

***Exploring the potential for pharmacist participation in community-based palliative care services in North West Tasmania***

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## **Abstract**

North West Tasmania is a vast and remote region with an ageing population. Since elderly people are prone to cancers and chronic diseases, the need for healthcare services in rural and remote communities is undoubtedly high, especially in the area of palliative care.

It has been reported that access to optimal healthcare for rural and remote area patients has been problematic and many are receiving suboptimal palliative care services. Furthermore, drug-related problems (DRPs) are commonly experienced by patients receiving palliative care; thus an efficient and quality assured standard of palliative care service is needed. We proposed that the inclusion of a pharmacist could be beneficial for palliative care services in North West Tasmania.

The main aim of this study was to explore the role of pharmacist participation in community-based palliative care services in North West Tasmania. Specific objectives were to investigate the nature and extent of DRPs in palliative care patients in North West Tasmania.

We conducted the study in two parts; we commenced by retrospectively examining and identifying DRPs from the North West palliative care home-based patients' medication records and then conducted a focus group discussion to gather opinions from the palliative care providers.

In the first part of the study, apart from the collection of data related to DRPs, we collected information including patient demographics, medications, medical history and relevant laboratory data.

The patients admitted under the palliative team care were reviewed. Their first three clinical assessments and the medication management of the patients were screened for potential and actual DRPs. For DRP assessment, the researchers first identified the symptoms as recorded in the medical notes. DRPs were then categorised using the D.O.C.U.M.E.N.T classification system

and their possible causes determined.

The first part of the study involved 100 patients. The median age of participants was 68 years. Two-thirds of patients were male, and lung cancer was the most prevalent cancer diagnosis. We found that 52% of our patient sample experienced DRPs when their admission data was assessed.

Using the D.O.C.U.M.E.N.T classification system, our findings indicated that the most common DRPs were drug toxicity, dosage problems and patient non-compliance. Dosage mismanagement and patient noncompliance were common contributing factors of DRPs among patients. These unwanted outcomes were mainly due to polypharmacy, when the patients were following multiple medication regimen for chemotherapy and chronic diseases. The study also found that opioid analgesics, benzodiazepines and anti-nausea medications were common causes of DRPs.

In the second part of the study, a focus group discussion was conducted to gather opinions from the North West palliative care team. The focus group was conducted with 14 participants to discuss 3 main topics: (1) DRPs encountered during work, (2) experiences to overcome DRPs, (3) opinions about the inclusion of a pharmacist in the team and barriers to implementation.

Opinions concerning the team members' experiences of DRPs and their management, and the potential role of a pharmacist on the team were shared and recorded. All qualitative data were audiotaped, transcribed and later analysed using thematic analysis.

Participants described patients' drug misadventure, inadequate drug supply, minimal patients education, lack of drug interventions and medication reviews as the main contributing factors of DRPs. During their community- based palliative care practices, they would also rely on GP/pharmacist advice when they needed access drug information. They also participated in regular group review to enhance their knowledge in DRPs management.

Several measures were discussed to either prevent or resolve DRPs and their consequences in order to achieve the best possible outcomes for the patients. The involvement of a pharmacist in

palliative care, such as pharmacist-conducted home medicines reviews (HMRs) for patients receiving palliative care, were suggested to prevent or manage DRPs. The participants also affirmed the value of an inclusion of pharmacist in the team, as pharmacist involvement was expected to improve patients' medication management and minimise related errors, and at the same time increased the medication-related knowledge of team members and patients. The main barriers to the implementation of a pharmacist-participated palliative care team were funding and State health service policy.

The challenges faced by the palliative care team members in this region have highlighted the need of a palliative care pharmacist. The inclusion of a pharmacist was considered to be beneficial to form a multidisciplinary team to support community-based palliative care service, but requires government funding and support.

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# **1 Introduction**

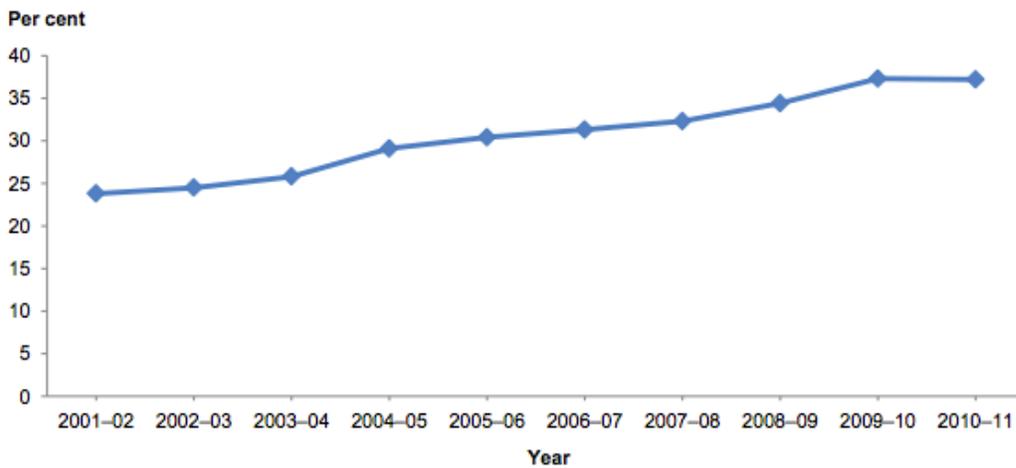
## **1.1 Palliative care**

### **1.1.1 What is palliative care**

The World Health Organization (WHO) describes palliative care as "an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual." [1]. The word palliative is derived from the Latin word 'palliare', meaning to cloak, to shield or to alleviate [2,3]. The aim of palliative care, therefore, is to cloak and reduce the noxious symptoms of advancing diseases, rather than to cure or reverse the progressive deterioration of the diseases [3].

Palliative care has been practiced in Australia since the 1980s. It started from a community-led call to recognise the needs of people who were dying and their families, and to provide services to address these needs [4]. In 2009-10, there were almost 56,000 patients under palliative care treatment reported from public and private hospitals in Australia [4]. This is an increase of 51% from the 2000-01 period.

In 2001-02, more than 1 in 5 (23.3%) hospital admitted patients had been palliative care patients [5]. This proportion has steadily increased to 1 in 3 (37.2%) people who died as an admitted patient receiving palliative care services (Figure 1) over the past decade.



**Figure 1. Data showing increasing number of admitted patients who received palliative care services [5]**

The most recent Tasmanian data available, from the University of Wollongong’s Centre for Health Services Development, showed that the number of palliative care referrals across the State increased by 205 (28.5%) between 2000/01 and 2002/03 [Figure 2]. The number of admissions grew by 83 (11.5%) in 2002/03. With an ageing population and the highest overall incidence of cancer in Australia, there is expected to be an increasing demand for palliative care services [6].

	2000/01	2001/02	2002/03	Net Change	% Change
Clients	3320	3633	4063	743	22.4
Referrals	719	836	924	205	28.5
Admissions	724	750	807	83	11.5
Deaths	695	653	672	-23	-3.3
Direct after hours	1162	1278	1219	57	4.9
Indirect after hours	1093	1012	1079	-14	-1.3

**Figure 2. Data showing the summary of community based palliative care service 2001/02-2002/03 [6]**

### 1.1.2 The principles of palliative care

WHO states that good palliative care should [1]:

- provide relief from pain, shortness of breath, nausea and other distressing symptoms;
- affirm life and regards dying as a normal process;
- intend neither to hasten nor to postpone death;
- integrate the psychological and spiritual aspects of patient care;
- offer a support system to help patients live as actively as possible;
- offer a support system to help the family cope;
- use a team approach to address the needs of patients and their families;
- enhance quality of life; and
- be applicable early in the course of illness, in conjunction with other therapies that are intended to prolong life, such as chemotherapy or radiation therapy.

The objective of palliative care is to provide the best possible quality of life, both for people approaching the end of life and for their families and carers [3]. Cicely Saunders [7], who was well known as the founder of modern hospice, advocated that as a palliative care health provider, one should stress the idea of ‘Total Pain’ relief, which is a holistic approach to provide an “active and total” care and support to patients whose disease is not responsive to curative treatment. Palliative care addresses patients’ physical symptoms and at the same time, takes into account their emotional, psychological and spiritual needs.

### **1.1.3 The focus of palliative care**

Palliative care should not only be offered when disease-specific treatment has failed, since it is perfectly applicable during the early stage of illness, in conjunction with other therapies that are implemented to prolong life.

Some of the common medical conditions of people requiring palliative care include: cancer, HIV/AIDS, motor neurone disease, muscular dystrophy, multiple sclerosis and end-stage dementia [1]. These are mainly incurable malignant chronic diseases that require regular medical attention and in many circumstances, patients' health progressively deteriorates. These patients require regular and formal clinical process of patient-appropriate assessment, diagnosis, planning, interventions, monitoring, and follow-up [8].

According to the Worldwide Palliative Care Alliance Policy (WPCA), which endorsed and elaborated the WHO definition of palliative care [9], the WHO definition is a description of compassionate, comprehensive palliative care that can be provided in any geopolitical, cultural and economic setting. However, in reality, many health care professionals and people still view palliative care as being limited to care of the dying in hospice and hospitals. This perception results in restricted access to palliative care for many people who could receive significant benefits from this care earlier in their illnesses and in their preferred care setting.

A good palliative service provider should integrate psychological and spiritual care to care for patients. One should not hasten or postpone the death of the deteriorated patients as cure is not the aim of the treatment. A good palliative care service offers a support system to help patients live as actively as possible until their death and in the environment of their choice.

One of the objectives of palliative care is focusing on pain and symptoms management, as pain relief and freedom from serious symptoms allows people to live as fully as possible for as long as possible. The service is not only for patients, but also for their family members and carers. It is important to note that support for carers is an essential part of palliative care, whether to family members or professional carers. Palliative care helps to support the family cope during the patient's illness and their own bereavement after death.

In summary, palliative care can, and should, be instituted as a specialised medical care aim for people with serious illnesses whether or not there is hope of a cure [1]. It should be administered as a team approach and available at all levels of care (primary or specialised, private or public), appropriate for any patient at any age in any care setting (patient's own home, a care facility, hospice, hospital) [10,11].

The core structures of palliative care are illustrated in the following diagram (Figure 3).

### **Core Structures of Palliative Care**

- Group focused care - client - family - friends
- Holistic
- Inter-disciplinary - collaborative team
- Coordinated
- Continuous
- Reviewed
- Comprehensive - biomedical/ complementary

**Figure 3. The core structures of palliative care [3]**

## **1.2 Palliative care and interdisciplinary approaches**

WHO claims that in order to effectively provide palliative care, it is necessary to include the patients' family members and make use of any available community resources to the extent that palliative care can be implemented in all settings. WHO states that even when the resources are limited, as long as it is done with a multidisciplinary approach, palliative care should be able to be effectively implemented [1].

Palliative care is best delivered using an interdisciplinary approach [10]. This is often referred to as the holistic approach, and it is patient and family-centred [3]. Family and carers are seen as equal members of the palliative care team [11]. The purpose of the palliative care interdisciplinary team is to bring together the individual strengths of each professional to support and address the multi-faceted nature of the patients' needs. The collaborative expertise from different healthcare professionals working together to achieve a comprehensive patient care that considers the physical, emotional, social, economic and spiritual needs of the person [11].

Without an interdisciplinary approach, it is unrealistic to expect one profession or individual to have the skills to make the necessary assessment, conduct the interventions, and provide ongoing monitoring [12].

### **1.2.1 Interdisciplinary or multidisciplinary?**

The words 'interdisciplinary' and 'multidisciplinary' are often used interchangeably, but

according to Palliative Care Australia [13], "interdisciplinary team" is the preferred term.

A multidisciplinary team might consist of health providers such as general practitioners, surgeons, medical or radiation oncologists, palliative care specialists, pastoral care workers, nurses, pharmacists, social workers, occupational therapists, physiotherapists, dieticians, and volunteers. These different disciplines use a care team approach to make decisions regarding diagnosis, treatment planning and other aspects of care for individual patients in order to provide a comprehensive care [14]. An interdisciplinary team is a team of providers who work together to develop and implement a plan of care. Team members vary depending on the services required to identify and address the expectations and needs of the patient, including their carers and family members.

As suggested by Jessup [15], interdisciplinary teams have some advantages over multidisciplinary teams. The most obvious is the patient-centred approach. Interdisciplinary teams integrate separate discipline approaches into a single consultation. The team conducts all care plan designs and management goals with the patient together. The patient is intimately involved in any discussions regarding their condition or prognosis and the plans regarding their care. A common understanding and holistic view of all aspects of the patient's care is ensured.

Furthermore, interdisciplinary teams provide a stimulating work environment in which different disciplines can conduct some of the assessments and interventions with each other. In this way, different disciplines will learn from each and knowledge and skills are shared for the benefits of their patients.

