agents at baseline (*M* = 8.2% residents, *SD* = 3.4) to time 26 (*M* = 5.9% residents, *SD* = 3.7), *t* (12) = 2.7, *p* < 0.02 (two-tailed). Results of the 2-way, repeated measures ANOVA showed a statistically significant effect of the intervention on the use of three or more psychotropic agents (*p* < 0.005).

Although increases in psychotropic measures in the control homes were seen over the trial, these were not significant: Mean psychotropic use: baseline (*M* = 62.4% residents, *SD* = 9.2) to time 26 weeks (*M* = 66.3% residents, *SD* = 10.8), *t* (11) = -1.8, *p* = 0.09 (two-tailed); baseline mean multiple psychotropic use (i.e. use of 2 or more psychotropic agents): (*M* = 27.4% residents, *SD* = 8.0) to time 26 weeks (*M* = 28.5% residents, *SD* = 8.9), *t* (11) = -0.7, *p* = 0.5 (two-tailed), and baseline mean use of three or more psychotropic agents: (*M* = 6.2% residents, *SD* = 3.5) to time 26 (*M* = 8.1% residents, *SD* = 5.7), *t* (11) = -1.7, *p* = 0.1 (two-tailed).

Figure 6: Mean proportion of multiple psychotropic use in intervention vs. control aged care homes over time

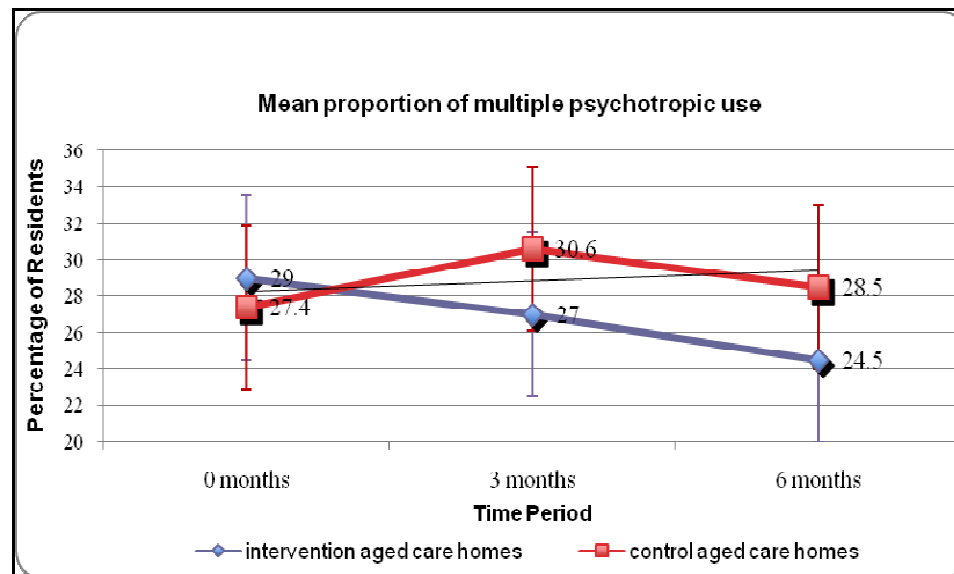
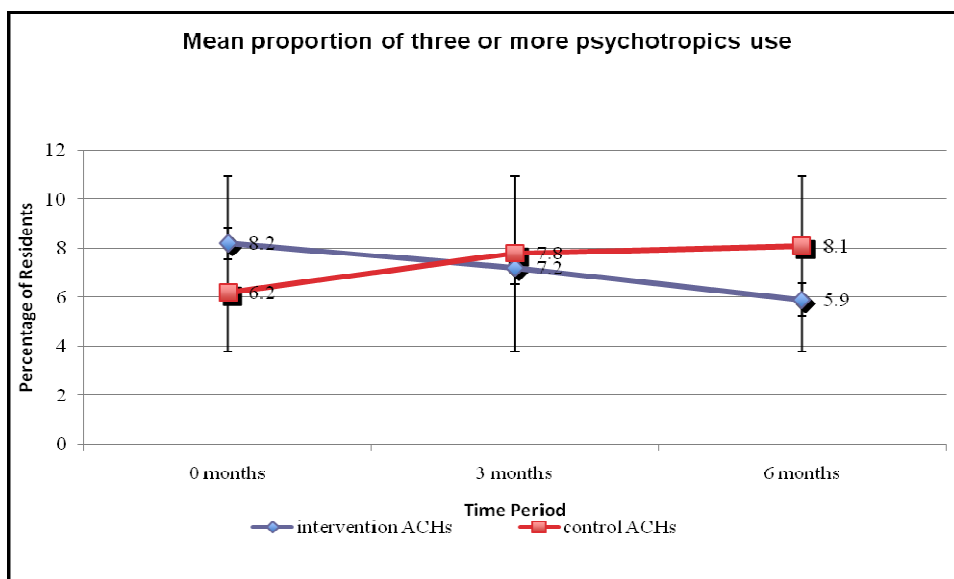


Figure 7: Mean proportion of three or more psychotropic agent use in intervention vs. control aged care homes over time.

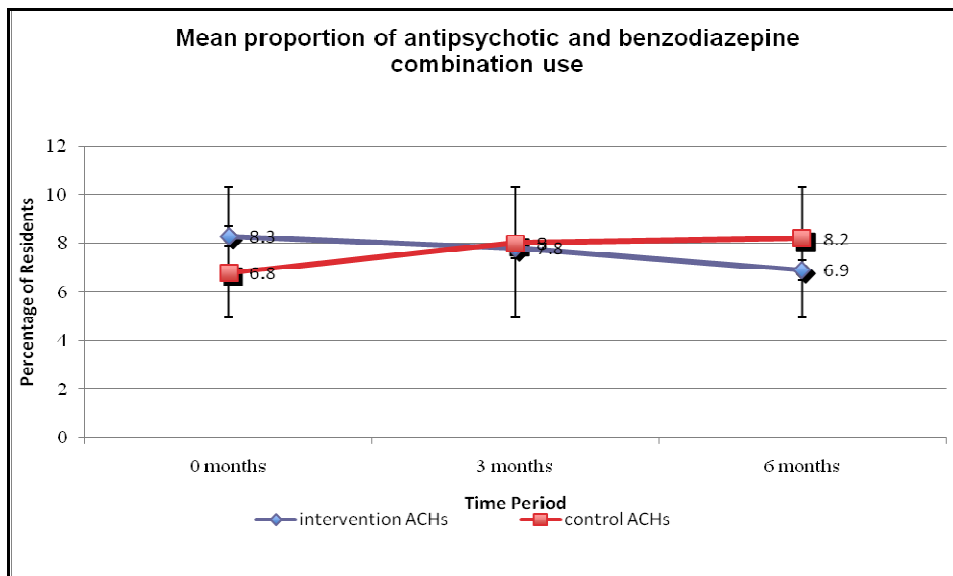


Co-administration of antipsychotics and benzodiazepines

As a further measure, the proportion of residents in each home taking antipsychotics and benzodiazepines together was examined. As with other measures, the proportion of residents taking both antipsychotic and benzodiazepine medication decreased in the intervention ACHs over the trial period, whereas the prevalence rate of this combination therapy increased in the control homes. This variation in rates can be seen in Figure 8.

There was a statistically significant decrease in the mean proportion of antipsychotic and benzodiazepine combination therapy used in intervention aged care homes from baseline ($M = 8.3\%$ residents, $SD = 5.2$) to time 26 ($M = 6.9\%$ residents, $SD = 4.5$), $t(12) = 2.4$, $p = 0.03$ (two-tailed). However, the 2-way repeated measures ANOVA showed that the effect just missed out on statistical significance ($P = 0.06$). There was no significant difference in the proportion of residents taking both antipsychotics and benzodiazepines in the control homes from baseline; ($M = 7.0\%$ residents, $SD = 5.0$) to time 26 ($M = 8.2\%$ residents, $SD = 5.2$), $t(11) = -1.22$, $p = 0.3$ (two-tailed).

Figure 8: Mean proportion of combination antipsychotic and benzodiazepine use in intervention vs. control aged care homes over time.

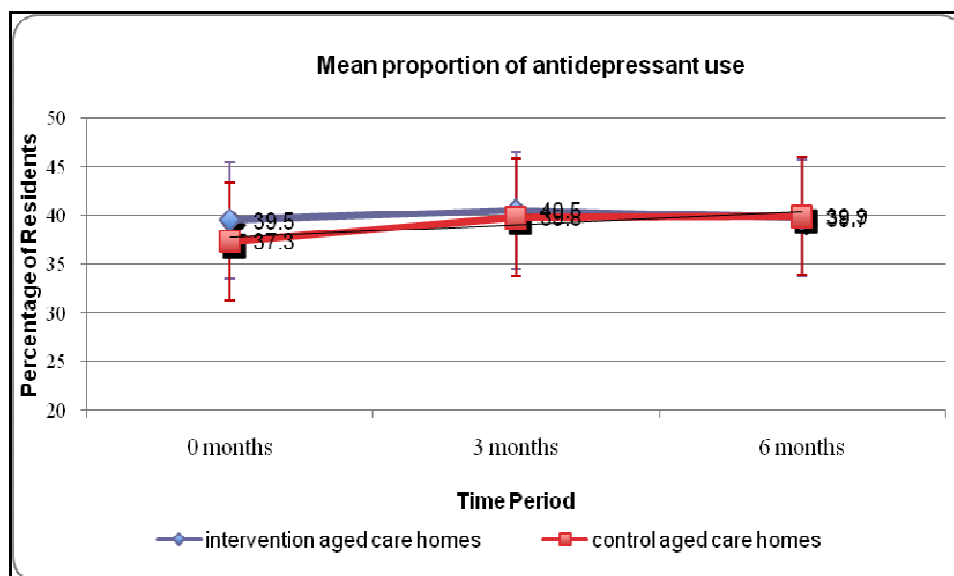


Rates of Antidepressant use

Finally, there was no significant impact of the RedUse trial from baseline to time 26 weeks on antidepressant use in either the control or intervention aged care home groups; intervention home mean antidepressant use: baseline; ($M = 39.5\%$ residents, $SD = 9.9$) to time 26 weeks ($M = 39.7\%$ residents, $SD = 8.8$), $t(12) = -0.1$, $p = 0.9$ (two-tailed), and control home mean antidepressant use: baseline; ($M = 37.3\%$ residents, $SD = 6.6$) to time 26 weeks ($M = 39.9\%$ residents, $SD = 10.0$), $t(11) = -1.4$, $p = 0.2$ (two-tailed). The proportions of residents taking antidepressants in intervention and control homes are represented graphically in figure 9.

The rate of tricyclic antidepressant use was examined separately because these agents can be prescribed for their sedative effects. The rates of tricyclic antidepressant use decreased slightly over the trial, albeit, non significantly, in both intervention and control age care homes: intervention home mean tricyclic use: baseline; ($M = 6.9\%$ residents, $SD = 3.9$) to time 26 weeks; ($M = 6.1\%$ residents, $SD = 3.6$), $t(12) = 1.4$, $p = 0.2$ (two-tailed); and control home mean tricyclic use: baseline; ($M = 10.9\%$ residents, $SD = 8.0$) to time 26 weeks; ($M = 10.3\%$ residents, $SD = 8.1$), $t(11) = 0.9$, $p = 0.5$ (two-tailed).

Figure 9: Mean proportion of antidepressant use in intervention vs. control nursing homes over time



Summary of the effect of the RedUSE intervention on psychotropic prevalence

Table 6 provides a summary of the rates of psychotropic utilisation in both intervention and control ACHs at the commencement of the project, and upon the project's conclusion. Significant differences in prevalence rates are shown in bold font.

Table 6: Mean psychotropic prevalence rates for intervention and control ACHs at baseline and wk26.

Psychotropic prevalence rate	Intervention ACHs			Control ACHs		
	baseline (%)	Wk26 (%)	<i>p</i> value*	baseline (%)	Wk26 (%)	<i>p</i> value*
Benzodiazepines	31.8	26.9	< 0.001	30.4	33.0	0.2
Antipsychotic	20.	18.6	< 0.05	21.9	23.9	0.2
Overall psychotropic rate	61.1	58.4	< 0.005	62.4	66.3	0.09
2+ psychotropics	29.0	25.5	< 0.01	27.4	28.5	0.5
3+ psychotropics	8.2	5.9	< 0.005	6.2	8.1	0.1
antipsychotic + benzodiazepine	8.3	6.9	0.06	7.0	8.2	0.3
Antidepressants	39.5	39.7	0.9	37.3	39.9	0.2
Tri-cyclic antidepressants	6.9	6.1	0.2	10.9	10.3	0.5

* Significant *p*-values (<0.05) are shown in bold font

Dose variation

The variation in doses throughout the trial was measured in all thirteen of the intervention aged care homes but was only able to be measured in eleven control homes. The reason for this missing data was because the RedUSE program was deleted in one of the control pharmacies at week 26. Instead, an independent measurement of sedative use was required, meaning that the resident dosages at this particular home could not be tracked by their assigned trial identification number.

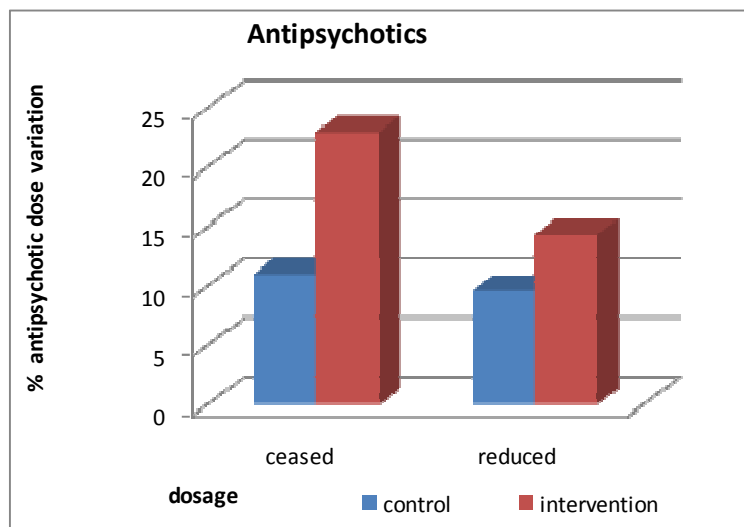
The medications and dosages of residents with three measures of medication use at baseline, 12 and 26 weeks had their dosage 'tracked' for this analysis of dosage variance. A total of 154 residents were taking antipsychotics at baseline in the intervention aged care homes. In the control homes, 115 residents were taking antipsychotics at baseline. Table 7 outlines the dosage variation of antipsychotic medication in both intervention and control home groups.

