Evaluation of the Nurse Practitioner in Aged Care

A report prepared for Central PHO and MidCentral DHB

by

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Ms Sue Foster, Ms Yvonne Stillwell

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Funded by Health Workforce New Zealand

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Executive Summary

Background

Nurse Practitioners are advanced practice nurses that provide high quality, cost effective and personalised care. They hold a minimum of a Master’s Degree in a specialised area of nursing, with advanced education and clinical skills and are certified by the Nursing Council of New Zealand.

Early in 2009, the CEO from the Masonic Villages Trust (MVT) and from Enliven Presbyterian Support Central (PSC) called for a change to the work sector to support a growing ageing population and an ageing clinical workforce. Specifically, they wished to appoint a Nurse Practitioner: Older Adult Nurse to their Horowhenua facilities. Both the Masonic Villages Trust and Enliven Presbyterian Support Central are charitable providers with a long history of providing care and accommodation to the older person. The organisations approached MidCentral District Health Board (MDHB) to help them implement a new model of care to better support residents within their three aged care facilities, namely Horowhenua Masonic Village, Revedon Home, and The Levin Home.

The CEO from the Masonic Villages Trust and GM Enliven Presbyterian Support Central envisaged this role would provide support, education and information to staff; provide regular and timely medication reviews to residents; provide education and information to family and carers of residents; support facilities with quality initiatives; provide three-monthly visits to residents previously seen by a GP (aligned to GP practice); assess acute presentations, UTIs, exacerbation of conditions, infections and the like; and provide clinical leadership on enhanced older persons’ knowledge and skills to facility staff.

General Practitioner numbers in the Horowhenua are limited and research indicates they will further decline over time. In the district 26% of the population is over 65 years of age. Currently there are eleven aged residential care facilities providing services to 490 residents with increasingly complex health needs. General Practitioners (GPs) provide a ‘house’ doctor service to these aged care facilities, but this is becoming increasingly problematic due to growing practice registers and shortages of GPs and locums.

A different model of care is required for aged care facilities in order to provide timely acute care, scheduled clinical reviews (an Aged Residential Care contractual obligation) and proactive care planning to support the health and well-being of facility residents.

To progress this initiative, a steering group was established that included:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiquita Hansen</td>
<td>Director of Nursing: MDHB</td>
</tr>
<tr>
<td>Deborah Davies</td>
<td>CNS: Primary Health Care: MDHB</td>
</tr>
<tr>
<td>Nicola Turner</td>
<td>GM Enliven: Presbyterian Support Central</td>
</tr>
<tr>
<td>Phillipa Molloy</td>
<td>Clinical Director: Enliven</td>
</tr>
<tr>
<td>Sue Maney</td>
<td>Manager: Horowhenua Masonic Village</td>
</tr>
<tr>
<td>Sylvia Meijer</td>
<td>Nurse Practitioner recruited for this initiative</td>
</tr>
<tr>
<td>Warick Dunn</td>
<td>CEO The Masonic Villages Trust, Wellington</td>
</tr>
</tbody>
</table>

Other stakeholders included District Health Boards New Zealand (DHBNZ), Portfolio Managers at MidCentral District Health Board (MDHB) for Primary Care and Health of Older Persons, the MDHB HealthCare Development Team and the General Practice teams providing services to Masonic Villages Trust (MVT) and Enliven Presbyterian Support Central (PSC) in Horowhenua. Each steering group participant met within their own organisations at senior levels nationally and at local levels with facility staff to consult on the merits of the Nurse Practitioner role.

In November 2009, Central PHO, in partnership with MidCentral DHB, established a business case to transform Primary Health Care services for the Ministry of Health. One of the four initiatives focused on the need for transformed services for older people. This led to the establishment of the Horowhenua Health of Older People (HoP) Team, located in primary health. Led by a Nurse Practitioner: Older Adult this team consists of a GP with Special Interest: Older People, a clinical pharmacist and allied health staff. The Health of Older People Team works together to meet the needs of moderate to complex older people in the Horowhenua, in partnership with general practice teams, aged residential care facilities and MidCentral Health acute and specialist services.

Due to the successful Transforming Primary Health Care business case MidCentral DHB worked with Central PHO, Masonic Villages Trust and Enliven Presbyterian Support Central to develop an employment arrangement for a Nurse Practitioner.
The Nurse Practitioner: Older Adult appointment to these aged residential care facilities was the first of its kind in the Horowhenua and in New Zealand overall. The Nurse Practitioner was appointed 0.6 FTE to the three aged residential care facilities, and 0.4 FTE to Central PHO as the Team Leader of the Health of Older Persons (HoP) Team.