### **1.2.2 Benefits of interdisciplinary approaches to palliative care**

Interdisciplinary approaches emphasise regular team meetings by the different professional disciplines to discuss the treatment plan for a patient by reviewing their physical, supportive care and emotional needs. These meetings are attended by a variety of health professionals who will differ depending on the type of non-curable diseases under discussion [16]. Strasser *et al* [17] showed that there was a reduction of the physical and psychological distress of patients with advance cancer when the patients were treated with an interdisciplinary approach and, at the same time, the patients also showed a high level of satisfaction. Other benefits of this care model are better patient survival rates, reduced costs for the healthcare facility and shorter waiting time to treatment [18].

A good interdisciplinary team practice requires effective planning and decision-making, in order to deliver quality patient care. Nancarrow *et al* (19) stated there were challenges faced by interdisciplinary team practice. One typical example was the reluctance of health professionals to share responsibilities and knowledge to other professionals with different kinds and levels of education.

### **1.3 The ageing population and problems in providing palliative care**

Australia's population is ageing; in 2001, 13.7% of Australians were aged over 65 and 1.6% were over 85. By 2056, it is estimated that 25% will be over 65 and 5-7% will be over 85 [20].

Cancer is predominantly a disease of older people [21]. It is estimated approximately 60% of all cancers and 70% of cancer mortality occur in people aged 65 years and over [22]. Cancer incidence increases with age, and because the population that is elderly is growing, the number of elderly patients with cancer will continue to increase. The national voice and peak body for palliative care in Australia, Palliative Care Australia [23] states that cancer is the most common principal diagnosis related to palliative care. In 2008-2009, approximately 60% of those reported to palliative care service were cancer related cases. It is prudent that the ageing population receives optimal palliative care services even though there are many barriers existed in the rural/regional community-based setting.

### **1.3.1 Physiologic ageing and pharmacokinetics/pharmacodynamics changes**

The ageing process is characterised by structural and functional changes [24]. The majority of elderly patients are likely to have some degree of age-related pharmacokinetic changes.

Physiological changes associated with ageing may alter the pharmacokinetics and pharmacodynamics of drug metabolism, which, in turn, decreasing their therapeutic index and increasing the risks of toxicity and drug-drug interactions [24].

Besides the changes in drug pharmacokinetic properties, sometimes significant pharmacodynamics changes also occur which tend to increase sensitivity to drugs. The changes in body composition, together with hepatic and renal impairment are responsible for an increase in the volume of distribution of lipid soluble drugs and reduced clearance of lipid soluble and water soluble drugs, respectively. All these changes lead to a prolongation of plasma elimination

half-life [24].

One of the most important changes to occur which influences the pharmacokinetics of many drugs is the progressive decline of renal function in elderly patients. Drugs are excreted at a slower rate and a lower dose may need to be prescribed. The progressive decline in glomerular filtration rate that occurs in elderly patients can lead to accumulation of opioid metabolites. Therefore, regular palliative medicine such as opioid analgesics should be monitored closely in the elderly patients.

There are other factors which make an older patients more vulnerable to drug interactions. The activity of the cytochrome P450 system (CYP) decreases with age, which in turn increases the risk of drug interactions in many elderly patients [25]. Older patients also experience age related changes in body fat that can affect the metabolism of medications as well as the absorption of transdermal preparations. Reduced liver function, reduced absorption from the gastrointestinal tract, reduced cardiac output and altered body composition also occur with ageing. These alterations cause changes in drug bioavailability, distribution and elimination [25].

It is widely recognised that changes in pharmacokinetics and pharmacodynamics of cancer therapy as a result of aging, together with polypharmacy, may have an impact on drug–drug interactions and adverse drug events in the elderly [26]. Careful clinical assessment and patient monitoring during palliative care is crucial to achieve a satisfactory outcome.

### **1.3.2 Comorbidities**

Older cancer patients often have many health concerns. The risks of drug related problem become a concern when elderly patients with metastatic cancer continue to take medications for the primary and secondary prevention of concomitant comorbidities such as hypertension, cardiovascular disease, diabetes, osteoarthritis [27, 28, 29]. The risk of a serious adverse drug reactions increases as more drugs are taken for different chronic diseases [29]. This situation may potentially impair the patient's quality of life and compromise anti-cancer and symptom control medication. Adherence to drug regimens also decreases as the number of drugs prescribed increases, meaning that anti-cancer and symptom control medication may not be taken because of the complexity and cost of multiple medications. There are several other factors that disrupt patient's quality of life such as the monitoring of the effects of medications given for co-morbidities (cholesterol levels and blood pressure), the costs of complex medications and the chances of developing unwanted drug related issues [29].

### **1.3.3 Polypharmacy**

The presence of comorbidities often leads to polypharmacy, which is the use of multiple medications by a single patient and is commonly observed among elderly patients [30]. It is usually defined as the use of five or more drugs, including prescribed, over the counter, and complementary medicines [31]. Hilmer found that the incidence of adverse drug effects increases with the number of medications used [31]. Polypharmacy is also a barrier to patients' compliance with medications because they are encountering complex medication regimens, increased risk of

adverse drug events and higher medication costs [31]. Although polypharmacy can be an issue in any age group, it can especially be a problem for the elderly, who consume more medications than any other patient group. Extermann in his studies suggested older cancer patients need to be assessed for more than just their cancer status [21].

Elderly patients are more likely to receive multiple drugs for their diseases and the addition of more drugs for the relief of symptoms increases the risk of drug interactions, undesirable effects and may affect adherence. Other contributing factor such as the increased availability of over-the-counter and herbal supplements for self-treatment can all contribute to polypharmacy [30, 31].

Apart from elderly patients who are more likely to experience polypharmacy, Currow *et al* found that among the majority of people admitted to palliative care services, the number of prescribed medications increased as death approached, with reductions in long-term medications often surpassed by initiation of drugs for symptom management [32].

#### **1.3.4 Drug related problems**

A drug related problem (DRP) is defined as “an undesirable patient experience that involves drug therapy and that actually or potentially interferes with the desired outcome of medical care [33].

Many medications used commonly in palliative care such as opioid analgesics, benzodiazepines and antidepressants contribute to the risk of DRPs occurring in palliative care patients [34].

These medications require careful clinical administration and monitoring.

DRPs are common in the palliative care setting; Lee *et al* [35] reported a prevalence of DRPs

such as underdosage, untreated indication and patients' failure to take or receive drugs. The data in this study were collected by two palliative care pharmacists over a period of 3 months to record any DRPs encountered by the patients during the study.

The table below shows the prevalence of common DRPs experienced by patients receiving palliative care [35].

<b>Drug-Related Problems Identified, January–March 2004 (n = 98)</b>	
<b>Drug-Related Problem</b>	<b>No. (%)</b>
Overdosage	5 (5)
Adverse drug reaction	6 (6)
Drug use without indication	6 (6)
Inappropriate drug therapy	11 (11)
Drug information	11 (11)
Failure to take or receive drug	15 (15)
Untreated indication	21 (21)
Underdosage	23 (23)

**Table 1. The prevalence of symptoms in palliative care patients [34].**

It is also important for palliative care health providers to be careful with patients who are taking off-label and over-the-counter medications (including complementary and alternative medicines), as they may also potentially lead to DRPs [36].

Optimising medication-related outcomes has become an important goal of care for palliative care health providers, particularly in the community setting. Medication management needs to be carried out effectively to reduce or eliminate symptoms, stop or slow a disease progress, or prevent a disease or symptom. Inadequate medication management often results from poor medication-related knowledge by patients and their family members, which potentially gives rise to medication noncompliance. Medication misadventure and adverse events (as shown in Table

1) may result in hospital admission. Therefore, quality of palliative care needs to be enhanced, whereby patients are able to be treated with health professionals with drug expertise.

### **1.3.5 Undertreatment and deprescribing**

Undertreatment and deprescribing are two important issues for both primary care and also specialist prescribers to address during palliative care.

Pain is a major healthcare problem for cancer patients. Despite the existence of guidelines for cancer care management, undertreatment is a widespread problem [37]. The quality of life of a cancer patient deteriorates when there are discrepancies in pain management. Poor pain assessment, difficulties in patient communication, inappropriate prescribing of drugs and doses, failure to adjust dosing intervals when necessary which are all factors contribute to undertreatment issues in palliative care [37].

Deprescribing at the end stage of a patient's life is a complex issue and often it is important for maintaining a patient's quality of life [38]. Deprescribing could be considered when there is polypharmacy, adverse drug reactions, ineffective treatment, falls or when treatment goals have changed. It is prudent to consider deprescribing during the end of life care, when re-evaluation of a treatment goal is needed. Many preventive therapies such as medicines used to treat hypertension, osteoporosis and hyperlipidaemia will have limited value in patients reaching the terminal phase of an illness such as cancer [38]. Furthermore, the pharmacokinetics and pharmacodynamics of many medicines change during this stage and pose more harms than

benefits to the dying patient. Deprescribing will reduce the medicine load and potential adverse effects, while shifting the therapeutic focus to end-of-life issues that are important to the patient.

As the world population continues to grow older, the need for palliative care service increases. The incorporation of preventive methods in palliative care service provision - such as patient and physician education, and regular medication list review and monitoring - prior to occurrence is critical to reach a balance between controlling symptoms and achieving comfort and quality of life

## **1.4 Overview of palliative care services in North West Tasmania**

### **1.4.1 Palliative care services in North West Tasmania**

The North West region of Tasmania is characterised by low and dispersed settlement densities and is classified as a rural and remote region (Figure 4). The widely dispersed population spreads over an area of 22,202 square kilometres and has only two primary urban activity centres, Burnie and Devonport [39].

In terms of remoteness, which is measured by the Accessibility/Remoteness Index for Australia (ARIA), Tasmania has no centres of population of over 250,000 and is separated from the nearest metropolitan city, Melbourne by the Bass Strait [40, 41].

**Structure of the Rural, Remote and Metropolitan Areas (RRMA) classification**

Zone	Category
Metropolitan zone	M1 Capital cities
	M2 Other metropolitan centres (urban centre population > 100,000)
Rural zone	R1 Large rural centres (urban centre population 25,000-99,999)
	R2 Small rural centres (urban centre population 10,000-24,999)
	R3 Other rural areas (urban centre population < 10,000)
Remote zone	Rem1 Remote centres (urban centre population > 4,999)
	Rem2 Other remote areas (urban centre population < 5,000)

**Figure 4. Structure of the Rural, Remote and Metropolitan Areas (RRMA) Classification [39].**

Besides the remoteness, people living in this region tend to experience lower socio-economic conditions, and have relatively high rates of obesity, smoking, lack of exercise and high of alcohol consumption compared to people living in metropolitan areas [40].

Tasmania has the oldest median age (40.8 years) of all Australian states and territories, and the highest proportion (17%) of people aged 65 years and over [42]. Statistically the North West population in this region has been ageing faster than any other area in Australia [43]. One of the most challenging issues facing health service delivery in Australia is the demographic reality of population ageing. An ageing population will lead to a growing dependency ratio in the region and the need for increased health service industries to meet the needs of the elderly. The burden of disease from an ageing population and increase chronic disease will potentially impact the North West Tasmanian community significantly.

One such area is the provision of palliative care to aged persons in more remote locations and scattered towns and communities across the region. This has been identified as as a significant challenge by the North West palliative care team.

### **1.4.2 North West Tasmania palliative care setting**

The palliative care services/resources available in North West Tasmania are supported by The North West Tasmanian Department of Health and Human Services' (DHHS) Palliative Care Service. They have identified the need to strengthen the partnerships and local palliative care networks particularly on the extension of inpatient palliative care facilities in the North West [44].

The North West Palliative Care Service works with primary health and acute care services to improve and develop palliative care services. Primary palliative care is provided for patients across all health care settings. Primary care providers include all health services and staff that have a primary or first contact relationship with the patient with a life limiting illness.

However, it is understood that most rural and remote communities are unlikely to receive the range of medical and health services characteristic of large urban centres. There is a need to develop primary health palliative care services supported by a general practitioner (GP) led workforce with sound palliative care knowledge and skills.

Tasmania has 10 designated beds in the palliative care inpatient units in Hobart, 6 beds in Launceston, but no designated inpatient or hospice palliative beds in the North West of Tasmania [6]. The settings of care in North West Tasmania are therefore mostly community based, with the majority of patients being assessed and treated at their home or residential aged care home. Strengthening primary care and community support and improving safety and quality in alternative residential settings is an important goal for the DHHS.

### **1.4.3 Barriers and difficulties faced by North West palliative care service**

There are important challenges faced by the palliative care team in regional towns and rural/remote areas. These issues mainly related to the access of service, the coordination of palliative care, the maintenance to the interdisciplinary palliative care teams and sufficient bed allocation in acute hospitals [45]. On the other hand, population ageing also causes an increase demand for medical services and lead to many workforce-related issues [46].

#### **1.4.3.1 Access to palliative care service**

Access to health care for patients living in rural and remote areas of Australia has always been problematic. The lack of accessibility to health professionals often turn out to be an impediment to good palliative care service particularly when after hour care is needed. Family members of a patient are facing various difficulties associated with the provision of care to a patient, especially at night. The lack of 24-hour palliative care coverage leads to a reliance on hospital emergency room services at night when care is urgently needed [45].