Table 7: Variation in resident antipsychotic use in intervention vs. control ACHs

Antipsychotic Agents	Intervention aged care homes Baseline to week 26 N (%)	Control aged care homes Baseline to week 26 N (%)
Drug ceased	35 (22.7)	13 (11.3)
Dose increased	6 (3.9)	19 (16.5)
Dose decreased	22 (14.3)	11 (9.6)
Same dose	91 (59.1)	72 (62.6)
Total	154 (100)	115 (100)

In the intervention homes, antipsychotic doses were more likely to have been ceased or reduced, and doses less likely to have been increased than in control homes. The difference in antipsychotic dose variations between the intervention and control groups was found to be very significant ($\chi^2 = 17.4$, (df=3), $p < 0.0005$). When the number of residents in each ACH group who had their antipsychotic dose ceased or reduced over the duration of the RedUSE trial was compared, a substantial difference was noted between the intervention and control homes (36.9% vs 20.9%, $\chi^2 = 7.4$, (df=1), $p < 0.01$). The reduction/cessation of antipsychotic doses is charted as Figure 10.

Figure 10: Antipsychotic doses ceased/reduced in intervention vs control ACHs



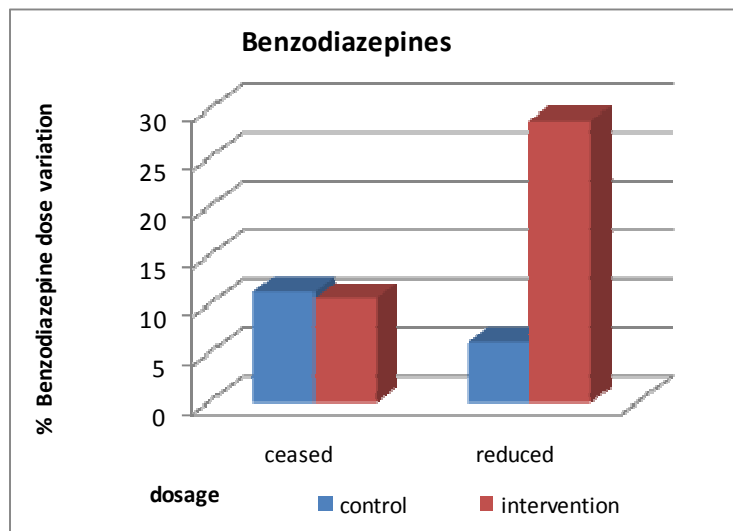
The dose variation of benzodiazepines in the RedUSE intervention homes was even greater than the antipsychotic dose variation. A total of 280 residents in intervention homes, and 176 residents in control homes were taking benzodiazepines at baseline. Table 8 shows the dosage variation of benzodiazepines in both intervention and control aged care home groups.

Table 8: Variation in resident's benzodiazepine use in intervention vs control ACHs

Benzodiazepine Agents	Intervention aged care homes Baseline to week 26 N (%)	Control aged care homes Baseline to week 26 N (%)
Drug ceased	30 (10.7)	20 (11.4)
Dose increased	17 (6.1)	28 (15.9)
Dose decreased	81 (28.9)	11 (6.2)
Same dose	152 (54.3)	117 (66.5)
Total	280 (100)	176 (100)

Benzodiazepine doses in the intervention aged care homes were more likely to have been reduced, and doses less likely to have been increased than in control homes. The difference between benzodiazepine dose variations in the intervention and control groups was found to be very significant when tested with a two way chi-squared test ($\chi^2 = 41$, (df=3), $p < 0.0001$). When the number of intervention residents who had their benzodiazepine dose ceased or reduced was compared to control home residents dosing data, there was a very significant difference (39.6% vs 17.6%, $\chi^2 = 23.4$, (df=1) $p < 0.0001$). The reduction/cessation rate of benzodiazepine doses is charted as Figure 11 below:

Figure 11: Benzodiazepine doses ceased/reduced in intervention vs control ACHs



Variation in dosage equivalents

When the Mean chlorpromazine and diazepam equivalents were calculated for each ACH at baseline, week 12 and week 26 measure and tested with students' t-test a significant difference was found between the intervention ACH dose equivalents before and after the intervention. However, the difference in dose equivalences found in the control homes was not significant. As found in all the other measures of psychotropic use, the mean dose equivalence of both antipsychotic and benzodiazepine agents decreased in the intervention homes, whereas this measure increased slightly in intervention homes. This finding provides further evidence that the total 'sedative' load in the intervention ACHs decreased.

There was a statistically significant decrease in the mean chlorpromazine equivalence ($M = \text{mg/ day/resident}$) of aged care homes from baseline ($M = 21.5$, $SD = 12.9$) to time 26 ($M = 17.1$, $SD = 9.9$), $t(12) = 4.2$, $p = 0.02$ (two-tailed). However, the 2-way repeated measures ANOVA showed a trend towards statistical significance ($P = 0.09$).

The decrease in the mean diazepam equivalence in intervention homes from baseline ($M = 3.8$, $SD = 1.2$) to time 26 weeks ($M = 2.9$, $SD = 1.0$), was also significant: $t(12) = 3.1$, $p < 0.01$ (two-tailed). Results of the 2-way, repeated measures ANOVA for the intervention group ACH data showed a statistically significant effect of the intervention on mean diazepam equivalence ($p < 0.005$).

Although increases in mean equivalence ($M = \text{mg/ day/resident}$) measures in the control homes were seen over the trial, these were not significant: Mean chlorpromazine equivalence: baseline ($M = 24.9$, $SD = 11.3$) to time 26 weeks ($M = 27.2$, $SD = 15.4$), $t(11) = -0.6$, $p = 0.5$ (two-tailed); and baseline mean diazepam equivalence: ($M = 2.9$, $SD = 1.0$) to time 26 weeks ($M = 3.2$, $SD = 0.7$), $t(11) = -1.1$, $p = 0.3$ (two-tailed).

The variation in mean equivalents over the RedUse trial is shown below in Tables 9 and 10 below:

Table 9: Variation in resident mean chlorpromazine dose equivalence use in intervention vs control ACHs over time

Mean chlorpromazine equivalence	Intervention ACHs (chlorpromazine equivalence, SD) ($M = \text{mg/ day/resident}$)	Control ACHs (chlorpromazine equivalence, SD) ($M = \text{mg/ day/resident}$)
Wk 0 (baseline)	21.6 (12.9)	24.9 (11.3)
Wk 12	18.1 (10.1)	24.7 (11.1)
Wk 26	17.1 (9.9)	27.2 (15.4)

Table 10: Variation in resident mean diazepam dose equivalence use in intervention vs control ACHs over time

Mean diazepam equivalence	Intervention ACHs (diazepam equivalence, SD) ($M = \text{mg/ day/resident}$)	Control ACHs (diazepam equivalence, SD) ($M = \text{mg/ day/resident}$)
Wk 0 (baseline)	3.8 (1.2)	2.9 (1.0)
Wk 12	3.3 (0.9)	3.1 (0.9)
Wk 26	2.9 (1.0)	3.2 (0.7)

Initiation of antipsychotic or benzodiazepine therapy

Throughout the six month duration of the RedUSe trial, a lower proportion of residents in the intervention aged care homes were started on antipsychotic or benzodiazepine medications than their control counterparts. When a chi-squared test was applied to this data it was found that significantly fewer residents in intervention homes started benzodiazepine treatment than residents in control homes (2.1% vs 7.0%, $\chi^2 = 21.9$, (df=1), $p < 0.0001$). However, the difference in the proportion of residents starting antipsychotic treatment between aged care home groups did not reach statistical significance (2.3% vs 4.2%, $\chi^2 = 2.8$, (df=1), $p = 0.09$). Figures 12 and 13 illustrate the difference in the proportion of antipsychotic and benzodiazepine sedative agents initiated from baseline to week 26.

Figure 12: Proportion of residents initiated on benzodiazepines in intervention vs. control ACHs

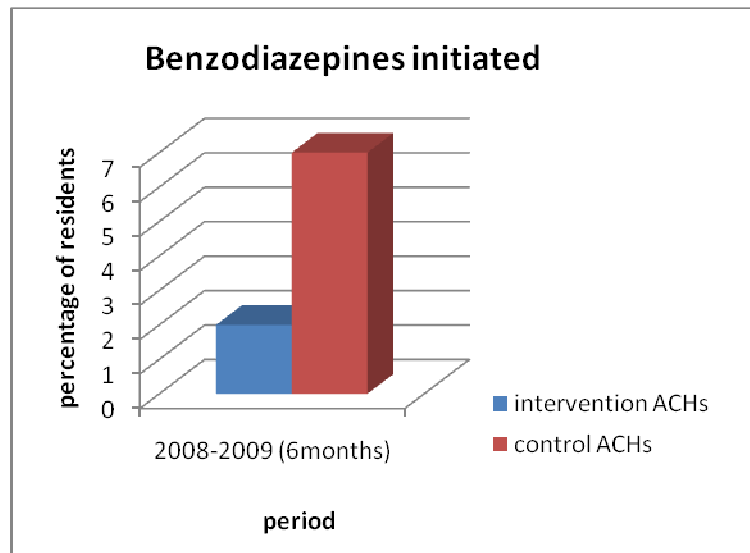
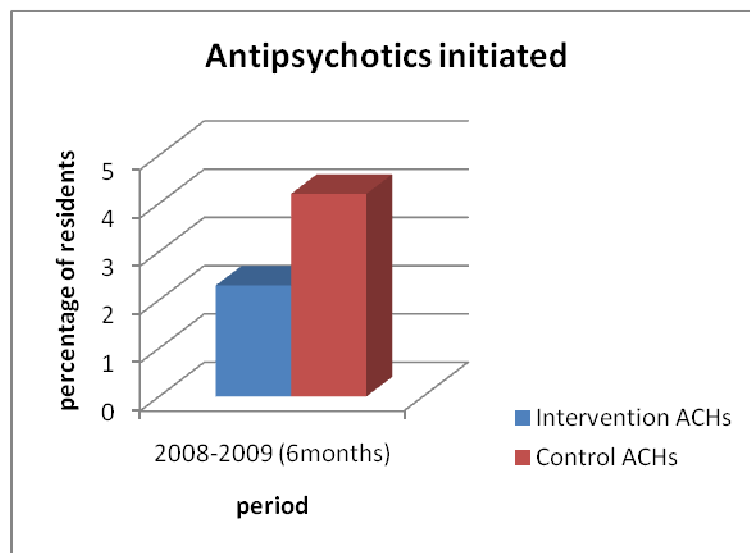


Figure 13: Proportion of residents initiated on antipsychotics in intervention vs. control ACHs



3.2 TRAINING EVALUATION

Evaluation of Pharmacist Training Weekend

Evaluation reports were submitted by eight of the ten pharmacists attending the RedUSE training weekend which was held at the beginning of July 2008. The evaluation form consisted of eight questions, with a final rating allocated to the entire training event. The evaluation was anonymous and completed after the final educational session on the Sunday. Table 11 summarises the reports.

Table 11: Evaluation report summary of RedUSE Pharmacist training.

Questions	Responses
<i>1. Did the training increase your understanding of the Quality use of psychotropic medication in older people?</i>	All eight pharmacists answered 'yes'. One commented, 'a very good refresher'
<i>2. Has the training influenced your attitude / perception of how you can promote the appropriate use of sedatives in aged care?</i>	All eight pharmacists answered 'yes'. Two of the pharmacists felt that the training 'has given me more confidence.'
<i>3. Which activities or training methods did you find the most effective in conveying the course content?</i>	Five of the participants ranked the case studies, and two ranked the panel discussion as the most effective training methods. One of the pharmacists elaborated further; "good to hear from GPs and nursing staff"- very valuable.'
<i>4. What would you like to see included or covered in greater depth in the training?</i>	Three of the participants did not answer and one commented that they thought the content just right. Of the other four respondents, one pharmacist wanted more clinical information and another requested more case studies. The other two pharmacists wanted more ideas about coping with resistance to change and non-drug strategies.
<i>5. Do you feel equipped to provide the strategies of RedUSE as a QUM activity in the aged care homes you service?</i>	Seven of the pharmacists felt that they were equipped and the final pharmacist thought they were 'nearly' equipped. Several of the Pharmacists were pleased that a researcher would help them install and run the program initially. Two of the participants wanted more detail about the staff training package.
<i>6. Your rating of the overall effectiveness of the training? 1. Excellent 2. Very good 3. Good 4. Fair 5. Poor .</i>	Three pharmacists ranked the training as excellent and five ranked the training as very good.
<i>7. Your comments on the pace of the course and the level of challenge/difficulty?</i>	All the pharmacists thought the training was well paced and aimed at the right level. One of the pharmacists thought this aspect of the training was excellent. One of the pharmacists commented; "as always there is never enough time! Less for training and maybe more practiced discussions with the two health professionals."
<i>8. Your comments about any other aspects of the RedUSE training. e.g. catering, timing of course, remuneration.</i>	Four of the pharmacists did not add any further comments. Two pharmacists added that they felt it was all good. One commented that they appreciated the effort not to take up too much time at the weekend! One final comment:: "All above aspects of the course were positive. I look forward to being involved."

Evaluation of RedUSE Launch

The RedUSE launch event was attended by 91 health professionals including GPs, nursing staff and pharmacists. Anonymous evaluation forms (see Appendix I) were placed in front of each place setting before attendees arrived. Each participant completed the same form regardless of profession and details were not sought regarding professional training. Participants were asked to rank certain aspects of the project on an analogue scale.

A total of 26 forms were completed giving a participation rate of 29%. The feedback from the evaluation is summarised below in Table 12.

Table 12: Evaluation report summary of RedUSE Launch presentation



Evaluation for RedUSE Launch 28Aug08	Mean Ranking:/ 5	Standard Deviation	comments
presentation	4.5	0.5	very relevant and useful.
Content	4.4	0.5	excellent presentation, wonderful research, good idea to have resources of NSW
Question time	3.9	0.8	invite minister of health
Relevance to practice	4.5	0.7	it did allow people to gain an insight into the roles others can play
Re-enforced knowledge	4.3	0.9	The session was very informative
Changed attitudes towards prescribing of sedatives	3.8	1.0	I look forward to this project and reducing the use of meds

Evaluation of the Nurse Educational Sessions

Two nursing staff training sessions were held after the baseline and 3 month DUE measurements in each of the 13 intervention homes. All education was delivered by 8 community pharmacists who had attended the pharmacist RedUSE training. A total of 105 aged care home nursing staff from intervention homes attended the first educational session (55 registered nurses (RNs), 47 enrolled nurses (ENs) and 3 personal care assistants (PCAs)) and 71 nursing staff attended the second session (44 RNs, 26 ENs and 1 PCA). Fifty of the nursing staff attending the first session also attended the follow-up session (27 RNs and 23 ENs).

All ACH nursing staff members attending an educational session were asked to complete an anonymous evaluation form at the end of the each session. The evaluation form asked participants to rank four aspects of the presentation using a visual analogue score from 1 to 5 where “1” was ranked as ‘unsatisfactory’ and “5” as ‘very satisfactory’. The nursing staff were also asked to rank whether their knowledge was enhanced, and attitudes around sedative use altered, as a result of the session. A section was also included for staff comments. A sample evaluation form is shown as Figure 14.