It was hypothesised that this innovation would improve care for residents with presenting acute medical conditions; ensure prompt response to medically unwell residents; provide early assessment and intervention; provide front line clinical support and clinical leadership to nurses and healthcare staff; support nursing leadership development; promote interdisciplinary care across different levels of the health system; promote establishment of best practice guidelines; and be cost effective.

To evaluate this, a study was funded by Health Workforce New Zealand and commissioned from the University of Auckland Uniservices by Central Primary Health Organisation and MidCentral District Health Boards’ (DHB) Health Care Development team. The evaluation commenced in January 2012 and was completed December 2012. Six aged care facilities participated in the evaluation study - three intervention facilities and three comparison facilities.

The aims of the evaluation

The aim of the study was to evaluate the impact of the implementation of a Nurse Practitioner: Older Adult role in three aged care facilities in the Horowhenua District, namely the Horowhenua Masonic Village, Reevedon Home and Levin Home.

Methodology

The evaluation, using a mixed methods approach, included a quasi-experimental evaluation of resident healthcare utilisation from three Nurse Practitioner intervention facilities compared to data from three comparison facilities, including hospital admissions, potentially avoidable hospitalisations and emergency department presentations. The evaluation also includes a description of Nurse Practitioner activity such as type and number of resident consultations and prescribing practices. Informant interviews and focus groups, using a semi-structured interview guide, were undertaken to determine the relationships with, and the perceptions of, the Nurse Practitioner role. This discussion explores the quantitative analysis and qualitative results and reports study limitations and future recommendations.

Four main themes emerged – accessibility, appropriateness and effectiveness of care, reduction in acute presentations to the emergency department and in hospital admissions; primary health care led collaborative partnerships and integrative working and increased capability, confidence, and competence of staff.

Key Findings

Accessibility, appropriateness and effectiveness of care

Qualitative data was collected in relation to the perception of accessibility, appropriateness and effectiveness of care provide by the Nurse Practitioner.

• The person-centred, holistic care provided by the Nurse Practitioner was commented on and valued by staff.

• Improved timeliness and access to care and a care coordination approach that transcended the boundaries of primary and secondary services was noted by staff.

• The Nurse Practitioner discontinued a number of medications, reducing polypharmacy to improve health outcomes.

• 55% of Nurse Practitioner activities were recorded as direct care including resident assessments and follow ups (30%), ordering diagnostic tests (7%), intervention and management plans (5%), prescribing and reviewing medications (7%), consultations (3%) and multi-disciplinary meetings (3%).

• Service related activities were recorded as 45% of total activities, including clinical inquiry (4%), health education (8%) travel (9%), data entry (8%), meetings and administration (5%), project work (7%), professional development (3%) and referrals (1%).
Reduction in acute presentations to the emergency department and in hospital admissions

Quantitative data was collected in relation to acute presentations and hospitalisations.

- The rate of Emergency Department visits were decreased significantly by 28% post Nurse Practitioner intervention compared to a 21% increased rate for facilities without a NP (incident rate ratio 0.72 [CI 0.57-0.91] and 1.21 [CI 0.87-1.72] respectively, p=0.001).

- Acute hospital admissions were decreased significantly by 22% post Nurse Practitioner intervention compared to a 21% increased rate for facilities without a Nurse Practitioner (incident rate ratio 0.78 [CI 0.62-0.99] and 1.21 [CI 0.88-1.71] respectively, p=0.027).

- Hospital admissions with diagnoses that could possibly have been avoided through earlier intervention were decreased 26% post Nurse Practitioner intervention compared to an 18% increase in facilities without Nurse Practitioner intervention, however, these results did not reach statistical significance (incident rate ratio 0.74 [CI 0.56-0.99] and 1.18 [CI 0.77-1.08] respectively, p=0.07).

Primary health care led collaborative partnerships and integrative working

Qualitative data was collected in relation to the perception of the Nurse Practitioner as a collaborative partner.

- The advanced nursing expertise of the Nurse Practitioner was acknowledged by the General Practitioners and this led to a high degree of collaborative practice.

- General Practitioners noted that the Nurse Practitioner role reduced their workload, and that they were able to focus on the more complex residents, in partnership with the Nurse Practitioner.

- As a result, General Practitioners stated that they were more attracted to supporting aged care facilities with the Nurse Practitioner role in place.