In rural and remote Australia, the dispersed nature of the population incurs heavy cost burdens on both patients and health care services because of the distances they are required to travel to access and provide health care. For many patients, the vast distance with poor roads and lack of public transport also poses as common problem to get a proper healthcare support.

For palliative care service providers, remoteness means difficulties in carrying out patient

assessments and symptom management resulting in uncertainties about how to resolve practical caregiving problems. Consequently, a reduced palliative care input and limited choices for home care may reduce the patients' quality of life.

#### **1.4.3.2 Co-ordination of palliative care service and work force related issues**

The North West Tasmania's dispersed population means that there is high demand of home medication review and telephone counselling for patients. However, healthcare workers have difficulties to provide adequate symptom management and assessment of the patient's condition when these are assessed remotely [47].

According to Walker, Behrens and Dow's [47] survey, there is no actual multidisciplinary/interdisciplinary practice in the North West Tasmania region of palliative care service.

Information is loosely processed and there is impaired communication and conflicting views of the roles and responsibilities of the service providers. These have been identified by Walker and Behrens as key barriers to effective service delivery and working relationships between palliative care providers.

As an interdisciplinary team approach is the aim of palliative care services, patient outcomes would improve when GPs and specialist palliative care teams communicate well and work together collaboratively, but Walker *et al* claimed that the local GP involvement in the North West region is often hard to obtain. They concluded that due to the geographical barriers, accompanied by the independent and autonomous nature of the role of rural and remote GPs,

these factors impede the quality coordinated palliative care delivery on North West Tasmania [47].

Furthermore, the shortage of skilled health professionals who are willing to take part in the provision of palliative care is also a barrier to the provision of palliative care [48]. The current interdisciplinary team providing service in the North West region consists of a GP and four clinical nurse consultants. Recently, the North West palliative care service expanded its interdisciplinary team with the addition of an occupational therapist and a social worker. However, there is still a shortage of allied health professionals to look after the patients holistically.

#### **1.4.3.3 Difficulties in bed allocation**

Bed allocation during end of life is difficult in the North West with no designated beds for palliative care patients. According to the Centre for Health Service Development [6], the absence of designated beds for palliative care service in the North West is a result of the 'Hospice without walls' model, which does not suggest a stand-alone hospice due to the dispersed population. In this model, palliative bed designation was strongly encouraged but it was recommended that the beds be spread between, existing acute and rural hospitals [6]. As a consequence, palliative patients need to travel to access services and then face uncertainties regarding bed availability.

#### **1.4.3.4 Geographical and demographic factors**

Distance and weather conditions are significant factors when individuals consider commuting for palliative care [45]. The cost and time commitments of travelling to urban centres (Hobart or Melbourne) for palliative care are burdens to overcome. Not only costs associated with health care delivery are increased, there is often lack of timely and sufficient palliative care service to rural patients available to rural palliative care patients related to insufficient numbers of providers. Furthermore, patients' emotional state can be affected due to the needs to travel to unfamiliar environment.

#### **1.4.3.5 Patient Awareness factor**

Patients living in remote regions are often not aware of the availability of palliative care services [48]. Information about their illnesses are also lacking due to reduced health care provider input and limited choices for home care. There are other disadvantages and barriers faced by these rural patients, factors such as lower education status, reluctant to use palliative service because patients, family members equate palliative services to death.

#### **1.5 The role of pharmacist in palliative care**

Since the goal of palliative care is largely depended on symptom management with significant reliance on medication management, pharmacist involvement in an interdisciplinary team is potentially beneficial. This is why there are an increasing number of health professionals and researchers believe pharmacists should be an essential aspect of an effective interdisciplinary

team [49, 50, 51].

### **1.5.1 Traditional role of the pharmacist**

Traditionally, the role of a pharmacist includes compounding and dispensing medications safely and effectively. The pharmacist's expertise is the knowledge and information in drugs, medication devices, and patient counselling. Their easy accessibility to the public also makes them a quick reference for medication use [49]. The traditional pharmacist's main focus was product management, more of a product and task oriented (dispensing) role [50] and they were not usually identified as a vital member of the healthcare team.

### **1.5.2 Expanded role of the pharmacist**

In palliative care, the concept of pharmaceutical role has expanded the pharmacist roles into a new dimension. Hepler and Strand [50] define pharmaceutical care as the "direct responsible provision of drug therapy for the purpose of achieving definite outcomes and improve a patient's quality of life" (Page 539). This statement shows the similarity of pharmaceutical care to the core principle of palliative care. Both emphasise the patient's quality of life as the eventual outcome, and both stress the holistic aspect of healthcare. This is also supported by the American Society of Health-System Pharmacists (ASHP). ASHP claims the goal of palliative care and pharmaceutical care is consistent and pharmaceutical care is a necessary component of good palliative care [49]. The aim of pharmaceutical care is not only to improve a patient's comfort; it can also be applied to cure a disease, to eliminate or reduce of patients' symptoms, to slow down

a disease process or prevent a disease. The ASHP believes the pharmacist has a pivotal and multifaceted role in the provision of hospice and palliative care [49]. ASHP claimed that high-quality hospice and palliative care requires both traditional and expanded pharmacist activities.

With these aspects, the pharmacist's position in palliative care would be transformed to a patient-oriented profession, with emphasis on the provision of care, particularly in medication advice and counselling [11,12].

According to the the ASHP, the expanded role of pharmacist includes [49]:

1. Assessing the appropriateness of medication orders and ensuring effective medications for symptom control.
2. Counseling and educating the palliative care team about medication therapy.
3. Ensuring that patients and caregivers understand and follow the directions provided with medications.
4. Providing efficient mechanisms for extemporaneous compounding of nonstandard dosage forms.
5. Addressing patients' financial concerns about palliative medications.
6. Ensuring safe and legal disposal of all medications after death.
7. Ensure patients' compliance with laws and regulations pertaining to medications.

### **1.5.2.1 Medication management and review**

Peter Gilbar [51] in his survey claimed that medication review was the most common clinical duty of a pharmacist in an interdisciplinary team. When a pharmacist plays a proactive role in performing medication reviews, pharmacotherapy for patients is improved [52]. By interacting with health providers in the team, the pharmacist can be actively involved in patient rounds, interviewing patients, assessing the appropriateness of medication orders and ensuring the timely provision of effective medications for symptom control. Pharmacists also maintain patient medication profiles and monitor all prescription and non-prescription medications use for safety and effectiveness [49]. Furthermore, they can provide patients discharge counselling and follow up.

It is even more important for the pharmacist to play a vital role when the condition of a patient declines and enters into the terminal stage of illness. At this stage, the need to evaluate interventions based on short-term symptom management goals is imperative. Pharmacists can aid the interdisciplinary team in deciding how and when to taper and discontinue medications to simplify the patient's profile, reducing pill burden, decreasing the risk of drug interactions, and easing medication administration by family/carers [53].

In developed countries, elderly populations have a particularly high incidence of medication misadventure, accounting for up to 14 to 30% of all hospital admissions. Medication misadventure not only decrease quality of life but presents a burden on the health care system. Non-compliance is a major contributor to this problem, accounting for 21 to 59 per cent of

medication related admissions in the elderly [54].

A complete and accurate medication history is crucial to avoid future medication misadventure. The pharmacist is ideally qualified to do medication review and checking histories as they have specialised knowledge of medications. Studies have already demonstrated that pharmacists are best suited to carry out this important role in patient care [55, 56]. The presence of a pharmacist has been shown to decrease preventable adverse drug reactions as pharmacists help intercept errors as well as to recognise ongoing medication related problems [34].

### **1.5.2.2 Symptom and pain management**

Gilbar [51] in his survey has claimed that pharmacists are capable of providing specific advice on pharmacotherapy, administration, treatment, adverse effects and incompatibilities in collaboration with other health disciplines. Since the majority of palliative care patients experience chronic pain, pain management has received the most attention in palliative care [57]. Gagnon [57] who looked at the contribution of pharmacists retrospectively in a Rapid access palliative Radiotherapy program (RAPRP) found that pharmacists can play a pivotal role in improving symptoms by optimising medication regimens, enhancing adherence through patient education and prevention of side effects, collaboration with other health providers, monitoring outcomes and conducting research. Gagnon claimed that the success of this program is a holistic patient approach, in which the pharmacist plays a significant role.

This is a broad area for the pharmacists to provide drug therapy and dispensing controlled drugs for patients in palliative care. Pain management such as opioid rotation and equianalgesic conversion calculations could be performed by the pharmacists to support and advise physicians [58]. For instance in the situation when there is morphine administration in the elderly and in patients' with renal dysfunction [59], pharmacists can support physicians in preventing opioid over-dosage in patients with renal failure.

For symptoms management besides pain, the pharmacist role is to improve symptoms by optimizing medication regimens, enhancing adherence through education of the patients and their family members.

When a pharmacist was included in a palliative care multidisciplinary team, Hussainy *et al* [34] recorded an increase in confidence of patients/carers in the use of medications and medication errors by both health professionals and patients/carers were reduced. Hussainy *et al* stated further stated that by incorporating a pharmacist in a multidisciplinary team, this would lead to an improved symptom and pain management, and therefore, a reduce hospital readmission.

This role of pharmacists has been recognised in different palliative care practice settings by different researchers. In hospice setting, the role of the pharmacist continues to expand. Clinical pharmacists working in hospice organisations were getting recognised by other healthcare professionals as core members of multidisciplinary teams [60]. There were also studies and recommendations about the benefits of community pharmacists being involved in palliative care team approach [61, 62].

Pharmacists play a pivotal role in improving quality use of medicines. Their expertise is needed to perform Home medicines review/Residential Medication Management Review (HMR/RMMR). A HMR/RMMR service is a comprehensive medication review performed by an accredited pharmacist [63]. By systematic evaluation of the patient's complete medication regimen and management of that medicine, pharmacists can improve therapeutic outcomes for the patients and ensure appropriate, safe and effective use of medicines [63]

### **1.5.2.3 Collaboration with other health providers**

The pharmacist is also capable of acting as a drug knowledge resource for the interdisciplinary team. This collaboration with other health providers may lead to better clinical outcomes to improve the patients' comfort and quality of life. During regular interdisciplinary meetings, pharmacists can advise other team members about medication therapy. This may include advice on dosage forms, routes of administration, costs, and availability of various drug products. Another important area in which the pharmacist can contribute their knowledge is the prevention of drug toxicity from drug-drug interactions and also with dietary supplements and other alternative/complementary therapies [49]. Spinewine *et al* [64] suggested the pharmacists should be integral members of all hospice interdisciplinary teams because their involvement will result in the most cost-effective therapies with fewer side effects and reduced potential for drug interactions. In other words, positive outcomes related to drug medications are achieved when the pharmacist collaborates closely with other health care professionals [52].

#### **1.5.2.4 Patient counselling and education**

While assessing the patient for adverse drug reactions during drug therapy, the pharmacist can provide counselling and education to the patients and their carers by carefully explaining dosage regimens and discussing potential side effects of medications with them [49]. Important issues, especially during pain management, such as the misconceptions about addiction to opioids, drug dependence and toxicity can be explained. The pharmacist can also ensure that all medication labelling is complete and understandable by patients and their carers in order to encourage drug adherence. Additional roles and responsibilities include ensuring safe and legal disposal of all medications after death, finding alternative generic medicines to address the financial problems of the patients, and also making sure there is adequate stock and continuous supply of medications for the treatment of the patients.

#### **1.6 Conclusion**

North West Tasmania is a vast and remote region with an ageing population. Since elderly people are prone to cancers and chronic diseases and drug-related problems (DRPs) are commonly experienced by patients receiving palliative care. the need for healthcare services in rural and remote communities is undoubtedly high, especially in the area of palliative care. It has been reported that access to optimal healthcare for rural and remote area patients has been problematic and many are receiving suboptimal palliative care services. For instance, home medication review/residential medication review (HMR/RMMR) is common in metropolitan area, but in regional/ rural Tasmania, it is rarely implemented due to the vast geographical

location and dispersed population. Thus, an efficient and quality assured standard of palliative care service is needed.

With the barriers faced by the North West palliative care service and rural patients, it seems the involvement of a pharmacist in the provision of community based palliative care service would be appropriate to alleviate the above challenges and supporting the palliative care patients in their respective communities.

The North West Tasmanian region needs a high quality and coordinated palliative care services with an increase collaboration and knowledge among the dispersed rural palliative care providers. By including a pharmacist in the community-based palliative care setting, it gives an 'added value' to the current workforce to prevent medication misadventure and symptom management. The pharmacist has a well-defined and important role in palliative care to alleviate patients' drug related problems by participating in an interdisciplinary team. Consequently, we postulated that the inclusion of a pharmacist could be beneficial for palliative care services in North West Tasmania.

## **2 Aims**

The main aim of this study was to explore the potential for pharmacist participation in community-based palliative care services in North West Tasmania. The specific aims were to investigate the nature and extent of DRPs in palliative care patients in North West Tasmania, to explore North West palliative care providers' views on the potential advantages of pharmacist involvement in their team, and identify any barriers to this inclusion.