Figure 14: Nursing evaluation form for RedUSE Nurse Educational Sessions

Evaluation for nursing staff education:
August / September 2008

On a scale of 1 to 5 (1 being unsatisfactory and 5 being very satisfactory) please rate your level of satisfaction with the following aspects of the session:

Presentation:	1	2	3	4	5
Content:	1	2	3	4	5
Discussion time:	1	2	3	4	5
Relevance to your Practice:	1	2	3	4	5

The educational session has reinforced my knowledge about the use of sedative drugs for residents of aged care homes.

Not at all 1 2 3 4 5 Greatly

My attitudes around the prescribing of sedative medication in aged care homes have altered as a result of this educational session.

Not at all 1 2 3 4 5 Greatly

Please add any further comments about the training or suggestions on how it could be improved:

.....

.....

.....

.....

.....

Thankyou for completing this form.

Eighty-five nursing staff members (81% of participants) completed an evaluation form for the first training session and 69 nursing staff (97% of participants) completed an evaluation report for the second training session. Overall, the training was ranked very highly with all aspects of the training being ranked more than 4 marks out of a possible 5 marks in all six questions. The Mean mark allocated to each question, its standard deviation (SD) and further comments made by nursing staff participants are all shown in Table 13.

Table 13: Evaluation report summary of RedUSE Nursing staff educational sessions

First training Aug/Sept 08	Mean Ranking:/ 5	Standard Deviation	comments
presentation	4.6	0.6	good presentation.
Content	4.7	0.5	learnt things I didn't know about sedatives
Discussion time	4.4	0.7	As a new nurse I found this great but would like a handout so I can study further
Relevance to practice	4.9	0.4	Older GPs tend to prescribe more. Younger GPs open to discussion with staff.
Re-enforced knowledge	4.7	0.7	The session was very informative
Changed attitudes towards sedatives	4.2	1.1	I have never believed in medicating people to deal with Behaviours
Second educational session Dec08/Jan09			
presentation	4.6	0.7	Could we have a case study of a specific resident
Content	4.6	0.7	I would appreciate regular pharmacology sessions
Discussion time	4.3	0.9	more than willing to answer any questions asked
Relevance to practice	4.7	0.7	We are committed to use these medications with awareness. To review regularly with GP
Re-enforced knowledge	4.6	0.6	educational - great!
Changed attitudes towards sedatives	4.3	1.0	I have always been concerned about overuse of sedatives

The pharmacists delivering the RedUSE educational sessions in the intervention ACHs also evaluated the nurse educational sessions as the 'trainer'. The sessions were evaluated by the same method as the nursing staff except that half of the questions differed slightly and sought to gauge the pharmacists' opinion of the acceptability of the nurses and the level the presentation was pitched. All eight of the pharmacists conducting educational sessions completed an evaluation form. A summary of the evaluation is presented as Table 14.

Table 14: Pharmacist Evaluation report summary of RedUSE Nursing presentation

Evaluation for RedUSE training – first session	Mean Ranking:/ 5	Standard Deviation	comments
presentation	4.9	0.3	an excellent resource, informative, attractively presented and very easy to use.
Content	4.4	0.5	nurses want handouts, brief overview of projects important points
Discussion time	4.0	1.3	makes drug discussions with staff very manageable & productive
Nursing acceptance	4.8	0.5	cast nurse in stronger role in case study
Pitched at right level	4.3	0.4	Quiz, some found some of the questions ambiguous.
Difficult to deliver?	1.5	1.1	simplify names of benzos, add a list of benzos

Effectiveness of Nursing Staff Educational Sessions

Two nursing staff training sessions were held after the baseline and 3 month DUE measurements in each of the 13 intervention homes. All education was delivered by 8 community pharmacists who had attended the pharmacist RedUSE training. A total of 105 aged care home nursing staff from intervention homes attended the first educational session (55 registered nurses (RNs), 47 enrolled nurses (ENs) and 3 personal care assistants (PCAs)) and 71 nursing staff attended the second session (44 RNs, 26 ENs and 1 PCA). Fifty of the nursing staff attending the first session also attended the follow-up session (27 RNs and 23 ENs).

At the beginning of the staff educational session, all of the nursing staff attendees were asked to complete a short, ten question multiple-choice quiz (shown at Appendix D) which was devised to assess knowledge on psychotropic medication for old age mental health conditions. The average quiz score of the RNs was 64.4% (SD 19.5%), and the average quiz score of the ENs was 50.2% (SD 16.6%). In order to assess the effectiveness of the RedUSE staff training educational sessions, the same quiz was repeated at the end of the second staff training session. Quiz results for those nursing staff that completed the quiz before and after the educational sessions are shown in Table 15.

Table 15: Mean Quiz scores for registered and enrolled nurses before the first staff training session and after the second staff training session

	Pre-training Mean score %	Post-training Mean Score %	Difference %
Registered nurses (N = 26)	69.6	87.3	17.7
Enrolled nurses (N = 21)	49.0	76.7	27.7

The mean quiz scores for both ENs and RNs improved markedly after attending the two RedUSE training sessions, with a greater score improvement seen in the ENs scores. When the pre and post training scores were tested with a paired t-test, a significant increase in the mean quiz score was found in both registered and enrolled nursing groups: For RNs; pre-training score ($M = 69.6$, $SD = 16.4$) to post-training score ($M = 87.3$, $SD = 12.5$), $t(25) = 4.0$, $p = 0.0005$ (two-tailed). For ENs the improvement was more pronounced; pre-training score ($M = 49.0$, $SD = 18.4$) to post-training score ($M = 76.7$, $SD = 18.0$), $t(20) = 6.8$, $p < 0.0001$ (two-tailed).

When the first RedUSE psychotropic quiz results were examined in detail, it was noted that some questions were more likely to be answered incorrectly than others. In particular, those questions related to the side effects of psychotropic medication or the duration of treatment were answered poorly. For example, many of the nurses were unaware that hyperglycaemia was a side effect of olanzapine, or that memory impairment was a common side effect of benzodiazepine use. The majority of nursing staff, particularly enrolled nurses, were unaware of the recommended duration of benzodiazepine and antipsychotic use. Less than half of the registered and enrolled nurses knew that the recommended duration of benzodiazepine use was 2-4 weeks.

One finding of particular concern was that the majority of enrolled nurses (60%) and nearly a third of registered nurses (31%) thought that oxazepam, a very commonly prescribed anxiolytic benzodiazepine in Tasmanian ACHs, was prescribed as an antipsychotic or as an antidepressant agent.

3.3 BASIC COST ANALYSIS

The basic cost analysis report was commissioned from an independent economic analyst, Mr Peter Brownscombe, who consulted at length with the research team. The preliminary cost analysis has indicated that implementation of the program appears cost effective. The benefits of the RedUSE project are more likely to be non-financial – but it appears that, given increases in sedative costs, there is still a potential significant cost saving to be achieved in every State and Territory, and Australia more generally, by implementing the RedUSE program.

If an assumption is made that there is a high level of homogeneity of ACH residents across Australia, it is possible to suggest an extrapolation from the “intervention” group in Tasmania to the Australian population. This requires a calculation to estimate both the current average cost/resident and the potential saving/average resident over a year by a reduction in their benzodiazepine medication cost by 15%.

The results from the trial showed that the average resident monthly cost of benzodiazepines was \$3.38 – which works out to 78 cents per week. If this was reduced by 15%, this cost would fall by 11 cents per resident per week. This converts to a potential saving per resident of \$5.72 per year. With almost 6000 residents in Tasmanian ACHs, the total potential savings could approach \$35 000 per annum for the state alone.

The full report is attached as Appendix J.

3.4 QUALITATIVE EVALUATION

Focus Group qualitative evaluation of RedUSE

An important outcome measure of the RedUSE project was the acceptance of its key strategies. To gauge acceptability, two focus groups were held in March 2009 with participants involved in the intervention arm. One group was conducted with mostly Directors of Nursing (DON) of the aged care homes and the other with participating community pharmacists. All trained pharmacists and DONs involved with the intervention aged care homes were invited to attend the focus groups on successive evenings in March 2009. Both groups were facilitated by an independent qualitative researcher, to ensure open feedback from the participants. Before the focus groups were held, the qualitative researcher met with the project manager to determine the main objectives of the qualitative analysis and to develop two interview schedule outlines. The two main objectives of the focus groups were:

- To determine the success of strategies and implementation procedures used in the RedUSE project; and
- To ascertain any barriers and enablers to the RedUSE project.

Eight out of the ten RedUSE-trained pharmacists agreed to join the pharmacist focus group. Nine nursing staff from nine of the thirteen intervention aged care homes participated in the nursing staff focus group. The results of the focus group analysis are derived from the final report of the qualitative analysis and the interview transcripts, and are grouped in key themes as follows:

A. Perceptions of the RedUSE project

Both pharmacists and nursing staff were initially hesitant over the perceived workload associated with RedUSE. However, the nurses maintained they were very keen to start the project and any apprehension was not well founded once the study was commenced.

"I think when we got the detail we thought, oh okay that's going to be fine, it was all steam ahead basically"
Nurse

Pharmacists were concerned about their capacity to participate in the program but agreed to participate because their aged care home had indicated interest, and also because of the remuneration offered.

"My main fear was how on earth was I going to try and fit this in and do this around everything else and do a good job?" Pharmacist

"The first thing I looked at was the financial incentives because I knew it was going to take time and the fact that it adequately covered costs for pharmacists going to nursing homes. I thought it was pretty worthwhile and pretty easy from the word go and you get paid to do the training sessions down at the nursing home. Well I can get someone to come in and do my shift then I can go down there and do the training." Pharmacist

B. Training

Prior to RedUSE, the community pharmacists had provided only limited training to staff of aged care homes. The only instances recalled involved medications for Parkinson's and cardiovascular disease. Pharmacists valued the training they received prior to the commencement of RedUSE. They reported that the speakers were of high quality, the information provided was very useful and the remuneration was important for pharmacists' participation.

"Yes, the training that was provided with the project was relevant, it was a great quality, you came away after a day-and-a-half and thought that was a good day-and-a-half; it was inspiring, there were so many benefits." Pharmacist

Most pharmacists said they enjoyed delivering the staff educational sessions and found the resource material 'easy to use'. In many cases it was the first time the pharmacists had used a PowerPoint® presentation. The training material gave them confidence as the content had been well researched.

"It was fabulous material to deal with and if you had a laptop to show them all the pictures; it was easy, it was very conducive to discussion and they (the nursing staff) said you should be doing more of this on other topics." Pharmacist

The feedback from the Nurse focus group was that the pharmacy education sessions were beneficial and well received by the nurses. Nurses also felt that having their supply pharmacist deliver the educational sessions promoted participation.

*"It was really visual and it was quick as well, like it didn't take too long, you know I mean in the aged care environment it's hard to capture everybody's attention you know ...compared to other training, I mean I could see the interest, like just actually looking around the room and seeing how they were engaged in it, and also the attendance, it was the first time I think I had every single RN and EN at the home, all sitting there."*Nurse

"Our staff have a rapport with that supplying pharmacist,.. to have them come in, because the registered staff knew them, oh [name]'s going to come, you know, so there was that willingness if you like, would you agree, to go along and listen to what this proposal you know was all about." Nurse

C. DUE and checking medication records at the aged care home

The procedure of using the RedUse software program was well accepted by pharmacists. Pharmacists were also required to visit their aged care homes to verify sedative use. One aged care facility seemed threatened by one pharmacist's visit and a nurse was asked to accompany her, however, this was an isolated incident. The pharmacists did, however, comment that they did not find the process of entering 'PRN' sedative usage into the program to be very streamlined. It seemed to be a cumbersome process and the pharmacists needed to enter a specific start date of administration and this was not always available. Both pharmacists and nurses found the DUE reports to be very interesting and useful as it enabled a sedative comparison across different aged care facilities.

*"We only knew which number we were, we didn't know which number other facilities were, so it was helpful to say, " well look guys this is us, in comparison to these", and you know I'm sort of in the middle so there were people above and below me, so I could say well look we're not real bad ... but we're not really good either because we weren't number 1, so there's obviously room, lots of room for improvement."*Nurse

D. Sedative Review Plan

Both groups discussed the Sedative Review Plan forms (see Appendix F) in detail. Initially, it was not clear to some nurses what information was required on the forms to the extent that pharmacists in a few places were asked to assist them. Some forms were completed quickly, whereas in others, completion was slow. One nurse offered the following explanation on the difficulty she found in completing the forms;

*"I think there was a time issue. A lot of facilities out there at the moment really struggling to find staff, ... and then they get agency staff and agency staff aren't there enough to probably make a decent comment on a form like that, because they are not with the residents long enough or on a regular basis."*Nurse

Nursing staff reported that they found the forms useful in assisting nursing staff to review why patients were receiving sedatives.

*"I think it prompted that thought process, before you just tended to dish out the pills without really thinking."*Nurse.

A few GPs did not respond well to the sedative review forms and in some cases wrote sharp comments in their comment sections of the form. However, most GPs seemed to be accepting and in some cases were enthusiastic of the initiative.

*"Some of the GPs, ... we had a run of them, just came straight in and said right 'Let's do it'. Let's do it, and they just took people off pills."*Nurse

*"Our doctors that have been involved in this they've really got really into it and they've actually raised the awareness, and they really are looking at it, whereas I didn't feel that they were doing that before."*Nurse

Many of the nurses were appreciative of being asked to comment on the forms when often they were not considered in such matters.

*"I would say maybe in the past .. that the comment of the registered nurses actually is not even included, it's actually forgotten."*Nurse

"I think (it gave nurses a voice), absolutely, and because of the project the doctor was actually compelled really to come in and actually say well what do you think Sis, I've got this form that says on here that you know Joe Blow does this you know, is that right and let's talk about it, or you know you don't think that he might need that dose or whatever the case may be" Nurse

E. RedUSE Newsletter and resident/relative pamphlet

While both groups were reasonably positive about the content of RedUSE newsletters there was evidence to suggest that distribution within some homes was inconsistent. Similarly, while the residents' pamphlet was useful when given to patients' relatives in case conferences, few residents may have read them; however, when used, they were beneficial.

"It's been helpful the pamphlets and the brochures and things that have gone with the RedUse project, especially the resident one. Like I had a difficult resident who wanted to have Temaze sort of like 2 o'clock and 3 o'clock in the morning, ... he'd been doing this for such a long time, and so I got all the books and all that sort of stuff and finally, he sat down and he read it all and now, he's actually done it." Nurse

F. Barriers to RedUSE-ing

Few barriers were reported related to RedUSE project. However, both nurses and pharmacists found that the attitudes of some of the nursing staff and GPs were the main obstacle to reducing sedative medication.

"They (two night nursing staff) were the most oppositional people that I'd ever come across, so they're at the other end of the extreme where they just were 'I just want an easy life; I come here to read my night sheet and I don't want any hassle'." Pharmacist

"There's a bit of a leap there, that some aren't prepared to take, do you know what I mean, there's a resistance, at times, only with some" Nurse

"Somehow you put the suggestion and when the GPs ring you they make it very clear that these guys are in the waiting room to heaven and let's just keep them comfortable...One of the GPs is just like that and he had 15 patients there. It is really hard to change that attitude." Pharmacist

G. Consequences of the RedUSE project

The following concluding comments were contained in the qualitative research final report. Overall, participants of the focus groups suggested that the RedUSE project had some very positive effects on the aged care homes. These were that:

- It increased the focus on sedative use in aged care, made staff re-evaluate the need for sedatives and refocussed the need for regular reviews of sedative use;
- It highlighted that sedatives can be reviewed in nursing homes without detrimental effects to patients;

"The ones that we tended to, they just stopped yeah, and they weren't missed, most of them, in fact I don't remember anyone going back on them again." Nurse

- RedUSE provided a framework so that stakeholders in the use of sedatives in residents could effectively act as a group which may not have been possible individually;
- It improved the education of nurses and pharmacists on sedative use and its possible consequences;
- It showed that community pharmacists could provide worthwhile education to aged care home staff when supplied with suitable training materials, support and background information;
- It increased community pharmacist and nurse confidence, so that they could challenge routine practices;
- It enabled some nursing homes to show accreditation committees that they had undertaken a positive quality use of medicines project.

"A couple of weeks ago we had our accreditation and as I say we're just a small facility and the accreditors who came were quite impressed that for, a couple of reasons, that we actually could be bothered to do, or that we did some research, because we're only a small, little facility, and they were impressed with the feedback that was given from the staff, so for you guys that are going for accreditation....." Nurse

UMORE, University of Tasmania

4. LIMITATIONS

4.1 LIMITATIONS

The RedUSE project had several limitations. Firstly, it is difficult to distinguish which of the strategies of the RedUSE project had greater impact on reducing antipsychotic and benzodiazepine use in the intervention aged care homes. To do this, researchers would have to test individual strategies in separate intervention studies. An extensive literature review conducted before the project commenced indicated that a multi-faceted approach involving those health professionals involved with in aged care homes, namely pharmacists, nurses and GPs, appeared to offer the most substantial chance of success to reduce sedative use; thus, for this reason the research team decided to adopt a similar approach.

It should be acknowledged that the success of the RedUSE project in reducing ACH sedative use may have been impacted by the publicity attracted from media reports and the visit of Professor John Snowdon. When the University of Tasmania announced the Pharmacy Guild funding for four 'Investigator Initiated' projects, the local newspaper, 'The Mercury' ran a story about the RedUSE project; at the same time, highlighting the risks and limited benefits of sedative use. Likewise, the newspaper and a local radio program ran a story about the Hobart visit of Professor John Snowdon to talk about sedative use in aged care homes. Such publicity may have had an independent effect on raising awareness of this issue and contributed to project outcomes. The individual impact of this unsolicited media publicity is difficult to assess.

Another potential limitation of the project was limited GP participation. For example, although over 140 GPs were invited to the launch event, only 18 GPs attended. Many of the GPs approached for an academic detailing session also declined to participate or did not attend pre-arranged sessions. This lack of GP participation was most likely due to the high workload of GPs, and a degree of professional education "saturation". The fact that a significant reduction of sedative use occurred in spite of the lack of GP participation is further evidence of the significant influence nursing staff exert on the utilisation of psychotropic medication in the aged care setting.

A further limitation of the project, which may have impacted on the scale of sedative reduction, was related to project timing. Although the second DUE measurement was completed by November, some of the pharmacists and aged care homes were unable to schedule the second nurse educational session before Christmas. This meant that staff feedback and follow-up education were delivered more than 6 weeks after the second DUE collection in five of the intervention homes. It was interesting to note that the sedative reduction in these homes was less than the reduction reported in homes receiving the educational session at the scheduled time. The delay in the education possibly reduced the momentum and impact of the project in these homes. In retrospect, a greater reduction in sedative use would probably have been achieved if the project was commenced earlier and did not run over the Christmas period.

It is also important to recognise that the positive impact of this trial on sedative rates in the sample of Tasmanian ACHs may not be transferable to other areas in Australia. It is not possible at this time to compare ACH rates of prescribing from state to state due to the limited number of published prevalence studies and lack of access to national prescribing information.⁴⁰ However, there are indications that the rate of benzodiazepine prescribing in Tasmania, in particular, may be higher than rates reported in other regions of Australia.⁴⁵ As a consequence, there may be more scope for a reduction in the prevalence rate of benzodiazepine medication. It should be noted; however, antipsychotic prevalence rates in Tasmanian ACHs were lower than rates reported in Sydney and New Zealand.⁴⁵ In spite of this lower baseline rate of antipsychotic use, a significant reduction in use of these agents was observed in intervention homes when compared to control homes. This positive finding serves to illustrate that the key strategies of the RedUSE project can promote reduced prescribing and increased review of sedative agents in instances when prevalence rates are not elevated in comparison to other areas.

Finally, although the RedUSE project was successful in reducing sedative use there is limited information on the clinical consequences/outcomes associated with the reduction found in the use of sedative agents. Interestingly, in the focus group several of the nursing staff mentioned that their falls rate had fallen as a consequence of the project. For this reason, subject to ethical approval and consent from the aged care homes, the research team hopes to examine fall rates and the incidence of challenging behaviours in all participant homes before, during and immediately after the RedUSE trial, in order to assess the impact of RedUSE on clinical outcome measures.

UMORE, University of Tasmania

5. DISCUSSION

The RedUSE (Reducing Use of Sedatives) Project
September 2009

DISCUSSION

The RedUSE project was a novel Australian intervention study which evaluated the impact of pharmacist-led QUM strategies on aged care home psychotropic rates. The RedUSE project strategies, including DUE, staff education and interdisciplinary sedative review, successfully reduced benzodiazepine and antipsychotic use in our intervention aged care home group when compared to our control aged care home group. Further, the project significantly increased the number of sedative dose reductions. Both findings corroborate the positive effect of previous intervention studies in aged care homes which utilised similar strategies of nurse education and interdisciplinary communication.^{26,47,48} This finding also validates the role of community pharmacists in ensuring quality use of sedative medication in aged care homes.

Prevalence rates of multiple psychotropic use

The RedUSE project had a positive impact on reducing the use of overall psychotropic and multiple psychotropic medications. This is a significant finding as multiple psychotropic agent usage is reported as the highest ranked medication-related risk factor for falls in aged care homes.⁶⁹ Therefore, it is possible that the falls rate in those homes with reduced sedative use has declined, with associated benefits of fewer GP attendances at the home, hospital admissions and improved quality of life. Subject to ethical approval and consent from the participant homes, the direct impact of the RedUSE project on falls rate may be able to be assessed in the near future.

The impact of the intervention strategies on the rate of combination antipsychotic and benzodiazepine therapy was also evaluated. There is evidence to suggest that benzodiazepine co-administration with antipsychotic medication may be a risk-factor for increased mortality associated with antipsychotic use in older people with dementia.⁷⁰ Moreover, another research team found that residents with Alzheimer's disease taking the two agents together experienced a faster rate of deterioration than those residents taking a single agent.⁷¹ The significant reduction recorded in the rate of co-prescribing of antipsychotics and benzodiazepines in the majority of intervention ACHs, may have positively impacted on the mortality and cognitive functioning of the residents.

Substitute sedative agents

Several researchers have suggested that when antipsychotic and benzodiazepine rates are reduced other agents may be prescribed to produce substitute sedative effects.^{48,72} For this reason the impact of the project on antidepressant prevalence was evaluated, as some of these agents, for example, tricyclic antidepressants, can be prescribed for their sedating properties.⁷³ Substitute prescribing of alternate agents in place of antipsychotics and benzodiazepines did not appear to occur as the prevalence of antidepressant use in the intervention homes was consistent throughout the trial, in both the intervention and control aged home groups, with the rate of tricyclic antidepressant use actually decreasing slightly.

Review of sedative medication

The majority of guidelines on the use of antipsychotics for BPSD stress the importance of regularly reviewing usage and trialling dose reduction/cessation every 6 -12 weeks.^{5,21,22} Prescriptions for benzodiazepines should generally be time-limited with long term users of benzodiazepines encouraged to reduce dosage at regular intervals.²⁴ A recent follow-up of the DART-AD (Dementia Antipsychotic withdrawal Trial) found that long-term antipsychotic users (longer than 12 months) with dementia had a significantly increased risk of mortality.²⁰ The researchers of the DART-AD trial "emphasised the urgent need to put an end to unnecessary and prolonged prescribing" of antipsychotic agents.²⁰ It is therefore pleasing to observe that one of the outcomes of the RedUSE project was a marked increase in the number of antipsychotic and benzodiazepine dosages reviewed, with a more than doubling of dose reductions/cessations in intervention homes when compared to control homes.

Strategies of the RedUSE project

There were three main strategies involved with the RedUSE trial. The strategy of clinical audit was shown to have limited impact on ACH antipsychotic use in one Australian study, possibly because the results were fed back solely to GPs attending aged care homes and nursing staff input was not included.⁶² However, the use of medication audits, or 'DUEs' presented to multidisciplinary hospital staff, has proved to be an effective strategy to reduce benzodiazepine prescribing in the hospital setting, with one research team reporting a marked reduction in prevalence rates from 36% to 31% of patients over a 3-month period.⁵⁸ The positive outcomes of our RedUSE project suggest that the use of DUEs, targeted at nursing staff, and supported by staff education and interdisciplinary review, can reduce psychotropic use and increase the number of attempts at dose reduction/cessation of these agents in the aged care home setting as well as the hospital setting.

Each of the three main strategies of the RedUSE project deserves due consideration as follows:

A. DUEs

The National Prescribing Service (NPS) has recently developed DUEs on benzodiazepines and antipsychotics for use in ACHs; however, their DUEs are paper-based, thus may be time-intensive, and are not aimed at one specific professional group. Moreover, the NPS DUEs are not benchmarked so individual home performance cannot be compared to that of other ACHs, nor are they reinforced by staff feedback or training on 'best practice' use of these medications.

The RedUSE DUE software application, on the other hand, requires minimal staff input as it 'extracts' existing community pharmacy dispensing information and converts this data into a benchmarked report; the results of which are subsequently feedback to nursing staff in an educational session. Given the present nurse staffing constraints in aged care, and the fact that pharmacists are being encouraged to 'become more involved in the monitoring and review of psychotropic medication', the RedUSE computerised program offers a timely, convenient and potentially cost-effective method of obtaining a DUE measure and disseminating the findings to nursing staff.³⁵

B. Sedative Review Plans

Another strategy of the RedUSE project involved a dedicated 'sedative review plan' for those residents taking sedative medication for extended periods. It could be argued that the Australian Government presently has a funded system of pharmacist provided medication review services operating in aged care homes; the Residential Medication Management Review (RMMR) system. However, the RedUSE 'sedative review plan' differs from the current RMMR in several ways. Firstly, the sedative review plan targets psychotropic medication use specifically, whereas RMMR's consider all medications; secondly, nursing staff comments are an integral component, whereas the present RMMR system may only involve communication between GPs and pharmacists; and, finally, pharmacists do not have to undergo the accreditation process to complete 'sedative review plans', allowing a greater number of community pharmacists to promote QUM in ACHs.

Roberts et al. reported a significant reduction in benzodiazepine prevalence in their trial of aged care home pharmacist-led medication reviews which became the model for the present RMMR system.²⁶ It should be noted though, that a significant amount of staff education (amounting to 26 hours per home) was also delivered to intervention homes in this particular trial.²⁶ Although one of the main justifications for the present 'RMMRs' is that reviews can reduce psychotropic use in aged care homes,⁴² there is limited evidence to show that RMMRs, as a stand-alone strategy, can result in a reduction of antipsychotic or benzodiazepine use.²⁸ This may be because the present RMMR involves dialogue between GPs and pharmacists, and nursing staff, who are considered very influential in the use of psychotropic medication,²⁸ are not actively involved. The RedUSE 'sedative review plan', which actively seeks nursing staff input and is supported by staff education and DUE feedback to staff, appears to be a more effective method to reduce the use of psychotropic medications.

There is currently a system of individualised targeted medication review that has proved successful in reducing benzodiazepine use in the community. In 2002, the Australian Department of Veterans' Affairs sent an individualised list of patients receiving long-acting benzodiazepines to prescribers, along with drug information on how to review the use of these medications.⁷⁴ This program is known as the veteran's MATES program. The use of long acting benzodiazepines in targeted veterans was reduced by 36% six months after the feedback program.⁷⁴

The RedUSE 'Sedative Review Plan' adopts a similar approach in providing and promoting review in targeted residents of ACHs taking antipsychotic and benzodiazepine medications for extended periods. Like the Veterans 'MATES' program, the Sedative review plan is also supported by a tailored educational program. However, the RedUSE targeted sedative review plan differs from the Veterans MATES program in several key areas. Firstly, nursing staff comments are a necessary component of the RedUSE sedative review process in recognition of ACH nursing staff influence on sedative use, whereas nursing staff input is not sought in the veterans MATES program. Further, the RedUSE sedative review plan encourages three health professional groups to communicate in an interdisciplinary way, a way of working which is heavily promoted in Australian health policy. Finally, the sedative review plan is initiated by community pharmacy and an external organisation is not involved in the process, significantly reducing infrastructure costs and allowing targeted review to be accessible to all residents of ACHs, not just the veteran population.

.C. Nursing Staff Education

The 'psychotropic medication' quiz provided to staff before and after the RedUSE project gave an indication that the level of knowledge of nursing staff about sedative medication, particularly knowledge related to side effects and recommended duration of use, was quite poor. Indeed, several of the pharmacists commented that they were surprised at the lack of understanding about medications shown by the nursing staff during the educational sessions. On the other hand, the majority of pharmacists reported that their ACHs were very keen to host and promote the educational sessions and there was a real desire to learn more about sedative use.

Educational interventions have been shown to be an effective strategy to reduce both antipsychotic and benzodiazepine use in aged care homes, with effective education based on guideline implementation and feedback to a interdisciplinary health care team.²⁸ The RedUSE educational sessions on psychotropic were well accepted by the ACH staff and pharmacists.

One of the key aspects of the education was that the sessions were delivered by community pharmacists who had a existing relationship with the home nursing staff and attending GPs. Nursing staff reported that staff were willing to participate in the educational sessions not only because they wanted more information about medications but they were also curious to hear what their pharmacist had to say. Not only did these educational sessions promote the review of psychotropic medication but participants of the RedUSE trial felt that they enhanced the professional relationship between the community pharmacy supplying the ACH and the nursing staff.

Another benefit of the RedUSE education strategy was that community pharmacists were trained, equipped and supported to deliver this education. Many pharmacists involved in the project admitted that they had not delivered formal educational sessions to ACH staff before. The success of the RedUSE training was also reflected in comments made by community pharmacists, who were keen to provide, and nursing staff, who were very keen to participate, in similarly formatted educational sessions on other 'pharmacological' topics.