## **3 Methodology**

The study was conducted in two stages.

- (1) A retrospective audit to collect the palliative care patients' data for DRP assessment.
- (2) A focus group discussion to explore the views of North West palliative care team members on DRP management during their community-based practice.

### **3.1 Retrospective audit of palliative care patient medication records**

#### **3.1.1 Study Design**

In this study we retrospectively examined and identified DRPs from the North West palliative care home-based patients' medication records. The researcher collected relevant patient

information, including demographics, medications, medical history and relevant laboratory data to investigate their impact on patient outcomes.

In this study, the first three encounters of the palliative patients recorded by the palliative team were reviewed. Their clinical assessments and medication managements of the patients were categorised and screened for DRPs.

For DRP assessment, we first identified the symptoms as written in the medical notes, then DRPs were categorised using the D.O.C.U.M.E.N.T classification system [65] and their possible causes determined. The data were later analysed using SPSS version 22 for Mac. A descriptive analysis was undertaken.

### **3.1.2 Patient selection**

This study focused on the North West Tasmanian community setting managed by the North West Palliative Care team. Cancer patients were identified as the target population and their medical records were reviewed retrospectively. The medical records (from August 2012 to August 2013) were collected from the patient archives that were retained in the North West Palliative care office, at Parkside, Burnie. Access to data from the medical records were done under the supervision of GP and nurse in charge.

The patient records targeted for this study were those who were referred to the palliative care teams by health professionals from the community or institutions. The patients were home-

dwelling with their family members and/or carers. Those who were receiving palliative care services in residential care facilities were also considered as eligible patients for this study.

The exclusion criteria for the sample selection were:

- 1) Patients who were treated by another palliative care team for their terminal illnesses;
- 2) Patients not living at home or supported residential facilities; or
- 3) No/Incomplete patient profile/medication notes recorded by the palliative care team.

### **3.1.3 Data collection and data entry**

One-hundred patients' medical records were retrospectively reviewed and documented for analysis by the research pharmacist. The patient names and contacts were not recorded. A unique identifying code was assigned to each patient and the data stored using this code. Since the study focused on the medical archives review of the patients, the informed consent was not required in this study as it did not require any contact with or direct participation from the patient themselves.

#### **3.1.3.1 Patient characteristics**

Before carrying out the retrospective study, a data collection sheet (Appendix 1) was developed to record the patients' demographics (age, gender, types of cancer, patient living days). The medical conditions of the targeted cancer patients prior to their first palliative care service were recorded with reference to the North West Client registration form. The above mentioned

patients' demographic and clinical characteristics provided reason for admission and also acted as baseline assessments. Other patient-related factors such as chronic liver disease, renal impairment and comorbidities were useful to identify any patient-related factors that might potentially contribute to DRPs. For each of the palliative care services received by the patients, comorbid conditions were recorded from their medical history notes.

### **3.1.3.2. Medication record**

A data collection sheet was designed to record medications (Appendix 2) prescribed to the patients during their first three encounters of the palliative care. The data sheet was used to document the type of medications, the name of drugs, their dosage frequency and changes to the drug managements commenced by the palliative care team. The medication records from each visit by the palliative care team were recorded and labelled as 'On Admission', 'Contact 1' and 'Contact 2' for each assessment by the palliative care team.

These data were reviewed to identify any medication regimen changes or modifications due to DRPs, other medication-related issues such as polypharmacy, under-treatment of symptoms, adverse drug reactions and patient non-adherence were also recorded.

### 3.1.3.3. DRP Assessment

In the DRP assessment sheet (Appendix 3) the researcher would first describe the symptoms as written in the medical notes, then the DRPs and their possible causes were identified and categorised using the D.O.C.U.M.E.N.T classification system [65].

The system consisted of eight categories (types) of DRP. Each category was further classified and encompassed with several subcategories (Appendix 4). The types of DRP classified in the D.O.C.U.M.E.N.T system were defined as follows:

- Drug selection—DRPs related to the choice of medications prescribed by community GP or palliative care doctor. A regimen that implied too frequent or too infrequent dosing, multiple drugs, or both may be too complicated for the patients to follow. It also included OTC products that the patients purchased for symptom relief. Subcategories: drug duplication, drug interaction, wrong drug and no apparent indication.
- Over or underdose prescribed—DRPs related to the prescribed dose or schedule of the drug. Generally, in palliative care dosage needed to be monitored closely, especially when the patients were elderly. Subcategories: dose too high, dose too low and incorrect schedule.
- Compliance—DRPs related to the patient's medication- related behaviour. Most commonly, it referred to medication or drug compliance. It was used to describe whether a patient correctly follows medical advice Subcategories: taking too little, taking too much, intentional drug misuse and difficulty using a dosage form.

- Untreated indications—DRPs related to actual or potential conditions that require interventions or management. Subcategories: a diagnosed condition not adequately treated or preventative therapy required.
- Monitoring—DRPs related to inadequate monitoring of the efficacy or adverse effects of a drug. This applied when a medical problem was being treated with the correct drug, but the patient is not adequately monitored for complications, effectiveness, or both. Subcategories: laboratory and non-laboratory monitoring.
- Education or information—DRPs related to knowledge of the disease or its management. It applied to the education and counselling given to the patients and their carers, at the same times, it also applied to education acquire or update by the team members. Categories: requests for drug information, confusion about therapy or disease states and demonstration of dose administration devices.
- Non-clinical—DRPs related to administrative aspects of the prescription.
- Toxicity or adverse reaction—DRPs related to the presence of signs or symptoms which were suspected to be related to an adverse effect of the drug. Categories: toxicity caused by dose, drug interaction or unknown causes.

Appendix 4 shows the different categories of the D.O.C.U.M.E.N.T classification and our own version of D.O.C.U.M.E.N.T table used to classify patient DRPs.

### **3.1.4 Statistical analysis**

Data were analysed using SPSS statistical software Version 22 for Mac. The study statistics were predominately descriptive. Binary outcome variables (yes/no) were recorded for the presence of

DRPs. The associations between independent variables (age, gender, types of symptoms, types of medications) were conducted using chi-squared analysis. A p-value of <0.05 was considered statistically significant.

### **3.2 Focus group discussion with North West palliative care services providers**

#### **3.2.1 Focus Group**

In our second study, we organised a focus group discussion to explore the palliative care team members' views on the DRPs encountered and their approach to DRP management during their community-based practice. We also aimed to explore their views on the potential advantages of pharmacist involvement in their team and identify any barriers for this inclusion.

According to Hansen [66], through interactive discussions and sharing experiences, opinions and views, focus groups let people spark off each other and bring new dimension to the topics. Focus groups also allow researchers to use their own frames of reference and to identify the topics that were important to them. They enable each participant to raise new issues and gain a better understanding of the reasons behind people's action and opinions.

It was hoped that through the focus group discussion, shared experience from the participants would help to identify different issues and challenges faced by the North West palliative care service providers, patients and carers.

### **3.2.2 Recruitment and participants**

We recruited 12 participants from the North West palliative team. There were made up of two palliative doctors, a chief nurse, one nurse consultant, five nurses, two allied health workers and a temporary palliative care pharmacist. The participants were informed a month earlier by email, and later they were reminded verbally by the palliative care doctor about the focus group discussion to make sure they were aware of the meeting date.

Each participant received a letter of invitation, an information sheet (Appendix 5), a letter of consent (Appendix 6) and the question guides (Appendix 7) from the researchers before the meeting date.

The 12 participants were willing to take an hour off their working afternoon to attend the focus group. The focus group were held in the North West palliative care conference room to avoid being disturbed and they felt at ease in the room where they were having weekly clinical reviews.

The issue of participants being 'not representative' was minimal, since the whole North West palliative team were invited to take part in this focus group discussion. One of the doctors acted as the group facilitator who introduced the topics for discussion and moderated the group. His role was to maximise interactions between the focus group participants to interaction and contribute ideas in a lively and natural discussion amongst themselves. The facilitator was also able to contribute his viewpoints throughout the discussion

### **3.2.3 Data collection**

Questions were asked in a group setting where participants were free to talk with other group members. Through interactive discussion, the experiences, opinions and views of each participant were recorded by audio devices and later transcript for qualitative analysis. The audio file was sent to SmartDocs Transcription Service to transcribe into text data. The transcription was later analysed together with the audio recording using qualitative thematic analysis. Since we wanted to seek people's experiences and opinions in order to answer our research questions, thematic analysis was deemed to be ideal to identifying important themes and patterned meaning from our data.

The focus group meeting was expected to last for approximately 60 minutes. Each participant was assigned a number as a unique identifier. We developed a question guide (Appendix 7) to address our aims and the three main areas that we would like to explore. The questions presented to the focus group were designed as open-ended questions as these would encourage the participants to have great freedom to provide information. Primary questions introduced new topics and secondary questions were asked to seek clarification. The participants were also encouraged to raise their own issues and freely shared their views on the topics concerned.

Thematic analysis is widely used in the field of qualitative health research to explore people's experiences, views and perceptions. Themes and patterns from a group of data [66, 67] were identified in order to answer research questions. A theme is defined as a recurring issue that emerged during the analysis of qualitative data [66].

In order to perform thematic analysis, the researchers need to use a coding system to count the number of times a particular theme/opinions/keywords is expressed [68]. Themes were recorded, reviewed for common patterns for result interpretation.

### **3.3 Ethics**

Approval was granted by the Tasmanian Health and Medical Human Research Ethics Committee (REF: H0013775 and H0015369).

## 4 Results

### 4.1 Retrospective study of palliative care patient medication records

#### 4.1.1 Patient demographics

One-hundred of the admitted palliative patients were randomly selected on admission to the North West Tasmanian Palliative Care Team as a convenience sample for our retrospective audit using a random number generator (Figure 5). All 100 participants had a primary diagnosis of cancer. During the data collection, the patient numbers in first contact of palliative care (C1) and the second (C2) dropped to 99 and 76 respectively, due to patient deaths.

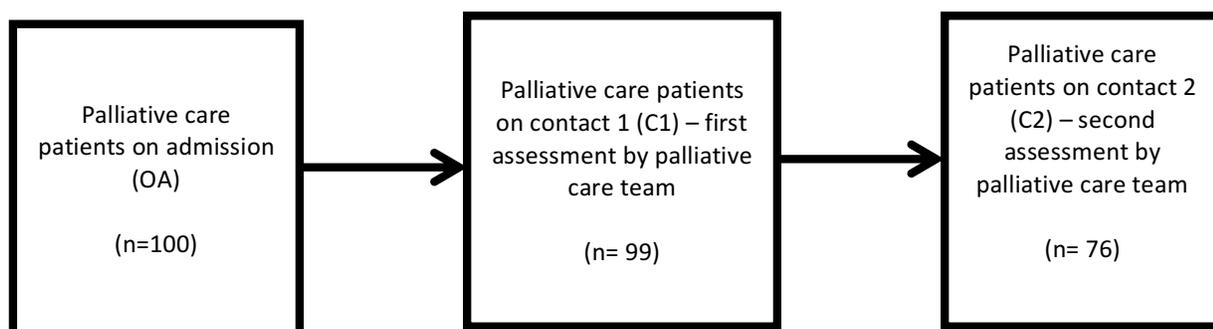


Figure 5. Patients' first three contacts with palliative care team flow chart

A summary of the patient demographics and clinical characteristics is provided in Table 1.

Age		Median	Range
		68	15-95
Gender n (%)		Male	Female
		67 (67)	33 (33)
Cancer type n (%)	Bone & skin	9 (9)	
	Lung	27 (27)	
	Brain	5 (5)	
	Urogenital	21 (21)	
	Breast	4 (4)	
	Endocrine	15 (15)	
	GIT	8 (8)	
	Blood and adenocarcinoma	11 (11)	
Days of life n (%)	1 month or less	29 (29)	
	> 1 month	71 (71)	
Patients with impairments n (%)	Liver	55 (55)	
	Kidney	44 (44)	
Documented co-morbidities n (%)	1	33 (33)	
	2	9 (9)	
	>2	7 (7)	

**Table 2. Patient demographics on admission**

Approximately two-thirds (n=67) of the patients were male and the most prevalent cancer was lung cancer, followed by urogenital and endocrine cancers. With regards to palliative care, 71 patients lived longer than 30 days under the care of the North West palliative team. Over half of the patients (55%) treated were documented as having liver impairment and 44% of patients were recorded with kidney failure. One third (33%) of patients required treatment for a type of chronic disease by the time of admission.

#### **4.1.2 Drug related problem frequencies**

Table 3 shows the frequencies of drug related problems (DRPs) at each contact. Fifty-two percent of the sample experienced one or more DRPs on admission to the palliative care service. The percentage of DRP occurrence increased slightly to 56.6% during C1 then decreased to 50% (C2). The lowest number of DRP recorded for the patient was 1 at every encounter, and the highest were 8 (OA), 7 (C1) and 10 (C2). There was a decrease of the median of DRP from 5 to 4 when the palliative care team intervened. The median of the DRPs were 4 for both C1 and C2.