The strategies of the RedUSE project

Apart from the DUE, staff education and the sedative review plan, the RedUSE project also included promotional strategies such as the launch event, the distribution of newsletters, dissemination of guidelines and the production and distribution of resident and relative pamphlets about benzodiazepines. It is difficult to assess the impact of these auxiliary strategies, although qualitative feedback indicates that both pharmacist and nursing staff participants considered these strategies to be supplementary to the key strategies of audit, education and sedative review. For instance, the pharmacists in the focus group expressed reservations about the benefit of the launch event, and the evaluation of the launch was not as positive as any of the other educational evaluations. Further, nursing administrators at several intervention ACHs admitted to not reading and distributing the RedUSE newsletters. Finally, although the nursing staff members were supportive of the resident and relative pamphlets, only one of the nurses said she promoted them.

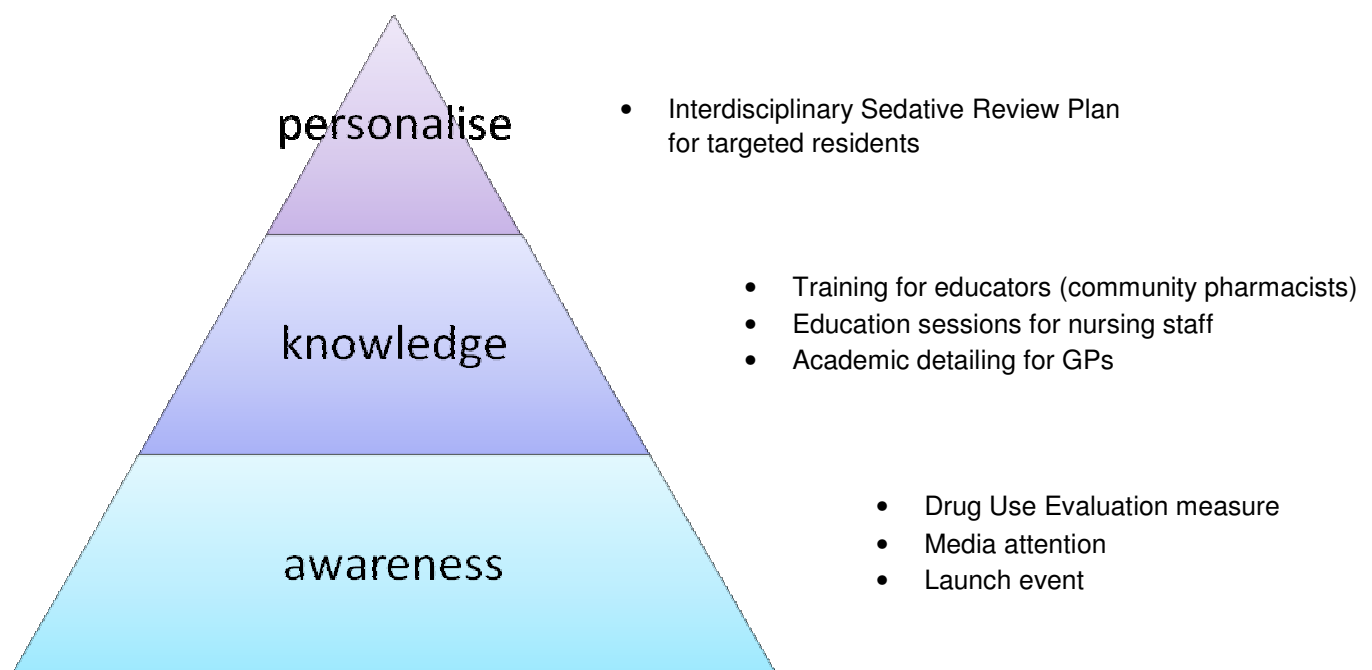
The nurses and pharmacists participating in the two focus groups were most supportive of the three key strategies of the RedUSE project; the DUE, educational sessions and the sedative review plan. Like the participants of the RedUSE trial, the research team theorises that the combination of these three strategies worked synergistically to produce the positive outcomes of the project.

It is essential to note that the RedUSE DUE program was installed in both intervention and control ACHs and that all ACHs received a customised benchmarked report regarding their sedative use. Despite receiving this prescribing information, the control ACHs recorded an overall increase in sedative rates of use. It could thus be argued that the simple provision of a DUE report is not sufficient on its own to impact prescribing rates. The DUE strategy appears to require the additional support of other strategies such as an educational program and/or targeted sedative review to have positive effect.

The DUE measure provided an overall picture of the pattern of antipsychotic and benzodiazepine use in each ACH. This sedative use information was then benchmarked and presented to nursing staff, along with education about the benefits and risks associated with these medications and non-pharmacological strategies to manage BPSD, sleep disturbance and anxiety. The final strategy, the targeted sedative review plan, allowed nursing staff to apply their enhanced knowledge at an individual level to review the actual sedative use of residents.

Figure 15 below illustrates the key themes and progression of the RedUSE project's strategies:

Figure 15: A schematic diagram of RedUSE intervention project strategies



The key strategies of the RedUSE project, specifically DUE feedback and staff education, could be easily adapted for other therapeutic applications in aged care. In fact, the strategies used in the RedUSE project could be incorporated into an implementation kit for pharmacies supplying medications to aged care homes.. In the focus groups, and in informal feedback to research staff, members of nursing staff suggested other topics that could be covered included bowel management and diabetes control. The RedUSE project also has the potential to be conducted in other regions of Australia and, indeed, in other countries where prescribing data can be measured and benchmarked and where healthcare systems are open to interdisciplinary training approaches.

The role of community pharmacists to improve sedative use in Aged Care Homes

Both the Commonwealth and NSW governments have voiced concern about the over-use and under review of sedative agents in aged care homes.^{35,37} Accordingly, both levels of government identified a role for pharmacists to promote the appropriate use and review of antipsychotic and benzodiazepine agents.^{35,37} Academic research has also shown that interventions led by pharmacists, or involving pharmacists as part of an interdisciplinary team, have led to the reduction of sedative use in the aged care setting.²⁸ The RedUSE trial provides further evidence that community pharmacists can effectively promote the quality use of sedative medication in this setting.

Each Pharmacy participating in the RedUSE project was asked to provide information about the number of RMMRs and associated QUM services supplied to ACHs. The provision of RMMRs in the control and intervention ACH groups was virtually identical prior to, and during the project. The pattern of QUM service provision was also very similar between control and intervention homes, although the majority of community pharmacies did not offer ACHs formalised training sessions, audits or other services besides informal talks. Some of the pharmacies admitted they did not offer QUM services at all. In spite of the RMMR service contract and QUM services provided, the rates of antipsychotic and benzodiazepine use were high in most of the project's ACHs. Similarly high rates of use of antipsychotic use are still reported in Sydney since the introduction of these enhanced pharmacy services.⁴⁴

The majority of Pharmacists in written evaluations of RedUSE educational sessions and in the focus group commented that they appreciated having a professional, ready-made program of strategies to provide and that the support of the research team was highly valued. Although there are a small range of materials available to pharmacists to use for QUM services produced by professional bodies such as the Pharmaceutical Society of Australia and the NPS, these are not accompanied by educational sessions for pharmacists on content or delivery. Part of the reason for the limited impact of the present RMMR and associated QUM services on sedative rates at present, could be attributed to a lack of education and support provided to community pharmacists to be able to provide QUM services effectively.

The success of the RedUSE program illustrates that QUM services provided by community pharmacists, when supported by education on content and instruction on how to effectively deliver these services, can be highly effective at reducing the rate of sedative prescribing and promoting review of these medications in ACHs.

Enabling factors and barriers for the RedUSE project

The enabling factors and barriers to the RedUSE project were identified in the qualitative focus groups held for senior nurses and pharmacists involved with the project. The enabling factors were identified as follows:

- As sedative use in Hobart ACHs was regarded as greater than necessary and past attempts to alter this usage were reported to be minimal: community pharmacists and nurses therefore accepted the rationale for the RedUSE project.
- The majority of ACHs in both Intervention and Control groups were willing to participate in the RedUSE project. Although many homes stated that they appreciated the funding received, the principle motive for taking part was the desire for education about medication and to meet accreditation standards. The majority of ACHs have been advised in reports from accreditation agencies that the level of sedative prescribing was too high.
- The pharmacists were highly appreciative of the training and support offered throughout the project, with many commenting that they would be happy to participate in other initiatives involving other topics if they were offered a similar level of training, support and remuneration to the RedUSE project.
- Many of the nursing staff stressed that they were supportive of the training because it was conducted by their community pharmacist who also supplied their medications and that they were familiar with. Many stressed that their communication with the pharmacy was enhanced as a result of the project.
- Nursing staff also felt more qualified to approach the resident's GPs after the training provided by the RedUSE project. Several of the pharmacists mentioned that there was a real 'hunger' for information about medications from the nursing staff at the ACHs.
- The level of remuneration offered to pharmacists for conducting the QUM strategies was felt to be appropriate by the majority of pharmacists, although several mentioned that they took more time than anticipated to collect prescribing information from ACHs. Many of the pharmacists also conducted unfunded independent study to answer further queries from the staff at ACHs about psychotropic use.

Barriers which may have reduced the impact of the RedUSE project were:

- In a few ACHs, there were issues with the timing of service provision. Although the DUE activity in nursing homes and completion of sedative review forms were well accepted, several homes commented that the timing of DUEs would best be coordinated with ACHs in advance of a pharmacy visits to ensure they are conducted with nursing staff knowledge and at convenient times.
- The Sedative review plan was introduced as an alternative to case conferences. Nursing staff and pharmacists felt that more consideration should be given for additional training to nursing staff on how to complete the review plans. Moreover, there needs to be an improved mechanism for the circulation of sedative reviews forms so the comments made are current and not relate to what could be past sedative use.
- Some of the GPs and nursing staff were resistant to changes in sedation use and can thus hinder the implementation of projects that promote review of these medications in ACHs.
- Many of the nursing staff and pharmacists commented that they wished they had more time to devote to reviewing resident medication use and considering alternative approaches to sedative medication. Additional Nursing Staffing resources were required to allow staff time perform some of the key strategies of the RedUSE project such as the sedative review plan.
- It was challenging to engage the GPs to be active participants in the project. Nursing staff did comment that most of the GPs were supportive of reviewing and reducing sedative use when prompted by nursing staff. However, further research is needed to evaluate the enablers and barriers for GP involvement in such interventions in order to involve this important health professional group to a greater extent.

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6. CONCLUSION AND FUTURE DIRECTIONS

The RedUSE (Reducing Use of Sedatives) Project

September 2009

6.1 Conclusion:

The RedUSE project led to a statistically significant reduction in the proportion of residents in aged care homes receiving benzodiazepines and antipsychotics. The number of antipsychotic and benzodiazepine dosages ceased or reduced in intervention homes was double that reported in the control aged care homes. The project was well received by the pharmacists delivering the QUM strategies and by the nursing staff participants. The findings suggest that QUM strategies coordinated through community pharmacies, and incorporating the dissemination of local data on medication use, offer an effective approach to reduce sedative use in aged care homes.

Both the Commonwealth and NSW governments have voiced concern about the over-use and under review of sedative agents in aged care homes. Accordingly, both levels of government identified a role for pharmacists to promote the appropriate use and review of antipsychotic and benzodiazepine agents. Academic research has also shown that interventions led by pharmacists, or involving pharmacists as part of an interdisciplinary team, have led to the reduction of sedative use in the aged care setting. The RedUSE trial provides further evidence that community pharmacists can effectively promote the quality use of sedative medication in this setting. The success of the RedUSE program illustrates that QUM services provided by community pharmacists, when supported by education on content and instruction on how to effectively deliver these services, can be highly effective at reducing the rate of sedative prescribing and promoting review of these medications in ACHs

6.2 future directions:

The future directions of the RedUSE project include:

- 1. The refinement and expansion of the 'RedUSE' project to several states across Australia.** The positive findings of the RedUSE project may have been impacted by the high baseline rate of benzodiazepine prescribing in Tasmania or influenced by other factors such as unsolicited media attention. Further research is necessary to assess the impact of the project's strategies on sedative use in ACHs in other areas of the country.
- 2. The investigation of the long-term clinical outcomes from reducing inappropriate sedative use in aged care.** Additional research funding should be allocated to provide direct evidence of the clinical benefits to residents of reducing the use of sedative medications in ACHs; for example, the inclusion of falls and quality of life measures. These outcome measures were not factored into the original RedUSE proposal and would strengthen the project considerably, as well as provide innovative evidence of the impact of sedative reduction on residents.
- 3. A dedicated health economic analysis.** The original RedUSE project did not incorporate a detailed cost effectiveness analysis in its design. Such professional health economist input would enable assessment of the financial impact of the reducing sedatives in ACHs to the Australian Health System.
- 4. Detailed investigation regarding the facilitators and barriers to incorporating nursing involvement into the medication review process.** Nursing staff in aged care homes appear to be a key influence when sedative medications are initiated, used and reviewed. Involving nursing staff to a greater degree in discussions about resident use of medicines has the potential to improve the outcomes of the RMMR process. Therefore, further research should be undertaken with the overall aim of promoting the involvement of aged care nursing staff in medication review processes.

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7. REFERENCES

7.1 REFERENCES

1. Australian Institute of Health and Welfare: Residential aged care in Australia 2007–08: A statistical overview. 2009 Aged Care Statistics Series Number 28. Australian Institute of Health and Welfare. Canberra. Cat. no. AGE 58.
2. Jones T, Matias M, Powell J, Jones E, Fishburn J and Looi J: Who cares for older people with mental illness? A survey of residential aged care facilities in the Australian Capital Territory: Implications for mental health nursing. *International Journal of Mental Health Nursing*. 16: 327-337, 2007.
3. Rovner B and Katz I: Psychiatric disorders in the nursing home: a selective review of studies related to clinical care. *International journal of Geriatric Psychiatry*. 8: 75-87, 1993.
4. Australian Bureau of Statistics: Year Book Australia, 2008. Release February 2008. Available at www.abs.gov.au/AUSTATS/ABS@nsf Accessed Sep 09. 2009.
5. Royal Australian College of General Practitioners: Medical care of older persons in residential aged care facilities. Silver Book National Taskforce. 4th Ed, 2005.
6. Flood M and Buckwater K: Recommendations for mental health care of older adults. Part 2. *Journal of Gerontological Nursing*. 35: 35-47, 2009.
7. Alzheimer's Australia: Dementia facts & statistics. Fact Sheet. Alzheimer's Australia, 2008.
8. Brodaty H, Draper B, Saab D, Low L, Richards F, Paton H and Lie D: Psychosis, depression and behavioural disturbances in Sydney nursing home residents: prevalence and predictors. *International Journal of Geriatric Psychiatry*. 16: 504-512, 2001.
9. Koch S, Haesler E, Tiziani A and Wilson J: Effectiveness of sleep management strategies for residents of aged care facilities: findings of a systemic review. *Journal of Clinical Nursing*. 15: 1267-1275, 2006.
10. Martin JL and Ancoli-Israel S: Sleep disturbances in Long-term Care. *Clin Geriatr Med*. 24: 39-vi, 2008.
11. Ancoli-Israel S, Parker L, Sinaee R, Fell R and Kripke D: Sleep fragmentation in patients from a nursing home. *Journal of Gerontology*. 44: M18-M21, 1989.
12. Ashton C: The diagnosis and management of benzodiazepine dependence. *Current Opinion in Psychiatry*. 18: 249-255, 2005.
13. Wikipedia: Available at [//en.wikipedia.org](http://en.wikipedia.org). Accessed 18 July 2007.
14. World Health Organisation: World Health Organisation 2006 Guidelines for ATC classification and DDD assignment. 9th Ed. Oslo WHO collaborating centre for drug statistics. Methodology, 2006.
15. The Royal Australian and New Zealand College of Psychiatrists: The use of antipsychotics in residential aged care. Clinical recommendations developed by the RANZCP Faculty of Psychiatry of Old Age (New Zealand), 2008.
16. Selbaek G, Kirkevold O and Engedal K: The course of psychiatric and behavioural symptoms and the use of psychotropic medication in patients with dementia in Norwegian nursing homes: A 12 month follow up study. *Am J Geriatr Psychiatry*. 16: 528-536, 2008.
17. Draper B, Brodaty H, Low L, Saab D, Lie D, Richards V and Paton H: Use of psychotropics in Sydney nursing homes: Associations with depression, psychosis, and behavioural disturbances. *International Psychogeriatrics*. 13: 107-120, 2001.
18. Schneider L, Dagerman M and Insel P: Efficacy and adverse effects of atypical antipsychotics for dementia: Meta-analysis of randomised, placebo-controlled trials. *American Journal of Geriatric Psychiatry*. 14: 191-210, 2006.
19. Ballard C, Waite J and Birks J: Atypical antipsychotics for aggression and psychosis in Alzheimer's disease. *Cochrane Database of Systematic Reviews* 2006, Issue 1. Art No.:CD003476. 2006.
20. Ballard C, Hanney M, Theodoulou M, Douglas S, McShane R, Kossakowski K, Gill S, Juszcak E, Yu L and Jacoby R: The dementia antipsychotic withdrawal trial (DART-AD): long -term follow-up of a randomised placebo-controlled trial. *Lancet Neurology*. 8: 151-157, 2009.
21. Department of Veterans' Affairs: Antipsychotics in dementia. Therapeutic Brief 12. Available at http://www.dva.gov.au/health/veteransmates/pdf/M12L_Therapeutic%20Brief_FINAL.pdf.PDF. Accessed 12 January 2009. 2007.
22. International Psychogeriatric Association: Primary Care Physicians guide to BPSD. Available at www.ipa-online.net Accessed March 14, 2009., 2004.
23. Madhusoodanan S and Bogunovic O: Safety of benzodiazepines in the geriatric population. *Expert Opinion Patient Safety*. 3: 485-493, 2004.
24. Royal Australian College of General Practitioners: Guidelines for the rational use of benzodiazepines. Available at www.racgp.org.au/publications. Accessed 6 March 2009. 2000.
25. Woodward M: Pharmacological treatment of challenging neuropsychiatric symptoms of dementia. *Journal of Pharmacy Practice and Research*. 35: 228-234, 2005.
26. Roberts M, Stokes J, King J, Lynne T, Purdie D, Glasziou P, Wilson D, McCarthy S, Brooks G, de Looze F *et al.*: Outcomes of a randomised controlled trial of a clinical pharmacy intervention in 52 nursing homes. *British Journal of Clinical Pharmacology*. 51: 257-265, 2001.

27. Snowdon J, Day S and Baker W: Current use of psychotropic medication in nursing homes. *International Psychogeriatrics*. 17: 1-10, 2005.
28. Nishtala P, McLachlan A, Bell J and Chen T: Psychotropic prescribing in long-term care facilities: Impact of Medication Reviews and Educational Interventions. *The American Journal of Geriatric Psychiatry*. 16: 621-632, 2008.
29. Feng Z, Hirdes J, Smith T, Finne-Soveri H, Chi I, Du Pasquier J, Gilgen R, Ikegami N and Mor V: Use of physical restraints and antipsychotic medications in nursing homes: a cross-national study. DOI: 10.1002/gps.2232. Available at: www.interscience.wiley.com . Accessed on 9 Sep 09 *International Journal of Geriatric Psychiatry*, 2009.
30. Briesacher B, Limcangco R, Simoni-Wastila L, Dolshi J, Levens S, Shea D and Stuart B: The quality of antipsychotic drug prescribing in nursing homes. *Arch Intern Med*. 165: 1280-1285, 2005.
31. Snowdon J, Day S and Baker W: Why and how antipsychotic drugs are used in 40 Sydney nursing homes. *Int J Geriatr Psychiatry*. 20: 1146-52, 2005.
32. Hagen B, Armstrong-Esther C, Quail P and et.al: Neuroleptic and benzodiazepine use in long term care in urban and rural Alberta: characteristics and results of an education intervention to ensure appropriate use. *Int Psychogeriatr*. 17: 631-652, 2005.
33. Selbaek G, Kirkevold O and Engedal K: The course of psychiatric and behavioural symptoms and the use of psychotropic medication in patients with dementia in norwegian nursing homes - a 12-month follow-up study. *Am J Geriatr Psychiatry*. 16: 528-536, 2008.
34. Snowdon J and Vaughan R: Changes in psychotropic medication use in nursing homes over a 9-month period. *Journal of Quality in Clinical Practice*. 17: 83-90, 1997.
35. Australian Senate: Psychotherapeutic medication in Australia: report of the Senate Community Affairs References Committee. (1995) Canberra. Australian Government Printing Service., 1995.
36. Snowdon J, Vaughan R, Miller R, Burgess E and Tremlett P: Psychotropic drug use in Sydney nursing homes. *MJA*. 163: 70-72, 1995.
37. NSW Health: Psychotropic medication use in nursing homes, NSW Ministerial taskforce, 1997.
38. Australian Government Department of Health and Ageing: Report to the Minister for ageing on residential care and people with psychogeriatric disorders 2008.
39. Pharmaceutical Society of Australia: Guidelines and Standards for the Collaborative and Pharmacist Residential Medication Management Review (RMMR) Program and Associated Quality Use of Medicines (QUM) Services. ©Pharmaceutical Society of Australia 2006. ISBN: 0-908185-86-3.
40. Hughes C, Roughead E and Kerse N: Improving use of medicines for older people in long-term care: contrasting the policy approach of four countries. *Healthcare Policy*. 3: e154-e167, 2008.
41. Australian Government Department of Health and Ageing: Aged Care Homes: Residential Medication Management Review. Available at: http://www.guild.org.au/uploadedfiles/Medication_Management_Reviews/Residential_Medication_Management_Reviews/RMMR-Current_model.pdf 2007.
42. Australian Pharmaceutical Advisory Council: Guidelines for medication management in residential aged care facilities. 3rd Ed. Canberra. Commonwealth of Australia. 2002.
43. Cheek J, Gilbert A, Ballantyne A and Penhall R: Factors influencing the implementation of quality use of medicines in residential aged care. *Drugs & Aging*. 21: 813-824, 2004.
44. Snowdon J, Day S and Baker W: Audits of medication use in Sydney nursing homes. *Age and Ageing* 35: 403-8, 2006.
45. Westbury J, Jackson S and Peterson G: Psycholeptic use in Tasmanian aged care homes *International Journal of Clinical Pharmacy and Therapeutics*. In press, 2009.
46. Verrue C, Petrovic M, Mehuys E, Remon J and van der Stichele R: Pharmacists' Interventions for optimisation of medication use in nursing homes: A systematic review. *Drugs & Aging*. 26: 37-49, 2009.
47. Schmidt I, Claesson C, Westerholm B, Nilsson L and Svarstad B: The impact of regular multidisciplinary Team interventions on psychotropic prescribing in Swedish Nursing homes J. *Am Geriatr Soc*. 46: 77-82, 1998.
48. Ray W, Blazer D, Schaffner W and Federspiel C: Reducing antipsychotic drug prescribing for nursing home patients: a controlled trial of the effect of an educational visit. *Am J Public Health*. 77: 1448-50, 1987.
49. Crotty M, Halbert J, Rowett D and al e: An outreach geriatric medication advisory service in residential aged care: a randomised controlled trial of case conferencing. *Age and Ageing*. 33: 612-17, 2004.
50. Hughes C, Lapane K, Watson M and Davies H: Does organisational culture influence prescribing in care homes for older people? *Drugs Aging*. 24: 81-93, 2007.
51. Pharmaceutical Benefits Service: *Schedule of Pharmaceutical Benefits for approved Pharmacists and Medical Practitioners*. Australian Government Department of Health and Ageing Commonwealth of Australia, 2006.

52. Gadzhanova S and Reed R: Medical services provided by general practitioners in residential aged-care facilities in Australia. *MJA*. 187: 92-94, 2007.
53. Ageing AGDoHa: Aged Care GP Panels Initiative. 2004 aged care homes survey. Canberra. Available at <http://www.health.gov.au/internet/wcms/publishing.nsf/Content/pcd-programs-acgppi-homesurvey> Accessed Sep 2009. 2005.
54. Walker S, McGeer A and Simor A: Why are antibiotics prescribed for asymptomatic bacteriuria in institutionised elderly people? *Canadian Medical Association Journal*. 163: 273-277, 2000.
55. Schweizer A, Hughes C and Macauley D: Managing urinary tract infections in nursing homes: a qualitative study. *Pharmacy World Science*. 27: 159-165, 2005.
56. Westbury J, Peterson G, Robinson A and Ezzy D: 'Why are sedatives prescribed in aged care homes and what are the roles of health professionals and relatives when these drugs are used?' Conference presentation for Emerging Researchers in Ageing Conference: "Shaping Research Landscape". 18 November 2008, Perth, WA, pp. 62. 2008.
57. Hsu M, Venturato L, Moyle W and Creedy D: Mental health knowledge in residential aged care: A descriptive review of the literature. *Contemporary Nurse*. 17: 231-239, 2004.
58. Elliott R, Woodward M and C O: Improving benzodiazepine prescribing for elderly hospital inpatients using audit and multidisciplinary feedback. *Internal Medical Journal*. 31: 529-535, 2001.
59. NPS: National Prescribing Service Drug usage Evaluation of benzodiazepine and non-benzodiazepine hypnotics for insomnia in RACFs March 2005.
60. Ballard C, Thomas A and Fossey J: A 3-month, randomised, placebo-controlled, neuroleptic discontinuation study in 100 people with dementia: The neuropsychiatric median cutoff is a predictor of clinical outcome. *J Clin Psychiatry*. 64: 114-19, 2004.
61. Gilbert A, Owen N, Innes JM and Sansom L: Trial of an intervention to reduce chronic benzodiazepine use among residents of aged-care accommodation. *Australia and New Zealand Journal of Medicine*. 23: 243-247, 1993.
62. Crotty M, Whitehead C, Rowett D, Halbert J, Weller D, Finucane P and Esterman A: An outreach intervention to implement evidence based practice in residential care: a randomised controlled trial. *BMC Health Services Research*. 4:6, 2004.
63. Medterms: Available at: <http://www.medterms.com>. Accessed November 5, 2007.
64. Monette J, Champoux N, Monette M, Fournier L, Wolfson C, Galbuad du Fort G, Sourial N, J-P LC and Gore B: Effect of an interdisciplinary educational program on antipsychotic prescribing among nursing home residents with dementia. *International Journal of Geriatric Psychiatry*. 23: 574-579, 2008.
65. W.H.O: Health Organisation. International Classification of Primary Care, Second edition (ICPC-2). Available from <http://www.who.int/classifications/icd/adaptations/icpc2/en/index.html>. Accessed 22 February 2008, ICPC-2.
66. Woods S: Chlorpromazine equivalent doses for the newer atypical antipsychotics. *Journal of Clinical Psychiatry*. 64: 663-637, 2003.
67. www.benzo.co.uk: Ashton CH. Guidelines to the rational use of benzodiazepines. Available from www.benzo.co.uk. Accessed March 2009.
68. Australian Government Department of Health and Ageing: Schedule of Pharmaceutical Benefits - February 2009. Pharmaceutical Benefits Scheme for Consumers. Available at <http://www.pbs.gov.au/html/consumer/publication/view?date=20090201&type=FlashPaper> Accessed June 2009, 2009.
69. Fonad E, Robins Wahlin T, Winblad R, Emami A and Sandmark H: Falls and fall risk among nursing home residents. *J Clin Nurs*. 17: 126-134, 2008.
70. Kryzhanovskaya LA, Jeste DV, Young CA, Polzer JP, Roddy TE and Jansen JF: A review of treatment-emergent adverse events during olanzapine clinical trials in elderly patients with dementia. *Journal of Clinical Psychiatry*. 67: 933-945, 2006.
71. Ellul J, Archer N, Foy C, Poppe M, Boothby H, Nicholas H, Brown R and Lovestone S: The effects of commonly prescribed drugs in patients with Alzheimer's disease on the rate of deterioration. *J Neurol Neurosurg Psychiatry*. 78: 233-239, 2007.
72. Avorn J, Soumerai S, Everitt D, Ross-Degnan D, Beers M, Sherman D, Salem-Schatz S and Fields D: A randomised trial of a program to reduce the use of psychoactive drugs in nursing homes. *N Engl J Med*. 327: 168-73 1992.
73. Conn D and Madan R: Use of sleep-promoting medications in nursing home residents. *Drugs Aging*. 23: 271-287, 2006.
74. Woodward M: Deprescribing: Achieving better health outcomes for older people through reducing medications. *Journal of Pharmacy Practice and Research*. 33: 323-328, 2003.

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8. APPENDICES

Appendix A

RedUSE DUE program, data entry page

Generate a DUE from the drugs entered into the Webster program.