	OA N=100	C1 N=99	C2 N=76
Number of patients with DRPs n (%)	52 (52)	56 (56.6)	38 (50.0)
Range of DRP	7	6	9
Lowest number of DRP	1	1	1
Highest Number of DRP	8	7	10
Median	5	4	4
OA=On admission C1=First contact of the patient C2=Second contact of the patient			

**Table 3. The proportion of patients with DRPs at each contact**

We further categorised the different DRPs using the D.O.C.U.M.E.N.T classification as shown in Table 4. Prior to admission, T (Drug toxicity) was the most frequently reported issues, followed by drug selection problems (D), patient noncompliance (C) and over/under dosage problems (O).

After the first palliative care contact (Table 4), the most reported problem was again drug toxicity (T), which were mainly due to medication adverse effects. This was followed by patient compliance issues (C), drug selection problems (D) and sub-optimal patient knowledge of their medications (E).

At C2 (Table 4), drug toxicity and side effects were still the major issues (24% of the patients) faced by the palliative care team, followed by drug selections and dosage problems. Compliance

issues showed the biggest improvement when patients were receiving palliative care, with the reported proportion of compliance-related DRPs reducing from 18% to 9%. However, adverse effects, drug selection and dosage problems did not reduce after the two palliative care contacts.

	DRP_OA (n=100) n (%)	DRP_C1 (n=99) n (%)	DRP_C2 (n=76) n (%)
D	20 (20.0)	18 (18.2)	14 (18.4)
O	12 (12.0)	13 (13.1)	14 (18.4)
C	18 (18.0)	20 (20.2)	7 (9.0)
U	7 (7.0)	13 (13.1)	7 (9.0)
M	6 (6.0)	9 (9.0)	8 (11.0)
E	2 (2.0)	15 (15.2)	3 (4.0)
N	3 (3.0)	5 (5.0)	3 (4.0)
T	21 (21.0)	23 (23.2)	18 (24.0)

**Table 4. DOCUMENT system frequencies at each contact**

#### **4.1.3 Patient characteristics vs DRPs**

Chi-squared analyses were performed to compare patient characteristics and DRP frequencies is shown in Table 5. There was a statistically significant increase in DRP occurrence in patients with hepatic impairment at the first encounter of palliative care (P =0.03). Beside hepatic impairment, no other patient characteristics showed any statistically significant associations with DRPs.

Patient Characteristics		DRP_OA (N =100) n (%)	DRP_C1 (N = 99) n (%)	DRP_C2 (N =76) n (%)	DRP Anytime n (%)	P Value			
						OA	C1	C2	Anytime
Gender	M (n=67)	34 (50.7)	56 (57.6)	25 (49.0)	24 (72.7)	0.721	0.774	0.677	0.966
	F (n=33)	18 (54.5)	18 (54.5)	13 (54.2)	49 (73.1)				
Liver Impairment	Yes (n=55)	26 (47.3)	28 (50.9)	21 (48.8)	16 (84.2)	0.232	0.033	0.172	0.201
Kidney Impairment	Yes (n=44)	23 (52.3)	22 (51.2)	17 (50)	38 (69.1)	0.642	0.210	0.554	0.893
CoM =1	Yes (n=33)	14 (42.4)	18 (56.3)	14 (56)	22 (66.7)	0.170	0.703	0.410	0.239
CoM=2	Yes (n=9)	4 (44.4)	6 (66.7)	2 (25)	6 (66.7)	0.630	0.621	0.145	0.601
CoM>2	Yes (n=7)	5 (71.4)	6 (85.7)	3 (60)	6 (85.7)	0.287	0.135	0.620	0.462

OA = On Admission, C1 = Contact 1, C2 = Contact 2,  
DRP Anytime = A combined DRP occurrence from OA, C1 and C2  
CoM = Comorbidities

**Table 5. Patient characteristics vs DRPs**

#### 4.1.4 Symptom Management and DRPs

Table 6 shows the frequencies of symptoms experienced by the patients at each contact recorded by the palliative care team. Fatigue was the most prevalent symptom at each contact. There were statistically significant differences over time for fatigue, pain, shortness of breath, constipation, nausea/vomiting, appetite problems, restlessness/anxiety and insomnia.

Symptoms	OA (N=100) n (%)	C1 (N=99) n (%)	C2 (N=76) n (%)	P Value
Pain	69 (69.0)	57 (57.6)	36 (47.4)	0.015
Shortness of Breath	61 (61.0)	42 (42.4)	27 (35.5)	0.002
Constipation	68 (68.0)	48 (48.5)	30 (39.5)	0.001
Nausea/Vomiting	51 (51.0)	43 (43.4)	18 (23.7)	0.001
Fatigue	93 (93.0)	72 (72.7)	48 (63.2)	0.001
Appetite problems	75 (75.0)	48 (48.5)	38 (50)	0.001
Restlessness/Anxiety	3 (3.0)	14 (14.1)	7 (9.2)	0.020
Insomnia	50 (50.0)	29 (29.3)	22 (28.9)	0.003
Confusion/Hallucination	3 (3.0)	8 (8.1)	6 (7.9)	0.253
Difficult Swallowing	3 (3.0)	7 (7.1)	5 (6.6)	0.395
Weight Loss	5 (5.0)	4 (4.0)	1 (1.3)	0.418
Delirium	5 (5.0)	3 (3.0)	3 (3.9)	0.777

**Table 6. Number of patients with Symptoms and time cross-tabulation (rates of symptoms)**

On admission, there were 93 patients showing signs of fatigue. This was followed by appetite problems as the next most commonly reported symptom, which existed among 75% of patients. Sixty-nine patients (69%) were admitted with pain issues, and there were 68 suffered constipation (68%). At least half of the patients reviewed had dyspnoea, nausea/vomiting and insomnia issues.

During contact 1, symptoms of fatigue had been reduced to 72.7%. This indicated that the palliative care team started to make progress, and there was improvement of the patients' quality of life. However, at this stage, 58% of the patients still complained about pain. During palliative care, these patients were treated by morphine and other opioids derivatives for their pain relief, the results showed that the occurrence of pain had been further decreased to 47% after the second palliative care contact (C2).

The two opioid-related symptoms, shortness of breath and constipation, also improved over time. Restlessness and anxiety was also more frequently reported (14.1%) when the palliative care started at C1, but subsequently reduced to 9.2% during the second contact.

We also found that symptoms like insomnia, delirium and weight loss were reported with less frequency after the commencement of palliative care (C1 and C2). There were successfully reduced, but other symptoms like confusion/hallucination, and difficult in swallowing produced a different trend, as their occurrence increased when the patients first received palliative care (C1), with patients showing signs of improvement after C2.

#### 4.1.5 Medication management vs DRPs

With regard to the patient medications prescribed and recorded on admission and during subsequent palliative care contacts, the prevalence of DRPs reported by nurses at each contact were recorded (Appendix 8). Table 7 shows the list of palliative drugs which showed a significant association with the prevalence of DRPs for each contact.

The drug regimens often contained a combination of opioid and non-opioid analgesics, benzodiazepines, anti-nausea agents and laxatives. We categorised the palliative drug administration into three types:

- 1) R = Regular dose,
- 2) PRN = Dose administered only when necessary, and
- 3) Any = Any form of dose administration, i.e either R or PRN, and sometimes both.

From our data, the usage of morphine administered in regular dose (R) increased from 14 patients to 30 patients after palliative care commenced. Midazolam (R) and haloperidol (R), which were often administered together with morphine during palliative care, also increased in usage by the palliative care team. We noticed that the usage of any form of benzodiazepines and haloperidol increased markedly when palliative care started.

Our findings also showed that medications that were significantly associated with DRPs on admission to the palliative care service included paracetamol (PRN), oxycodone (regular or

PRN), hydromorphone (R, regular or PRN, clonazepam (R, regular or PRN) and metoclopramide (PRN). Fentanyl was significantly associated with DRPs when it was administered at regular doses and in any form of administration at C1 (P=0.019). Similarly, oxycodone (PRN) and haloperidol (R, regular or PRN) at C1 were also significantly associated with DRPs. At C2, when midazolam and haloperidol were both administered in regular dose and in any method to the patients, there was a significant association between these two medications and DRPS.

Type of Drugs	Medication	Method	Stages	P Values
Analgesic	Paracetamol	PRN	OA	0.045
Opioid	Oxycodone	PRN	C1	0.015
Opioid	Oxycodone	Any method	OA	0.026
Opioid	Hydromorphone	R	OA	0.032
Opioid	Hydromorphone	Any method	OA	0.032
Opioid	Fentanyl	R	C1	0.019
Opioid	Fentanyl	Any method	C1	0.019
Benzodiazepine	Midazolam	R	C2	0.027
Benzodiazepine	Midazolam	Any method	OA	0.061
Benzodiazepine	Clonazepam	R	OA	0.028
Benzodiazepine	Clonazepam	Any method	OA	0.015
Antinausea	Haloperidol	R	C1	0.008

Antinausea	Haloperidol	R	C2	0.049
Antinausea	Haloperidol	Any Method	C1	0.030
Antinausea	Haloperidol	Any Method	C2	0.025
Antinausea	Metoclopramide	PRN	OA	0.020

Table 7. List of palliative drugs which showed a significant association with the prevalence of DRPs for each contact

## 4.2 Focus group discussion

### 4.2.1. DRPs encountered by the North West palliative care team

A number of issues and concerns were raised by the palliative care team when discussing the occurrence of DRPs during their practice. These concerns are outlined below.

(1) Inappropriate dosages given to the cancer patients were constantly an issue for the team to deal with. Drug labelling instructions and advice were often not followed by the patients and their family members. One palliative nurse explained:

*“There’s a resistance to change to medications, they (clients) actually like some of the things they are taking so they will have resistance. Or there can be phobias about some of the medications when they might benefit, like opioids, morphine type drugs, they will have a phobia about those. So we’ve got resistance and we’ve got phobias, so they’ll just suffer.”*

(2) The geographical disadvantage was identified as a significant obstacle in palliative care delivery, which resulted in a shortage and irregular supply of palliative medicine to home-based cancer patients. This usually occurred in an aged care institution and drug supply problems also resulted in patients being undertreated. The nurse stated:

*“I’m just thinking about clients in aged care facilities and I reckon the thing I hear most from them is how much they have to wait for their medication, and they suffer quite a lot before they can be attended to. And I understand that’s a resourcing issue, but it’s a big fear of people when they get put in aged care facilities. And they suffer.”*

(3) The low socio economic status in North West Tasmania has resulted in some community GPs and palliative nurses being reluctant to keep patients’ medications well stocked at home for the fear of drug abuse by patients’ family members. Several participants had stressed this was noted as a concern for clients who were living in a ‘high social drug dependent community’.

*“We have a high social drug dependent community which is making our job very challenging, when we are trying to work out appropriate medication doses and safety issues in houses. And the effects of those, we don’t know what we are dealing with.”*

(4) The community GPs prescribing habits also had a significant impact on the patient’s health outcomes. One nurse mentioned that communication between the community-based palliative care team and patients’ GPs was crucial for adequate drug supply in times of emergency since

most patients were required to see GPs whenever they ran out of drug supply. The nurse further stated that:

*“The GPs won’t always give authorities so they (clients) are expected to go back to the GPs constantly, because they don’t have enough drugs in the house.”*

(5) The presence of a high turnover of medical practitioners and health professionals as locums often complicated the situation, with different professional views on the treatment of patients. Patients were required to adapt to different palliative approaches based on the multicultural background of healthcare professionals. This situation not only hindered the provision of an effective palliative care outcome but also left the allied health workers and patients in confusion each time they received different or contradicting advises from the health professionals. The nurse consultant further explained:

*“We have a multicultural lot of medical practitioners and other health professionals; they don’t always hear or understand what’s being said. So they can go on their senses to understand their medications.”*

The high turnover of GPs also contributed to many medication-related issues. Patients would often see different GPs regarding their treatment and medications. Sometimes patients were confused by the different information and advice provided by different GPs. The chief palliative care nurse stated:

*“One of the problems that I’ve observed over a long period of time is that some GPs are not prepared to rationalise a palliative care client’s drugs, at appropriate times. And that increases the burden for clients and their families.”*

(6) Low health literacy was also of concern. Some patients had difficulties reading and understanding different medication labels. Drug education and advice were scarce for patients and their carers. Palliative care service providers spent little time reviewing patients’ medication regimens due to the geographical challenges. The lack of drug education and medication information to the home-based cancer patients was thought to enhance the prevalence of DRPs experienced by the North West palliative care patients. One of the palliative care nurses said:

*“I think that our low level health literacy problems, people just don’t understand the drugs they’re taking. GPs not reviewing the drugs required for our clients. ”*

(7) The consumption of complementary and herbal medicine, some from overseas, was common practice among the patients. The palliative care nurses expressed a serious concern about these ‘additional medicines’. One of the nurses, talking about the lack of proper medication reviews of these alternative medicines which had complicated the patient assessment and their clinical outcomes, explained:

*“The other issue is around GPs not reviewing the drugs required for our clients. Also I think there’s a problem for healthcare workers too in not reviewing and really scrutinising what they are actually taking. I’m not only taking the prescribed, I’m looking at complementary*

*medications too, over-the-counter medications or something that somebody has brewed up and made into a cocktail of their own.”*

(8) The ageing population in the North West region also resulted in a high number of elderly patient-related issues like poor eyesight, inabilities to self-administer medicine and poor comprehension of instructions due to old age and low literacy. Medication non-adherence was common among the elderly cancer patients because they were reluctant and resist to make changes due to unfamiliarity with their medications. The nurse consultant pointed out that patients’ low drug compliance was one of the main reasons that led to the prevalence of DRPs:

*“I think there’s still for some of the frail older people if they’re, like sight impairment, they might go by the colours and feel of the medications without really knowing, being able to read the labels.. . I think some clients there’s a resistance to change to medications, they actually like some of the things they are taking so they will have resistance. Or there can be phobias about some of the medications when they might benefit, like opioids, morphine type drugs, they will have a phobia about those. So we’ve got resistance and we’ve got phobias, so they’ll just suffer.”*

#### **4.2.2. How the palliative care team manages DRPs**

In order to achieve optimal clinical effects, especially for pain relief in palliative care, the healthcare providers needed to perform complex calculations and remember conversion rules for opioids. The palliative team members needed to be trained to perform confidently in both the

hospital and community-based environments. However, it was felt that support and resources required to enhance the effectiveness of the North West palliative care service were lacking. The nurses agreed that the lack of skills and knowledge to perform opioid conversion were obvious, and opioid prescribing habits were thought to be a significant contributor to DRPs, in addition to polypharmacy, poor health literacy and OTC medication abuse.