RedUSE Data Entry

Select Study Period
☒ week 0 ☐ week 12 ☐ week 26

Select Nursing Home
 My Nursing Home 1

Date
 3/07/2008

Only Show patients who are :
☒ Active ☐ Inactive ☐ All

Patient's Regular Drugs

Drug Name	Dose Per Day	Instructions
Abilify 30mg Tab	1	
Alendro Once Weekly 70mg Tab	0.1429	
Dapa-Tabs 2.5mg Tab	1	
DBL Aspirin 100mg Tab	1	
natures way	1	
Nexium 40mg Tab	2	
Noten 50mg Tab	0.5	
Stildem 10mg Tablet	1	

Patient's antipsychotic, anxiolytic, hypnotic and antidepressant PRN drugs

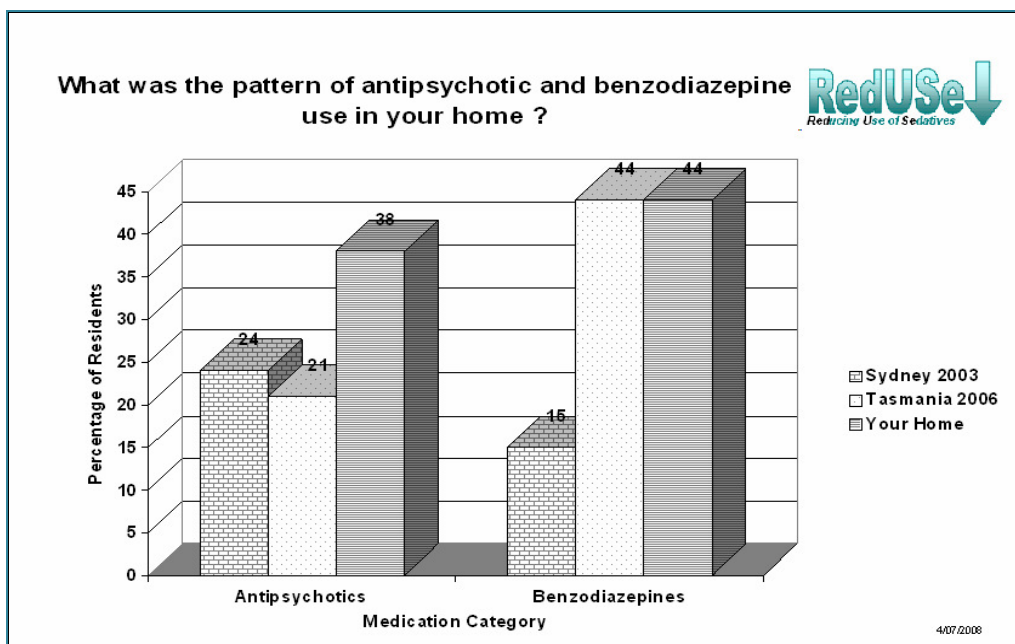
Drug Name	Dose per day	PRN medicine is used
-----------	--------------	----------------------

Buttons:
 Add Regular Drug, Are the regular Meds correct? ☒ Yes ☐ No
 Add PRN Drug, Are the PRN Meds correct? ☒ Yes ☐ No

Footer Buttons:
 Print Resident List, Print Sedative Review Plan, Generate DUE, Export Data, Quit

Appendix B

RedUSe report page examples: Provided to each participant aged care home



Drug Use Evaluation (DUE) – 'RedUSe'

What is a DUE?

- A Drug Usage Evaluation (DUE) is a cyclic medication audit that promotes 'continuous improvement'
- A DUE involves:
 - monitoring medication use
 - comparing practice, and
 - modifying practice
- This information for the RedUSe DUE has been collected from your supply pharmacy's computer records.
- There are 2 DUE cycles in the RedUSe project. This is the first DUE report. The second DUE cycle will commence in Sept 2008.

The information collected from this DUE will be used:

1. To provide a measure of each Residential Care Facility's (RCF's) psychotropic medication use with a focus on medications used for their sedative properties.
2. For benchmarking with Tasmanian RCF rates from 2006 and Central Sydney rates from 2003...and for comparison with data at 12 and 26 weeks.
3. To create a customised training session for nursing staff.

NB: For the RedUSe DUE, the antipsychotics monitored were newer agents like risperidone and olanzapine, and the older agents such as haloperidol. The hypnotics/anxiolytics monitored were mostly benzodiazepines, such as temazepam, oxazepam and diazepam. The antidepressants monitored were the newer agents such as citalopram, sertraline and mirtazapine, and the older tricyclic antidepressants (e.g. amitriptyline, doxepin).

The RedUSe program is funded by the Australian Government Department of Health and Ageing as part of the Fourth Community Pharmacy Agreement through the Fourth Community Pharmacy Agreement Grants Program managed by the Pharmacy Guild of Australia. If you would like more information about the RedUSe project please phone Juanita Westbury on 6226 1966 or email Juanita.Westbury@utas.edu.au

Benzodiazepines

What are benzodiazepines used for?

- Short-term (2-4 weeks) to manage anxiety and insomnia
- Long-term use (regular use for 4 weeks or more) is not recommended because of the potential for side effects, tolerance and dependency.¹

How long does it take to develop tolerance to benzodiazepines?

- Tolerance to the hypnotic effects develops within a few weeks
- Tolerance to the anxiolytic effects develops over a few months.¹

Why RedUSe benzodiazepines?

- Continuing treatment in older people is associated with:
 - impairment of cognitive function and memory
 - an increased risk of fractured hips

A cohort study of 125,203 over 65yr-olds found a 24% increased risk of hip fracture in people taking benzodiazepines compared with those not taking benzodiazepines

- The benefits of stopping long-term benzodiazepines were shown in a Randomised Controlled Trial of 139 over 65yr-olds¹ which reported that stopping treatment:
 - had no long-term adverse effects on insomnia or anxiety symptoms
 - improved memory, reaction times and alertness
 - improved quality of life measures for function and vitality.

How to avoid withdrawal symptoms¹

- Most people only experience mild withdrawal symptoms when withdrawal is slow (e.g. anxiety, insomnia, headache, dizziness)²
- The key steps for a successful withdrawal are:
 - assess suitability for withdrawal at the present time (e.g. avoid withdrawal if acutely ill)
 - consider whether conversion to diazepam is indicated
 - gradually reduce dose
 - ensure the withdrawal schedule is flexible and tailored to the individual.

How to RedUSe?

The suggested rate of withdrawal is to reduce the current daily dose by 10-20% / week²

	Number of tablets to be taken						
	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 1	1.5	2	1.5	2	1.5	2	1.5
Week 2	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Week 3	1	1.5	1	1.5	1	1.5	1
Week 4	1	1	1	1	1	1	1
Week 5	0.5	1	0.5	1	0.5	1	0.5
Week 6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Week 7	0	0.5	0	0.5	0	0.5	0
Week 8	0	0	0	0	0	0	0

A sample withdrawal schedule²

for a resident taking
2 x 10mg temazepam tablets or
2 x 5mg nitrazepam tablets

Benzodiazepines....continued

Why convert to diazepam?

- Diazepam has a long half-life which ensures a gradual fall in blood concentrations
- Diazepam is available in low-dosage tablets which allows for small dosage reductions

Consider whether conversion to diazepam is indicated.²

- Convert all people taking oxazepam, lorazepam or alprazolam
- Convert people having difficulty withdrawing on temazepam or nitrazepam

Diazepam equivalence table ¹

5mg diazepam	= 0.25mg alprazolam
	= 0.5mg lorazepam
	= 5mg nitrazepam
	= 15mg oxazepam
	= 10mg temazepam

How to convert to diazepam?

- For people on higher doses of benzodiazepines, conversion to diazepam is best carried out in stages, one dose at a time, to avoid daytime sedation.¹

A suggested conversion schedule¹

For a resident taking oxazepam 15mg tds

	morning	midday	evening
Week 1	oxazepam 15mg	oxazepam 15mg	oxazepam 15mg
Week 2	oxazepam 15mg	oxazepam 15mg	oxazepam 7.5mg + diazepam 2.5mg
Week 3	oxazepam 7.5mg + diazepam 2.5mg	oxazepam 15mg	oxazepam 7.5mg + diazepam 2.5mg
Week 4	oxazepam 7.5mg + diazepam 2.5mg	oxazepam 15mg	diazepam 5mg
Week 5	diazepam 5mg	oxazepam 15mg	diazepam 5mg
Week 6	diazepam 5mg	oxazepam 7.5mg + diazepam 2.5mg	diazepam 5mg
Week 7	diazepam 5mg	diazepam 5mg	diazepam 5mg
Week 8	Start diazepam taper		

Supporting the person during and after withdrawal

- Provide encouragement, support and information to patient, relatives and nursing staff
- Manage any withdrawal symptoms by use of non-drug strategies
- Consider slowing or temporarily stopping withdrawal if withdrawal symptoms become troublesome.¹

Tricyclic Antidepressants (TCAs)

- Almost 10% of residents of Tasmanian nursing homes are prescribed TCAs, which is more than twice the rate of use reported in Sydney nursing homes.¹
- On the basis of a more acceptable side effect profile in the elderly, the usual first choice antidepressant would be SSRIs, mirtazapine, MAO-I (moclobemide), or SNRI (venlafaxine).²
- TCAs are second-line antidepressant therapy in older people.²
- Reserve TCAs for clinical circumstances where there has been excellent previous treatment response, or where alternate treatment is ineffective or poorly tolerated.³

Side-effects of TCAs in older people

- Older people are more likely to have side effects, such as:
 - anticholinergic effects - dry mouth, constipation, urinary retention and confusion
 - postural hypotension
 - cardiac rhythm alteration in those predisposed.²

Alternatives to TCAs for treating non-mental health conditions

- In many cases low dose TCAs are added to a drug regimen for reasons other than antidepressant effect e.g. urinary incontinence, sleep disturbance and neuropathic pain.
- For many residents, alternative treatment can be trialled in place of a TCA³

Urinary urge incontinence

Oxybutynin, propantheline, tolterodine

Sleep disturbance

Sleep hygiene and assessment, Short-term hypnotics

Neuropathic pain

Gabapentin, carbamazepine, topical capsaicin

Alternatives to TCAs for treating non-mental health conditions³

How to RedUSE TCAs?

- It is usual to reduce the TCA dose over a few weeks before finally stopping.

Antipsychotics in dementia

Key messages

- Behavioural and environmental interventions should be first-line management of behaviour
- Antipsychotics have limited efficacy (at best, a 20% response) in the treatment of challenging behaviour
- If an antipsychotic is used, then:
 - Start with a low dose and titrate upwards very slowly according to clinical response
 - Review regularly for efficacy and adverse effects
 - Trial dose reduction/cessation every 3 months.⁴

How to RedUSE antipsychotics?

- The dose should be tapered by 50% every two weeks and stopped after two weeks on the minimum dose.⁴

References:

¹ Snowden J et al. Current use of psychotropic medication in Sydney nursing homes. Int Psychogeriatr 2005;17(4):1-10

² NSWHealth 2001 Consensus Guidelines for Assessment and Management of Depression in the Elderly.

³ DVA Veterans' Mates Therapeutic brief 5 – Antidepressants 2006 ⁴ DVA Veterans' Mates Therapeutic brief 12 – Antipsychotics in dementia 2007



The PHARMACY GUILD of AUSTRALIA



Community Pharmacy promoting appropriate sedative use in Aged Care: the RedUse project

Pharmacist Training

Sat 5th & Sun 6th July 2008, 'Drovers Room', The Old Woolstore Apartment Hotel, 1 Macquarie St, Hobart, Tasmania

Programme

Day 1: Saturday 5th July 2008 (12.30hrs – 17.00hrs)

Time	Session : Presenter
12.30 - 13.00	Arrival – light lunch
13.00 - 13.10	Welcome Address and RedUse overview : Professor Gregory Peterson, Professor of Pharmacy, Unit for Medications Outcomes Research and Education (UMORE), School of Pharmacy, University of Tasmania
13.15 - 14.00	Psychogeriatrics: Behavioural and psychological symptoms in older people : Juanita Westbury, RedUse project manager, PhD candidate, UMORE, School of Pharmacy, University of Tasmania
14.00 – 14.30	Residential care: first line management of challenging behaviour : Liz Musgrove, Director of Nursing, ADARDS Nursing home, Warrane
14.30 – 15.15	Pharmacological management of behavioural and psychological symptoms in residential care - part 1 : Dr Jane Tolman, Geriatrician, Royal Hobart Hospital
15.15 – 15.30	Afternoon tea
15.30 - 16.15	Pharmacological management of behavioural and psychological symptoms in residential care - part 2 Dr Jane Tolman, Geriatrician, Royal Hobart Hospital
16.00 – 16.30	Benzodiazepine use in Tasmania : Dr Nicolle Khelifa, Clinical Psychiatrist, Drug and Alcohol services, Newtown, Hobart
16.30 – 17.00	Psychotropic drug use in Tasmania : Juanita Westbury, RedUse project manager, PhD candidate, UMORE, School of Pharmacy, University of Tasmania



Programme

Day 2: Sunday 6th July 2008 (09.00hrs – 15.00hrs)

Time	Session : Presenter
09.00 - 09.15	Arrival – tea and coffee
09.15 - 10.00	QUM and Residential Care Facilities- Influencing change : Dr Shane Jackson, Senior Research Fellow, Unit for Medications Outcomes, Research and Education (UMORE) , School of Pharmacy, University of Tasmania
10.00 - 10.30	The RedUse project - the strategies : Juanita Westbury, Unit for Medications Outcomes, Research and Education (UMORE) , School of Pharmacy, University of Tasmania
10.30 - 10.45	Morning tea
10.45 - 11.15	The RedUse DUE – how does it work? : Juanita Westbury, Unit for Medications Outcomes, Research and Education (UMORE) , School of Pharmacy, University of Tasmania
11.15 - 11.45	The Staff training package + CD case study : Juanita Westbury, Unit for Medications Outcomes, Research and Education (UMORE) , School of Pharmacy, University of Tasmania
11.45 – 12.15	Sedative review / Case conferencing / GP collaboration : Dr Shane Jackson, Dr Jonathon Isles, Liz Musgrove, Unit for Medications Outcomes, Research and Education (UMORE), School of Pharmacy, University of Tasmania/ GP /ADARDS
12.15 - 13.00	Lunch – hot buffet
13.00 - 15.00	Putting RedUse into practice : Panel with Juanita, Shane Jackson, Liz Musgrove, Dr Jonathon Isles. UMORE, School of Pharmacy, University of Tasmania

Appendix E



Participant Number: _____

Anonymous pre-educational quiz for nursing staff

Could you please complete this quiz to allow for evaluation of the RedUse staff education package. Your presenter will allocate you a number before you start this quiz. (please write your number in a diary or enter it into your mobile)

I work as a: EN RN (Please circle answer)

1. **Risperidone is most effective for the treatment of which behaviour of concern?**
a. calling out b. wandering c. aggression d. repetitive questioning
2. **The maximum recommended daily dose of risperidone in older people with dementia is:**
a. 2mg b. 1 mg c. 4mg d. 3mg
3. **Which of the following side effects has not been associated with the use of olanzapine?**
a. stroke b. falls c. elevated blood sugar d. hyperthyroidism
4. **Regular trials of reducing antipsychotic doses in residents with dementia should be performed every:**
a. month b. 3 months c. 6 months d. 12 months
5. **The drug diazepam is mainly indicated to treat:**
a. depression b. behaviours of concern c. infection d. anxiety
6. **Which of the following side effects is not commonly associated with benzodiazepine use?**
a. falls b. memory impairment c. nausea d. confusion
7. **What is the recommended duration of benzodiazepine treatment for sleep disorder or anxiety?**
a. 2 - 4 weeks b. 6 weeks c. 3 months d. 6 months
8. **The first-line medication treatment for depression in older people is:**
a. amitriptyline b. a SSRI (e.g. citalopram) c. risperidone d. oxazepam
9. **Tricyclic antidepressants, such as amitriptyline and doxepin, are recommended as a night time sedative.**
True False (please circle correct answer)
10. **Oxazepam belongs in which psychotropic drug group?**
a. antidepressant b. anticonvulsant c. anxiolytic d. antipsychotic

Sample page from 'RedUSER' newsletter

THE REDUSER,
DECEMBER 2008
EDITION 2

In this edition.....

- First Drug Use Evaluation results
- The DART-AD trial
- RedUSE feature medication: "Olanzapine"
- Exercise: can it help dementia?
- Latest RedUSE news...

the RedUSER

Reducing Use of Sedatives

First Drug Use Evaluation (D.U.E) Results

The first Drug Use Evaluation (DUE) results for the RedUSE project were collected during August and September 2008.

DUEs are clinical audits of medication use and are recommended by the National Prescribing Service in aged care homes.

DUE results can be compared

to results from other homes or recent studies; a process known as 'benchmarking'.

The RedUSE D.U.E. focuses primarily on benzodiazepines and antipsychotics and compares the overall use of these two medication groups to other homes in the project as well as to Central Sydney.

The chart below shows the benzodiazepine rates of use for each RedUSE home. The graph shows a large variation between RedUSE homes in the use of these medications.

H

RedUSE Hobart aged care homes- BENZODIAZEPINE use

Home Code	Proportion of residents
1	17
2	21
3	26
4	27
5	28
6	30
7	31
8	31
9	33
10	35
11	38
12	44
13	47

DART-AD trial

A recent UK trial¹ (DART-AD) aimed to determine the impact of long-term treatment of antipsychotics upon behavioural symptoms and overall decline in patients with Alzheimer's disease.

Over one hundred patients with behavioural symptoms taking antipsychotics for longer than 3 months were randomly assigned to two groups. The first group continued anti-psychotics for 12 months whereas the other group

was switched to placebo (inactive treatment).

The researchers found that withdrawal of antipsychotic treatment had no significant effect on function, behaviour or cognition. There was, however, a significant deterioration in verbal fluency for those patients continuing antipsychotic treatment.

1. Ballard C et al. A Randomized, Blinded, Placebo-Controlled trial in Dementia Patients continuing or stopping neuroleptics. (DART-AD) *PLoS Medicine* 2008; 5(4) e76

General principles when reducing sedative medication:

- Antipsychotics should be reduced gradually by halving the dose no more frequently than every two weeks
- Withdrawal of benzodiazepines must be gradual with a reducing regime generally taking 6-8 weeks
- Gradually reduce the resident's benzodiazepine dose using a set reducing dosage over a set time period (e.g. reduce the most important dose of the day by ¼ of a tablet)
- Discuss sleep, stress management and exercise strategies and provide encouragement.

Page from Relative information leaflet



Other ways of tackling anxiety and sleeping problems

Benzodiazepines are not recommended for long term use for anxiety and sleep problems. There may be other ways of tackling symptoms of anxiety; for example, relaxation tapes or talking about underlying causes. If anxiety symptoms persist or are severe, the doctor may advise on other treatments.

As people age, their sleep pattern often changes. Older people require less sleep than younger people. Measures such as keeping more active during the day, participating in activities provided by the home and avoiding caffeine drinks such as tea and coffee in the late afternoon and evening may promote natural sleep.

2008. Juanita Westbury MSc, BPharm, RedUSE Project Manager, UMORE 6226 1966


The RedUSE project is funded by the Australian Government Department of Health and Ageing – as part of the Fourth Community Pharmacy Agreement through the Fourth Community Pharmacy Agreement Grants Program managed by the Pharmacy Guild of Australia

Sedative Review Plan

Appendix H

Sedative Review Plan

Please write comments on how to best reduce the use of sedatives in this patient.



Patient name: Rod Flanders Residential Care Facility: My Nursing Home 1

GP Details: Dr. Julius Hibbert

Fax: 6249 9035

Phone:

Date	Drug Name	Instructions	Total Daily Dose	Date of First Supply
3/07/2008	Alodorm 5mg Tab	Take ONE and a HALF tablets at night	7.5 mg	
3/07/2008	Risperdal 0.5mg Tab	Take ONE tablet at night	0.5 mg	18/06/2007

Pharmacist's Comments

..... Now give to the patient's Nurse for the RN comments

RN's Comments

..... Now give to patient's GP for their comments

Doctor's Comments

..... Now store this form in the patient's notes at the Residential Home, and review regularly

Evaluation form for RedUSE launch

Appendix I



Evaluation for educational event:

“Elders behaving badly”

28 August 2008

On a scale of 1 to 5 (1 being unsatisfactory and 5 being very satisfactory) please rate your level of satisfaction with the following aspects of the session:

Presentation:	1	2	3	4	5
Content:	1	2	3	4	5
Question time:	1	2	3	4	5
Relevance to your Practice:	1	2	3	4	5

The educational session has reinforced my knowledge about the use of psychotropic drugs to treat residents of aged care homes.

Not at all 1 2 3 4 5 Greatly

My attitudes around the prescribing of psychotropic medication in aged care homes have altered as a result of this educational session.

Not at all 1 2 3 4 5 Greatly

Please add any further comments about the training or suggestions on how it could be improved:

ECONOMIC DIMENSIONS OF REVIEW OF SEDATIVE USE IN AGED CARE

1. Introduction

The broader research objectives and methodology for the main project have been outlined in the main report in some detail. As part of the main study into sedative use in aged care, it was decided to have a preliminary look at the relevant economic issues.

It was never intended that there would be a detailed examination of all the economic drivers in this investigation. This was in part because, by application of benefit:cost principles, it was concluded that it was not worth undertaking a detailed examination unless the perceived benefits significantly exceeded the costs.

Initial feelings of researchers were that non economic outcomes rather than economic ones, were most likely from a better adherence to best practice prescribing policy for sedatives in aged care. By this is meant that improved health care and patient well-being were likely to be far more important than cost savings from reduced sedative consumption in the average Australian nursing home.

Accordingly, in the design of the research project, financial and economic issues have not been at the forefront. However, having said this, significant information was collected to enable some critical but albeit limited economic analysis to be undertaken.

2. Broad Approach

It is appropriate to apply a benefit:cost type assessment as to whether the apparent findings of the RedUSE project justify a widespread adoption in the Australian nursing homes (or wider) population – or whether further detailed research, as proposed in the conclusion of the main study, should occur before that action is considered further.

Such an approach requires:

- (a) identification of relative “benefits” and “costs” – from a substantial reduction in sedative consumption in nursing homes;
- (b) attribution of a financial measure, if possible, to each of the benefits and costs;
- (c) a comparison of the total benefits and costs and, if the benefits are significantly greater than the costs, there are grounds for pursuing mechanisms to reduce sedative consumption in nursing homes.

3. Specific Identification of Benefits and Costs

The following are the primary “benefits” that might be expected from significant compliance with best practice prescribing of sedatives in nursing homes – as compared with the current practice of prescribing sedatives - which is significantly higher than best practice policy:

- (a) less patient falls – and hence potentially less patients needing more expensive treatment and hence higher health costs;
- (b) better health of patients – by a feeling of greater engagement within their community; and
- (c) less cost for medicines – due to either no consumption at a individual patient level or a lesser consumption of sedatives in nursing homes generally.

The following are the primary “costs” that might be expected from a significant compliance with best practice prescribing of sedatives in nursing homes:

- (i) the time for education of health professionals – in terms of reading materials and attending training courses on optimal sedative consumption;
- (ii) software costs – as a result of preparation and installation of software used in the RedUSE program; and
- (iii) the time for data entry into a personal computer and review – as part of the RedUSE program.

A comment on the most likely financial magnitude of each of the above six elements is shown below:

- (a) less patient falls - insufficient data on reductions in falls with lower sedative use at this stage – and hence very difficult to put a financial figure on this at this stage;
- (b) better health- very difficult to assess – and even harder to ascribe a financial figure to;
- (c) less medicine costs- see next section;
- (i) time for education- expected to be small and perhaps could be considered part of the normal education or up-skilling processes;
- (ii) software- cost would be minimal – as most research and development is already complete;
- (iii) time for data entry- is expected to be minimal – and could be considered part of normal patient care activities.

4. Actual Results

In broad terms, the conclusions reached by the clinical researchers was that the RedUSE program could generate a significant reduction in the use of sedatives in nursing homes – as compared with current consumption rates.

The main results, from a cost of medicines perspective, are shown in Tables 1 and 2. Table 1 shows the costs of antipsychotics and Table 2 shows use of benzodiazepines.

	Control		Intervention	
	Week = 1-4	Week = 23-26	Week = 1-4	Week = 23- 26
Number of residents	684	705	891	888
Total cost of sedative medicines for patients per month (30 days)	\$11,452	\$12,339	\$12,630	\$12,849
Average cost per patient for medicines per month (30 days)	\$16.74	\$17.50	\$14.18	\$14.47

Table 1 – Details of antipsychotic consumption during the 6 months study.

	Control		Intervention	
	Week = 1-4	Week = 23-26	Week = 1-4	Week = 23-26
Number of residents	684	705	891	888
Total cost of sedative medicines for patients per month	\$2,007	\$2,377	\$3,434	\$2,886
Average cost per patient per month	\$2.93	\$3.37	\$3.85	\$3.25

Table 2 – Details of benzodiazepine consumption during the 6 months study.

These Tables show, in broad terms, that:

- (a) there was a “control” group (which was in Launceston) and an “intervention” group (which was in Hobart);
- (b) there were two types of sedatives examined; antipsychotics and benzodiazepines (which represents the main groups of sedatives currently in use in Australian nursing homes);
- (c) there was identification of medicine use (and hence costs) at the start of the trial (weeks = 1-4) and at the end of the trial (weeks = 23-26).

Some particular conclusions can be extracted from an examination of Table 1 dealing with antipsychotics. These are as follows:

- A – resident numbers changed slightly over the course of the 26 weeks;
- B – average costs per patient increased slightly in both the control group (4.5%) and the intervention group (2%) over the course of the 26 weeks;
- C – costs in the intervention group were significantly lower (15%) than in the control group at the start of the trial.

Some particular conclusions can be extracted from an examination of Table 2 dealing with benzodiazepines. These are as follows:

- D. – resident numbers have changed slightly over the course of the 26 weeks (same as for Table 1);
- E. – costs per patient increased significantly in the control group (15%) over the course of the 26 weeks
- F. – average costs per patient decreased significantly in the intervention group (15%) over the course of the 26 weeks
- G. - costs in the intervention group were significantly higher (31%) than in the control group at the start of the trial.

5. Actual Results of Main Trial

The primary study demonstrated that, by adopting a multidisciplinary approach, led by a community pharmacist involving nursing staff and promoting GP and resident/relative involvement, there can be a significant reduction in the use of sedatives towards best practice consumption levels.

Whilst the full details can be extracted from the primary report, in short, in a sample of nursing homes in southern Tasmania, following the intervention strategy designed and delivered over a 6 month period– as compared with a legitimately constructed and comparable control group:

- (a) there was a 16% overall reduction in the regular taking of benzodiazepines (from 32% to 27%);
- (b) there was 9% overall reduction in antipsychotic use (from 20.3% to 28.6%);
- (c) there was a 22% increase in dose reductions/cessations of benzodiazepines and (this represented a more than doubling of reductions/cessations);
- (d) there was a 16% increase in dose reductions/cessations of antipsychotics. (again there were double the numbers of agents reduced/ceased).

6. Discussion

As identified above, there was not intended to be a complete and detailed assessment of the costs and benefits of the trial – but there was intended to be the basis for intelligent assessment of future directions necessary in relation to economic analysis.

Accordingly, a number of areas where the study is not ideal for economic assessments can be identified. For instance, the data collected on costs is not directly comparable – as there is a change in the sample size over the period being assessed. The tracking of the same patients for the whole trial would also have been preferable to group averages for the purpose of economic analysis.

Another issue of concern is that the average costs of medication in the “control” and “intervention” groups were not similar at the start of the trial. It would seem that this is due to variation in prescribing habits from area to area. Hobart was prone to use much cheaper antipsychotics but more expensive benzodiazepine agents. Every area has its own prescribing patterns. This situation requires further examination. In addition, it is difficult to differentiate between the “volume” and “cost” drivers leading to the changes in average costs per patient. (It is understood that there was a significant increase in some medications during the course of the trial. This is not unusual in economic analysis but more analysis is required to disaggregate these effects.)

However, these are not fatal flaws in achieving the primary objective of getting an understanding of the order of magnitude of the various cost and benefit drivers. Indeed, it is clear from this initial analysis that the primary “cost” of introducing the drug reduction strategies are relatively small and the “benefits” – at least in terms of the medicine savings are also small – but still worth doing as there is a positive benefit:cost ratio.

As identified in the main report, more light will be shed on the “benefits” if there can be a better identification of the nexus between falls of patients in nursing in homes and higher sedative prescribing rates and also the nature of better health for patients from a reduction in average sedative use – towards the best practice prescribing levels. (A further study is in progress to examine the impact of the project on falls rates and levels of challenging behaviour within participant homes.)

However it is possible to ascertain that, as compared with an increase of medicine costs by approximately 15% for the control group, the medicine cost fell by approximately 15% for the intervention group. This represents a 30% difference at the end of the trial which is certainly significant.

It would seem that there is some difficulty establishing a common measure for the number of nursing home patients for which there is commonality. Some guidance is provided from the Australian Institute of Health and Welfare: ‘Residential aged care in Australia 2006–07: A statistical overview’ (June 2008) Cat. no. AGE 56. This report shows that as of 30 June 2007, there were 4,354 “residents of aged care homes” in Tasmania and 170,071 in Australia as a whole.

If therefore an assumption is made that there is a high level of homogeneity of nursing home patients across Australia, it is possible to suggest an extrapolation from the “intervention” group in Tasmania to the Australian population. This requires a calculation to estimate both the current average cost/patient and the potential saving/average patient over a year – say by a reduction in their benzodiazepine medication cost by 15%.

The results from the trial showed that the average resident monthly cost of benzodiazepines was \$3.38 – which works out to 78 cents per week. If this was reduced by 15%, this cost would fall by 11 cents per resident per week. This converts to a potential saving per resident of \$5.72 per year. With almost 6000 residents in Tasmanian ACHs, the total potential savings could approach \$35 000 per annum for the state alone.

7. Conclusion

The main study demonstrated that by application of the program, there can be a substantial reduction in sedative use in nursing homes – bringing them much closer to best practice prescribing regimes.

The preliminary economic analysis has indicated that implementation of the program appears cost effective – and consequently more research should be undertaken to refine the potential benefits that can be achieved.

These benefits are more likely to be non financial – but it appears that, given increases in sedative costs, there is still a significant cost saving to be achieved in every State and Territory, and Australia more generally, by implementing the RedUSE program.



School of Pharmacy