It was also pointed out during the group discussion that patients preferred to call a pharmacist for medication advice and assistance whenever they encountered DRPs. For the palliative care nurses, their methods for dealing with DRPs would depend on the level of urgency. For example, if the patient's medication problems were acute, an ambulance would be called. Otherwise, the DRPs would be brought to a GP's attention or discussed during the weekly clinical reviews among the palliative care team members. One nurse, referring to the methods to overcome patient DRPs, stated:

*"I'd always go back to the prescriber, whoever has prescribed, if there was a medication error or something that wasn't right, to have a look to see who prescribed it in the first place. If it's at home or if a phone assessment, the first thing I would assess for is the level of danger, is there anything I need to do immediately, and that would be obviously an ambulance, a 000 call if I felt that was the reason. If it was something that I assess and feel as if it could be sorted out with me discussing with their GP, or with the medical registrar who is here with us, I would do it that way. If it's something that could wait I would then bring it up in clinical review and then get back to them about what. So it would be a matter of triaging whatever that drug related issue was."*

Two allied specialist health workers, an occupational therapist and a social worker proposed using the 'triage' system or referring the problems to palliative care nurses during their contacts with the patients. They also suggested the other nurses perform regular medication reviews either in hospital or home-based for the general wellbeing of the palliative care patients. A weekly clinical review, whereby team members gathered and discussed patient conditions and offered solutions were deemed as a crucial step to ensure a holistic palliative care. The nurse explained:

*“Also every week have a clinical review where we bring up discussions and any medication management issues there with our pharmacist, and with our doctors, and with out specialist nurses and whoever who help with, especially we’re talking medication here.”*

The introduction of the 'yellow envelope' system was praised by the team. This is a system whereby a paper envelope was used as a patient log and information centre. It contained all the required medical and drug information related to home-based patients. In times of emergency, ambulance and primary health providers could easily obtain the patient details required to carry out appropriate assessment and follow up.

One of the nurses suggested that an instant access to online palliative pathway which provides updated medical and drug information during community visitation would be beneficial.

Otherwise, bringing qualified and educated pharmacist into the palliative care team would be beneficial to provide drug and symptom knowledge.

In addition, it was also deemed crucial for the palliative care nurses and allied health workers to continuously receive updated health education. One nurse said this education needed to be ‘ongoing’, provided by various medical professionals including locums.

Since the nature of palliative care has changed tremendously and treatment of diseases has become complex, it was suggested that the medical institutions needed to provide well-designed palliative courses for the medical and nursing students in the universities in order to equip them with sufficient palliative care knowledge and awareness before they commenced in their professional roles. The participants also felt that palliative care team ought to be multidisciplinary in order to be effective and efficient to provide a holistic palliative care.

All participants agreed that it would be a difficult task to raise an awareness of the importance of palliative care among the Tasmanian health service stakeholders.

#### **4.2.3. Pharmacist involvement within the team**

Many participants in the focus study agreed that the inclusion of a pharmacist in a palliative care team would be ‘amazing’. The nurses preferred to work with an accredited pharmacist who possessed sufficient experience in palliative care. Only an accredited pharmacist in palliative care would be able to conduct proper medication interference and review, reduce medication errors, educating the patients and team members in the palliative care community-based setting.

The nurse consultant explained:

*“One of the great valuable aspects of having a community pharmacist on our team is the fact that the pharmacist can give advice around the interactions of medications for our clients. Many of our clients with life limiting illnesses have co-morbidities, and there is huge interaction between medications they might be prescribed for their particular or specific palliative diagnosis, in conjunction with their co-morbidities. So it’s been very valuable for the pharmacist to be here to provide advice around the interactions of various medications. And whether the medications might need rationalising.”*

One of the allied health workers felt that extra drug knowledge would be gained during home visitations if a pharmacist was available. The occupational therapist stated:

*“From an allied health perspective, it’s really useful having a pharmacist on the team to explain medications in layman’s terms, in a way that an allied health professional would understand who, is not necessarily aware of all the medications. Over time that changes obviously with more education.”*

It was also mentioned by one palliative care nurse that pharmacist participation would reduce the bill and cost burdens of the patients due to their extensive drug knowledge and familiarity with drug pricing.

*“It’s been really valuable having the community pharmacist on a multidisciplinary team, as in updating us and keeping the rest of the team on relevant medications for patients, as well as able to review a patient’s drug chart and speak about unnecessary medications that someone may be*

*taking that's in a terminal phase, or deteriorating phase. And leaving that burden of people having to take more and more tablets for no reason.”*

<b>Themes</b>	<b>Key findings</b>
Factors contributing to DRPs encountered during palliative care delivery	<ol style="list-style-type: none"> <li>1. Suboptimal drug management</li> <li>2. geographical disadvantage causing short supply of drugs</li> <li>3. Potential drug abuse, e.g in low socio-economic areas</li> <li>4. Different prescribing habits by community GPs.</li> <li>5. A high turnover of medical practitioners and health professionals</li> <li>6. Low health literacy, lack of drug education and knowledge</li> <li>7. Lack of home medication review</li> <li>8. Patient frailty in an aging population</li> </ol>
Opinions on DRP management	<ol style="list-style-type: none"> <li>1. Adequate Skills and knowledge .eg Opioid conversions</li> <li>2. Continuing education for the palliative care team members</li> <li>3. Reliable supports and resources</li> <li>4. Carry out regular medication reviews (hospital and community)</li> <li>5. ‘Yellow Envelope’</li> <li>6. Utilise online palliative pathway</li> <li>7. Bring in highly qualified health professional e.g pharmacist</li> <li>8. Form a Multidisciplinary team</li> </ol>
Opinions on pharmacist inclusion in the palliative care team	<p>Requirement: Need to be accredited, experienced.</p> <p>Benefits:</p> <ol style="list-style-type: none"> <li>1. Give advice to patients, prevent drug interactions</li> <li>2. Provide drug knowledge to patents who are home-based.</li> <li>3. Reduce bill and cost burdens</li> </ol>

	4. Updating drug knowledge to co-workers in a multidisciplinary team
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Table 8. Responses of the focus group participants to the main discussion themes

Although it would be cost effective to include a pharmacist in the team, the inclusion of a pharmacist would make their palliative care team ‘multidisciplinary’ effective. The nature of regional and rural palliative care pharmacy practice would be difficult and appeared to be more challenging compared to those who work in urban hospitals. This was deemed to be due to the vast geographical area which would lead to increased travelling time. This served as a workforce deterrent for any potential pharmacist who would consider working in the North West community-based palliative care service.

One of the nurses said the availability of a pharmacist most likely would only benefit some areas, but not the whole region. Smaller and remote areas would still not receive instant and regular coverage of palliative care service.

Finally, the participants collectively agreed that a lack of funding would serve as the biggest obstacle to including a pharmacist as a permanent member in their palliative care team.

## **5 Discussion**

Our studies suggest that DRPs are common in the North West palliative care setting. The retrospective study highlighted three types of DRP, Adverse drug reactions, dosage mismanagement and noncompliance with drug use were the most common DRPs experienced by our sample patients. The patients' clinical outcomes showed significant improvement after receiving palliative care as symptoms such as pain, shortness of breath, constipation, nausea/vomiting, fatigue, appetite problems and insomnia were reduced in occurrence. Weight loss and delirium appeared to produce a non significant downward trend during the data collection period. Other symptoms such as dysphagia and confusion/hallucination did not produce a positive trend of response. These symptoms remained despite active drug and medical management provided.

Several palliative medicines were associated with DRPs. This was particularly important when multiple drugs were used in palliative care which would lead to the prevalence of DRPs (69). The patients were given opioid analgesics for pain relief, and a series of dose titrations were often needed in order to reach the optimal analgesic effect. The occurrence of DRPs associated with palliative medicines indicated the palliative care team needed to perform regular and accurate medication monitoring.

There are several potential reasons for the high prevalence of DRPs among the palliative care patients.

1. As patients' cancer diseases progressed, the number of prescribed medication also increased during palliation. The increasing use of opioids and psychotropic medications in palliative care contributed to the increase of drug toxicity and adverse effects (69). Their combination usage with anticancer drugs gave rise to DRPs and patient compliance issues.

2. Although multiple drug management was deemed important during palliative care, often it was difficult to achieve optimal pain and symptom relief due to DRPs. The situation became even more challenging when the same patients had impaired hepatic or renal function (70, 71).

3. The prevalence of DRPs usually indicated the progression of cancer diseases and deterioration of the patients' health issues. Increased frailty of the patients as their conditions deteriorated resulted in a higher rate of DRPs among these patients, despite the provision of palliative care services. Although it was identified that patients' comorbidities and polypharmacy contributed to DRPs, treatment of co-morbidities could be considered as subordinate in this terminal stage. Chronic diseases such as hypertension and diabetes could potentially be left untreated (or treated less intensively), when the primary goal of the palliative care team would be totally focused on patient comfort from cancer deterioration. Therefore, symptoms related to co-morbidities could be treated sub-optimally and appear as DRPs in our study.

4. Apart from the difficulties associated with managing complex disease states, the high incidence of DRPs could also be due to geographical and demographic barriers factors

[72]. The North West palliative cancer patients were often home-based and required frequent home assessments by the palliative care team. The inconvenience of transport and vast distance resulted in inadequate medical monitoring of the home-based patients. Walker *et al* in their report stated the North West palliative care service was not fully utilised because of issues relating to distance and role delineation (47). Although telephone communication had been actively utilised by the palliative care team for medication counselling, it was still considered as insufficient to address the complex palliative problems faced by the patients and their family members.

Previous studies have described the barriers and challenges faced by regional palliative care service providers. For example, has been reported that more than 90% of elderly cancer patients suffered from at least one comorbidity, and 30–40% of those comorbidities were severe [21]. Similarly, Hilmer *et al* [31] found that elderly patients were at high risk of experiencing DRPs when they took multiple drugs for chronic disease treatment and cancer chemotherapy.

There are a number of limitations to the retrospective study. Throughout the study, the recording of patients' medical and drug information was not consistent. Sometimes, there were limited descriptions on the patient's status. This could be due to a lack of regular home-based medical visitation by healthcare providers or incomplete patient journal data entry while accessing the patients. It was not uncommon for the patients and their carers to give misleading description of their cancer conditions, particularly at the stage of admission due to a lack of disease or drug knowledge (72). The denial of symptoms by the patients, or the deterioration of their condition during home visitation could also have made our medical review less accurate. Patient

hospitalisation in other hospital(s), other than the North West Regional Hospital and Mersey Community Hospital, was also one of the factors which resulted in incomplete medical record or even zero data entry for a period of time in the patient record. On some occasions, patients died before the completion of assessments.

We also observed a number of patients after their admission to palliative care continuing to be treated with their cancer chemotherapy and also their chronic diseases. It is possible that chemotherapy and comorbidities treatment were to some extent responsible for drug toxicity and adverse effects instead of the palliative medicines (73). It was impossible to determine whether symptoms like fatigue, hallucination, vomiting or loss of appetite were due to the side effects of chemotherapy or palliative medicines, since there was no description about the cause of symptoms. Even patients' pain relief was challenging to monitor, because the pain might not be from the lack of analgesia, but due to the progression of cancer.

This study only reviewed the first three contacts of patients with the palliative care team. Further research is needed to extend the study time frame in order to explore the complete palliative care service received by the patients throughout their cancer journey. The inclusion criteria could be expanded to include patients in hospital and other hospice care facilities, instead of only looking at home-based patients.

The retrospective study has identified that patients in North West Tasmania require an effective community-based palliative care service to address their DRPs and complications of the care provided (6). The present palliative care service currently utilises the combined efforts of a

palliative care doctor, palliative care trained nurses and community nurses for home visitation. North West Tasmania's hospitals are still not equipped with designated beds for palliative care patients, and most of the cancer patients in this region are forced to stay at home waiting for community palliative care service delivery (6). There are insufficient qualified palliative care specialist resources to provide interdisciplinary palliative care to the patients and family members. Perhaps by incorporating a pharmacist in the team, DRPs and symptomatic complication could be reduced.

### **Palliative care team members' recommendations**

In our focus group study, medication mismanagement was identified as the most common contribution to DRPs in palliative care service. Medication errors were mainly due to noncompliance and lack of understanding of health and medication information.

It was identified that many rural palliative care patients faced difficulties associated with reduced healthcare provider input and limited knowledge of their medications. They had fewer or zero visits from physicians and specialists. The lack of palliative care information could also be due to reduced health care provider input and limited choices for home care. As counselling and education were crucial to enhance patient compliance, it was a challenge for the palliative care team to ensure the patients would receive accurate information throughout their palliative care services.

Besides the above challenges, the palliative team members also suggested making full use of the Tasmanian Health pathway Direct Assess Website for instant resources access while providing their community home visits or even after hour services.

The demand for a collaborative approach between palliative care providers including community GPs and other health professionals was also emphasised. There was a common understanding among the team members that healthcare professionals in the North West needed to improved workplace communications and collaboration in order to provide better clinical outcomes for community palliative care. It was pointed out that the shortage of skilled health professionals and high turnover of doctors was an impediment factor for an effective palliative care service. Hence, recruiting more palliative care specialists was considered as being important to reduce the risk of medication misadventure.

The inclusion of a pharmacist in the service delivery was perceived to be beneficial, particularly in patient's medication and symptom control. A pharmacist's participation could also potentially update the team with the latest drug knowledge and price information. Continuing education could be provided to health care workers by the pharmacist about the latest knowledge of palliative medicines.

More importantly, with the pharmacist expertise, the cost-effectiveness and cost-benefit of medications used in palliative care would be better determined. In this way, avoidance of patient admissions to hospitals or long-term care facilities expenses through effective symptom control is a desirable outcome.

Many previous reviews have suggested that the pharmacist is particularly of value to the overall functioning of the team by identifying potential DRPs and improving symptom control. Lee *et al* [35] stated pharmacist intervention was ‘pivotal’ for the patients to achieve a positive clinical outcome. Hussainy *et al* [34] claimed that medication reviews by a pharmacist either by home visitation or telephone would bring a significant impact to patients’ care. The patients/carers were given up-to-date medication counselling and education to make them feel confidence in the usage of medications [34]. This was considered to be important because a reduction in medication errors meant reduction in hospital admissions. This would in term reduce the cost of medical care for the patients.

There were limitations to the focus study. The North West palliative care service was operated by a relatively small team which comprised of nurses and doctors. Occasionally, the unit would hire a temporary pharmacist when the funding allowed. Therefore, the nurses’ views were dominant. There was a lack of multidisciplinary opinions from other allied health workers. In addition, patients and carers were not involved in the study, with respect to their opinions about DRPs prevalence and the potential benefits of pharmacist inclusion in palliative care.

Despite the limitations of the focus study, the palliative care team members supported the inclusion of pharmacist in the North West palliative care team, because pharmacist expertise could potentially benefit the palliative care service providers, patients and carers. The team also emphasised the importance of an accredited palliative care pharmacist to take charge of the home medication reviews.

Finally, all participants agreed that the inclusion of a pharmacist in the palliative care team would largely depend on the allocation of funding. A permanent full time position would be ideal but the funding for this position would put pressure in an already stretched state government health service budget. This situation is also unlikely to change without recognition by the government and health service administrator of the value of pharmacist involvement with the palliative care service.

## **6 Conclusion**

There is a high prevalence of DRPs among the cancer population in North West Tasmania. The challenges faced by the palliative care team members in this region have highlighted the need of a palliative care pharmacist. The North West palliative care team recognised pharmacist interventions as one of the options to potentially improve palliative patient care and reduce DRPs, and the inclusion of a pharmacist would likely improve the quality of life for patients receiving community-based palliative care services in North West Tasmania.

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## 8 Appendices

### APPENDIX 1

#### Patient code:

#### Demographics

Age: \_\_\_\_\_ M/F: \_\_\_\_\_ Postcode: \_\_\_\_\_

\*1<sup>st</sup> contact: \_\_\_\_\_ \*Death: \_\_\_\_\_

#### Patient Related Factors

Weight \_\_\_\_\_ Height \_\_\_\_\_

#### Living Status

Living alone  Living with carer/family member  in supported residential services  poor carer support or carer concerns

#### Medical Conditions

Main Diagnosis (requiring palliative care): Cancer  Others

Details: \_\_\_\_\_

#### Comorbid Conditions:

- Myocardial infarction
- Congestive heart failure
- Peripheral vascular disease
- Hemiplegia or paraplegia
- Dementia
- Chronic pulmonary disease
- Peptic ulcer disease
- Diabetes without chronic complications
- Diabetes with chronic complications
- Renal disease
- Any malignancy, including leukemia and lymphoma
- Metastatic solid tumor
- Mild liver disease
- Moderate or severe liver disease
- AIDS/HIV

Comments: \_\_\_\_\_

\*KF: \_\_\_\_\_ \*Phase: \_\_\_\_\_ \*SPZA: \_\_\_\_\_

#### Renal function:

Renal Failure

Creatinine Clearance: \_\_\_\_\_ eGFR: \_\_\_\_\_

#### Liver Function Tests:

Liver Disease

Albumin: \_\_\_\_\_ Bilirubin: \_\_\_\_\_ Gamma

GT: \_\_\_\_\_ AST/SGOT: \_\_\_\_\_ ;ALT/SGPT: \_\_\_\_\_ ALP: \_\_\_\_\_

\*CE (clinical examination) page (1st contact) :

\*Medication Record:

**APPENDIX 2**

**Medication Record Form (1<sup>st</sup> Contact)**

**Patient Code:**

Date of first contact: \_\_\_\_\_

Medications on first contact

Symptom and Type of drug	Drug	Dose (mg/day)	Comments
<b>Pain</b>			
Non Opioids			
Opioids			
<b>Neuropathic Pain</b>			
Antidepressant			
Anticonvulsant			
Corticosteroid			
<b>Nausea/Vomiting</b>			
Antiemetic			
<b>Constipation</b>			
Laxative			
<b>Others</b>			
Anti ulcers			
Hyperthyroidism			
Hormone			

Hormone			

**Medication Record Form (2nd Contact)**

**Patient Code:**

Date of second contact: \_\_\_\_\_

Medications on second contact

Symptom and Type of drug	Drug	Dose (mg/day)	Comments
<b>Pain</b>			
Non Opioids			
Opioids			
<b>Neuropathic Pain</b>			
Antidepressant			
Anticonvulsant			
Corticosteroid			
<b>Nausea/Vomiting</b>			
Antiemetic			
<b>Constipation</b>			
Laxative			

<b>Others</b>			
Bronchodilator			
Antibacterial			

**Medication Record Form (3rd Contact)**

**Patient Code:**

Date of third contact: \_\_\_\_\_

Medications on second contact

Symptom and Type of drug	Drug	Dose (mg/day)	Comments
<b>Pain</b>			
Non Opioids			
Opioids			
<b>Neuropathic Pain</b>			
Antidepressant			
Anticonvulsant			



**APPENDIX 3**

**DRPs Assessment sheets**

**Patients' problems from the medical notes will be described. Classification of DRPs is done by ticking the relevant categories and subcategories will be written respectively as detailed comments. (Refer to Appendix 4 for DRPs classification tool)**

Date: \_\_\_\_\_

Description of problem:

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Classification:  D \_\_\_\_\_  
 O \_\_\_\_\_  
 C \_\_\_\_\_  
 U \_\_\_\_\_  
 M \_\_\_\_\_  
 E \_\_\_\_\_  
 N \_\_\_\_\_  
 T \_\_\_\_\_

Date:

Description of problem:

---

---

Classification:  D \_\_\_\_\_  
 O \_\_\_\_\_  
 C \_\_\_\_\_  
 U \_\_\_\_\_  
 M \_\_\_\_\_  
 E \_\_\_\_\_  
 N \_\_\_\_\_  
 T \_\_\_\_\_

Date: \_\_\_\_\_

Description of problem: \_\_\_\_\_

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---

---

Classification:  D \_\_\_\_\_

- O \_\_\_\_\_
- C \_\_\_\_\_
- U \_\_\_\_\_
- M \_\_\_\_\_
- E \_\_\_\_\_
- N \_\_\_\_\_
- T \_\_\_\_\_

## APPENDIX 4

### FOR REFERENCE ONLY

#### Classification of Drug Related Problems using the D.O.C.U.M.E.N.T

##### D Drug selection

- D1 Duplication
- D2 Drug interaction
- D3 Wrong drug
- D4 Incorrect strength
- D5 Inappropriate dosage form
- D6 Contraindications apparent
- D7 No indication apparent
- D8 Other drug selection problem \_\_\_\_\_

##### O Over or under-dose

- O1 Prescribed dose too high
- O2 Prescribed dose too low
- O3 Incorrect or unclear dosing instructions
- O0 Other dose problem \_\_\_\_\_

##### C Compliance

- C1 Taking too little
- C2 Taking too much
- C3 Erratic use of medication
- C4 Intentional drug misuse (Including OTCs)
- C5 Difficulty with dosage form
- C0 Other compliance problem \_\_\_\_\_

##### U Under-treated or Untreated indication

- U1 Condition not adequately treated
- U2 Condition untreated
- U3 Preventive therapy required
- U0 Other untreated indication problem \_\_\_\_\_

##### M Monitoring required

- M1 Laboratory monitoring
- M2 Non-laboratory monitoring
- M0 Other monitoring problem \_\_\_\_\_

##### E Education or Information

- E1 Patient requests drug information
- E2 Patient requests disease management advice
- E0 Other education or information problem \_\_\_\_\_

##### N Not classifiable

- N0 Clinical interventions that cannot be classified under another category

##### T Toxicity or adverse reaction

- T1 Toxicity, allergic reaction or adverse effect present

### Classification of Drug Related Problems using the D.O.C.U.M.E.N.T

Classification	Definition
D	Drug selections
O	Over or Under-dose
C	Patients and carers Compliance
U	Under-treated or Untreated indication
M	Monitoring requirement (Lab or Non-Lab)
E	Education, counselling and information
N	Not Classifiable (transport, delivery of medication)
T	Toxicity

## APPENDIX 5



Tasmanian School of Pharmacy  
Private Bag 26  
HOBART TASMANIA 7001  
Telephone (03) 6226 2190  
Fax (03) 6226 7627



### **To explore the role of pharmacist participation in community-based palliative care service in North West Tasmania Information Sheet for participants**

You are invited to participate in a research study, conducted by the University of Tasmania, School of Medicine. Before you decide whether or not you wish to participate in this study, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. This research forms part of Johnny Hii's Master of Pharmacy project, under the supervision of Assoc Prof Luke Bereznicki, Dr Leanne Chalmers and Dr Thiru Thirukkumaran.

#### **1. What is the purpose of this study?**

In palliative care, drug-related problems (DRPs) are very common. It is especially difficult to manage DRPs in a community-based setting. Through this focus group discussion, we hope to find out about your experience in addressing these challenges in order to provide a positive clinical outcome for patients receiving palliative care.

This discussion aims to identify -

- I. The North West palliative care service members' perceptions of current DRP management.
- II. Your experiences and opinions in monitoring DRP management in a community-based palliative care setting.
- III. If there is a role for pharmacists to be more involved in the community-based palliative care setting.

#### **2. Why have I been invited to participate in this study?**

You have been invited to take part because you provide community-based palliative care service in the North West Tasmania region.

#### **3. What does this study involve?**

You will be asked to attend a 1-2 hour focus group session to share about your experience as a palliative care service provider in North West Tasmania. You will be encouraged to express your opinions on the following:

- I. Brief introduction about yourself and your discipline so we know a little more about the health professions taking part in this focus group.
- II. Questions on DRPs faced by patients and the palliative care team, and your approach to effectively reduce DRPs.
- III. Your views on the potential involvement of pharmacist, from both the perspectives of the team and the patients.

The focus group discussion will be tape recorded to ensure that your comments are accurately recorded.

**4. What happens if I don't want to take part in this study, or if I want to withdraw later?**

Participation is entirely voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation.

**5. What are the benefits of this study?**

It is hoped that through the focus group discussion, shared experience from the participants will help identifying different issues and challenges faced by the palliative care service providers, patients and carers. The views from the participants will be seek to inform the future incorporation of a pharmacist in the North West Palliative Care team.

**6. Are there any potential risks associated with this study?**

This is a focus group discussion. There are no potential risks associated with the researcher and participants. Each participant will be assigned with a unique identifier to ensure anonymity.

**7. How will my confidentiality be protected?**

Only information required to meet the aims of the study will be audiotaped, transcribed and analysed. The information collected will be treated confidentially and you will be given a unique identifier, to ensure your identity is protected. Any reports or publications that result from this study will not contain reference to any identifiable person. All information collected as part of this study will be kept in secure storage in the Division of Pharmacy, School of Medicine, University of Tasmania, and will be destroyed after 5 years in line with University of Tasmania regulations.

**8. What should I do if I want to know more about the research before I decide?**

When you have read this information, if you have any queries regarding this discussion, please do not hesitate to contact the investigator listed below:

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**9. If I agree to take part, what happens next?**

You will need to sign and return the attached consent form.

**10. Who should I contact if I have concerns about the conduct of this study?**

This project has been approved by the Tasmanian Health and Medical Human Research Ethics Committee. If you have any concerns of an ethical nature, or complaints about the manner in which the study is conducted, you may contact the Executive Officer of the Human Research Ethics Committee (Tasmania) Network on (03) 6226 7479 or [human.ethics@utas.edu.au](mailto:human.ethics@utas.edu.au). Please quote the ethics reference number XXXXX.

**Thank you for taking the time to consider taking part in this study.  
This information sheet is for you to keep.**

## APPENDIX 6

### **Exploration of the role of a pharmacist in the community-based palliative care service in North West Tasmania**

#### **Participant Consent Form**

1. I acknowledge that the nature, purpose and contemplated effects of the project so far as it affects me, have been fully explained to my satisfaction by the research worker and my consent is given voluntarily.
2. I have read and understood the 'Information Sheet' for this study.
3. The details of the study methods have also been explained to me. I understand that I will be asked to attend a 1-2 hour focus group session to share my experiences of drug-related problems as a palliative care service provider in North West Tasmania, and my opinions about the potential involvement of pharmacist on the team. I understand that the focus group discussion will be tape recorded to ensure that my comments are accurately recorded.
4. I have been informed that the aim of the study is to improve the future delivery of palliative care services.
5. I understand that participation is entirely voluntary. There are no consequences if I decide not to participate.
6. I agree that research data gathered for the study may be published provided that I cannot be identified.
7. I understand that the researchers will maintain my identity confidential and that any information I supply to the researchers will be used only for the purposes of the research. I understand that I am required to maintain the confidentiality of the identities and responses of the other members of the focus group. While all of the focus group members will be advised of this requirement, I acknowledge that the researchers cannot be held responsible for the other focus group members maintaining this confidentiality.
8. Any questions I have asked have been answered to my satisfaction.
9. I understand that I will be given a signed copy of this Participant Information Sheet and consent form. I am not giving up my legal rights by signing this consent form.

10. I understand that the study will be conducted in accordance with the latest versions of the National Statement on Ethical Conduct in Human Research 2007 and applicable privacy laws.

Name of participant: \_\_\_\_\_

Signature of participant: \_\_\_\_\_ Date: \_\_\_\_\_

11. I have explained this project and the implications of participation in it to the participant and I believe that the consent is informed and that he/she understands the implications of participation.

Name of investigator: \_\_\_\_\_

Signature of investigator: \_\_\_\_\_ Date: \_\_\_\_\_

## **APPENDIX 7**

### **Question Guide**

#### **Themes**

- DRPs encountered by the palliative care service
- The approach to DRP management by the palliative care service
- Views on potential inclusion of a pharmacist in the team

The questions for the focus group participants are:

1. The palliative care population is considered to be at high risk of drug-related problems (DRPs). Describe the type of DRPs faced by patients, and the team during community-based palliative care such as drug dosage and side effects monitoring, patient adherence to medication regimen etc.

-What are the main DRPs?

-What factors contribute to the DRPs?

-How significant are the DRPs?

2. How does the palliative care team cope with the DRPs and how do you overcome them?

- Please describe your approach to DRP management during community-based practice.

-What are the obstacles and barriers faced by the patients, health professionals, family members and carers during DRP management of a community-based patient?

3. What are your perceptions and views on the pharmacist service in the context of community-based palliative care?

- What roles/activities could be undertaken by a pharmacist on the palliative care team?

- What potential advantages can you envisage from involvement of a pharmacist on the team from the perspective of a) the team, and b) the patients?

- What barriers are there to the involvement of a pharmacist?

- Overall, would you be supportive of a pharmacist on the palliative care team?

**APPENDIX 8**

**Patient medications and the prevalence of DRPs for each contact**

Drugs used			P Values					
			DRP_OA N=100 n (%)	DRP_C1 N=99 n (%)	DRP_C2 N=76 n (%)	OA	C1	C2
Analgesic	Paracetamol (R)	Yes N=30 (OA) N=19 (C1) N=14 (C2)	15 (50.0)	11 (57.9)	9 (64.3)	0.793	0.897	0.258
	Paracetamol (PRN)	Yes N=16 (OA) N=10 (C1) N= 4 (C2)	12 (75.0)	7 (70.0)	3 (75.0)	0.045	0.366	0.317
	Paracetamol +codeine (R)	Yes N=5 (OA) N=3 (C1) N=4 (C2)	3 (60.0)	56 (56.6)	2 (50.0)	0.713	0.410	0.978
	Any paracetamol	Yes N= 49 (OA) N= 30 (C1) N= 19 (C2)	29 (59.2)	18 (60.0)	12 (63.2)	0.159	0.649	0.208
NSAIDs	Any NSAIDs NSAIDs (PRN)	Yes N=15 (OA) N=8 (C1) N=4 (C2)	9 (60.0)	5 (62.5)	2 (50.0)	0.501	0.724	0.978
Opioids	Morphine (R)	Yes N= 14 (OA) N= 19 (C1) N= 30 (C2)	6 (42.9)	9 (47.4)	14 (46.7)	0.460	0.368	0.572
	Morphine (PRN)	Yes N= 25(OA) N= 31 (C1) N= 18 (C2)	10 (40.0)	17 (54.8)	10 (55.6)	0.166	0.815	0.634

	Any morphine	Yes N= 32 (OA) N= 40(C1) N= 39 (C2)	14 (43.8)	21 (52.5)	20 (51.3)	0.257	0.502	0.912
	Oxycodone (R)	Yes N= 34 (OA) N= 34 (C1) N= 17 (C2)	21 (61.8)	19 (55.9)	9 (52.9)	0.161	0.921	0.831
	Oxycodone (PRN)	Yes N= 30(OA) N= 26(C1) N= 16(C2)	19 (63.3)	20 (76.9)	10 (62.5)	0.138	0.015	-
	Oxycodone/naloxone	Yes N= 2 (OA) N= 1 (C1) N= 4 (C2)	2 (100.0)	1 (100.0)	1 (25.0)	0.170	0.378	0.291
	Any oxycodone	Yes N= 47 (OA) N= 45 (C1) N= 29 (C2)	30 (63.8)	28 (62.2)	16 (55.2)	0.026	0.300	0.535
	Hydromorphone (R)	Yes N= 14 (OA) N= 13 (C1) N= 9 (C2)	11 (78.6)	7 (53.8)	3 (33.3)	0.032	0.832	0.268
	Hydromorphone (PRN)	Yes N= 5 (OA) N= 10 (C1) N= 8 (C2)	2 (40.0)	6 (60.0)	3 (37.5)	0.582	0.817	0.431
	Any hydromorphone	Yes N= 14 (OA) N= 16 (C1) N= 13 (C2)	11 (78.6)	9 (56.3)	5 (38.5)	0.032	0.978	0.333
	Fentanyl (R)	Yes N= 9 (OA) N= 7 (C1) N=10 (C2)	4 (44.4)	1 (14.3)	4 (40.0)	0.634	0.019	0.469
	Fentanyl (PRN)	Yes N= 1 (OA) N= 1 (C1) N= 0 (C2)	0(0.0)	0 (0.0)	--	0.296	0.251	-

	Any fentanyl	Yes N= 9 (OA) N= 7 (C1) N=10 (C2)	4 (44.4)	1 (14.3)	4 (40.0)	0.634	0.019	0.469
	Any opioids	Yes N= 76 (OA) N= 87 (C1) N= 71 (C2)	42 (55.3)	48 (55.2)	35 (49.3)	0.245	0.451	0.317
Benzodiazepines	Midazolam (R)	Yes N= 7 (OA) N= 15 (C1) N= 31 (C2)	2 (28.6)	7 (46.7)	11 (35.5)	0.198	0.401	0.027
	Midazolam (PRN)	Yes N= 5 (OA) N= 11 (C1) N= 15 (C2)	2 (40.0)	8 (72.7)	6 (40.0)	0.582	0.251	0.356
	Any midazolam	Yes N= 9 (OA) N=19 (C1) N=32 (C2)	2 (22.2)	10 (52.6)	12 (37.5)	0.061	0.700	0.049
	Clonazepam (R)	Yes N= 5 (OA) N= 3 (C1) N= 2 (C2)	5 (100.0)	2 (66.7)	0 (0.0)	0.028	0.720	0.146
	Clonazepam (PRN)	Yes N= 1 (OA) N= 6 (C1) N= 4 (C2)	1 (100.0)	5 (83.3)	3 (75.0)	0.334	0.172	0.317
	Any clonazepam	Yes N=6 (OA) N=9 (C1) N=6 (C2)	6 (100.0)	7 (77.8)	3 (50.0)	0.015	0.178	0.973
	Any benzodiazepines	Yes N=27 (OA) N=38 (C1) N=44 (C2)	15 (55.6)	22 (57.9)	19 (43.2)	0.665	0.833	0.122
AntiNausea	Haloperidol (R)	Yes N= 16(OA) N= 24(C1) N= 38(C2)	7 (43.8)	8 (33.3)	15 (39.5)	0.471	0.008	0.049

	Haloperidol (PRN)	Yes N= 10 (OA) N= 5 (C1) N= 13 (C2)	3 (30.0)	2 (40.0)	4 (30.8)	0.142	0.443	0.115
	Any haloperidol	Yes N=19 (OA) N=26 (C1) N=43 (C2)	7 (36.8)	10 (38.5)	17 (39.5)	0.142	0.030	0.025
	Metoclopramide (R)	Yes N= 15 (OA) N= 16 (C1) N= 11 (C2)	5 (33.3)	9 (56.3)	7 (63.6)	0.117	0.978	0.352
	Metoclopramide (PRN)	Yes N= 9 (OA) N= 5 (C1) N= 2 (C2)	8 (88.9)	2 (40.0)	0 (0.0)	0.020	0.443	0.146
	Any metoclopramide	Yes N=24 (OA) N=21 (C1) N=13 (C2)	13 (54.2)	11 (52.4)	7 (53.8)	0.807	0.663	0.801
	Ondansetron (R)	Yes N= 7 (OA) N= 7 (C1) N= 5 (C2)	4 (57.1)	3 (42.9)	4 (80.0)	0.778	0.448	0.174
	Ondansetron (PRN)	Yes N= 4 (OA) N= 2 (C1) N= 0 (C2)	3 (75.0)	2 (100.0)	--	0.347	0.211	-
	Any ondansetron	Yes N=11 (OA) N= 9 (C1) N= 5 (C2)	7 (63.6)	5 (55.6)	4 (80.0)	0.413	0.949	0.174
	Any anti Nausea	Yes N=48 (OA) N=49 (C1) N=53 (C2)	25 (52.1)	24 (49.0)	24 (45.3)	0.987	0.132	0.148
Laxatives	Coloxyl & Senna (R)	Yes N= 17 (OA) N= 15 (C1) N= 10 (C2)	10 (58.8)	6 (40.0)	7 (70.0)	0.536	0.160	0.189

	Coloxyl & Senna (PRN)	Yes N= 5 (OA) N= 3 (C1) N= 0 (C2)	2 (40.0)	2 (66.7)	--	0.582	0.720	-
	Any Coloxyl & Senna	Yes N=22 (OA) N=18 (C1) N=10 (C2)	12 (54.5)	8 (44.4)	7 (70.0)	0.787	0.251	0.189
	Macrogol (R)	Yes N= 6 (OA) N= 9 (C1) N= 4 (C2)	2 (33.3)	6 (66.7)	2 (50.0)	0.345	0.521	0.978
	Macrogol (PRN)	Yes N= 6 (OA) N= 5 (C1) N= 5 (C2)	3 (50.0)	3 (60.0)	3 (60.0)	0.919	0.874	0.666
	Any macrogol	Yes N=12 (OA) N=13 (C1) N= 9 (C2)	5 (41.7)	9 (69.2)	5 (55.6)	0.445	0.323	0.754
	Any Laxative	Yes N=31 (OA) N=26 (C1) N=16 (C2)	17 (54.8)	15 (57.7)	9 (56.3)	0.703	0.893	0.615

R = Regular dose

PRN = When required

Any = Any form of administration, can be either regular or when required, or both