- The avoidance of hospital admissions and satisfied residents and staff reinforced the value of the collaborative partnership between the Nurse Practitioner, General Practitioners and aged care staff.

- Health teams in the three aged care facilities were strongly supportive of the Nurse Practitioner role.

- The dual appointment of this Nurse Practitioner to the Health of Older People Team as well as the aged care facilities added a particular strength as she had well established inter-professional relationships across primary and secondary care services.

Increased capability, confidence and competence

Qualitative data was collected in relation to the perception of the Nurse Practitioner’s impact on the capability, confidence and competence of the workforce.

- The Nurse Practitioner provided clinical leadership for Facility staff, promoting evidence-based practice.

- The Nurse Practitioner contributed to building staff confidence and competence through targeted education.

- Staff felt less stressed and more supported by having access to the Nurse Practitioner.

- Feedback was sought from residents and families, but only one was able to participate. This family felt care had been enhanced by the presence of the Nurse Practitioner, and appreciated the obvious collaboration between the Nurse Practitioner and General Practitioner.
Conclusion

The evaluation study has found the Nurse Practitioner role in aged residential care facilities achieved the following:

- Increased timely access to primary healthcare services.
- Decreased fragmentation across primary and secondary services through a care coordination approach.
- Decreased presentations to the Emergency Department and reduced hospital admissions.
- Reduction in polypharmacy.
- Highly collaborative care between Nurse Practitioner, General Practitioners, hospital specialists and aged care staff.
- Advanced clinical nursing leadership that increased staff confidence and decreased anxiety.
- Positive impact on the recruitment and retention of General Practitioners, who noted they were more attracted to working in the sector knowing they had the clinical support provided by the Nurse Practitioner role.

The Nurse Practitioner in aged residential care expands the capability and capacity of the primary healthcare team through a highly collaborative approach with General Practitioner colleagues, acute and specialist services and aged care staff. Given the success of this initiative, serious consideration should be given to the implementation of a model of care that enables more Nurse Practitioners and General Practitioners to work in partnership in caring for older people in aged residential care facilities.

Recommendations

1. The current Nurse Practitioner: Older Adult model of care in aged residential care in the Horowhenua is continued.

2. A standardised patient information system for aged residential care facilities is developed. (Though it is noted that this problem may be solved to some degree following the introduction of the interRAI assessment instrument.)

3. Address the capability and compatibility issues across MedTech, secondary care patient information systems and aged care information systems to alleviate a considerable amount of unnecessary administration activity for the Nurse Practitioner and General Practitioners.

4. A standardised information system is developed that will assist in measuring the savings to the health system including ambulance transport; hospital admissions; bed stay days; and polypharmacy.

5. A further evaluative study is conducted to further measure the impact of the Nurse Practitioner on reducing emergency department presentations per potentially avoidable diagnoses.

6. A public awareness campaign is developed to inform the sector about the benefits of the Nurse Practitioner in aged care.

7. The Nurse Practitioner role must be established in a collaborative partnership with general practice teams, primary health care, acute and specialist services and facility staff.

8. The outcomes of this initiative on GP recruitment, retention and job satisfaction be shared with national GP leaders through, for example, publications and presentations.

9. Strategies for the spread of the innovation are established, through the Ministry of Health, Health Workforce New Zealand and the Regional Training Hubs.

10. The improved workforce knowledge and move towards aged care settings as learning organisations through Nurse Practitioner led practice development is significant and should incorporate the interdisciplinary team to maximise resources and ensure sustainability.

11. The number of Nurse Practitioners working in the MidCentral DHB aged care sector is expanded. This will allow more aged care facilities in the area to have access to the advanced nursing practice expertise provided by the Nurse Practitioner.

12. The funding model currently used for the employment of the Nurse Practitioner is reviewed by MidCentral DHB, Central PHO, Masonic Villages Trust and Enliven Presbyterian Support Central including the use of financial modelling and benefits realisation.

13. Scoping of potential models of care for providing primary health care services to Aged Residential Care Facilities be undertaken.
Introduction

This report describes the results of the evaluation of the Nurse Practitioner: Older Adult role in aged residential care facilities within the Horowhenua district. This project was initiated at the request of Masonic Villages Trust (MVT) and Enliven Presbyterian Support Central (PSC), and sponsored by MidCentral District Health Board and Central Primary Health Organisation (PHO). The Nurse Practitioner evaluation began in January 2012 and the evaluation concluded in December 2012.

The impetus for this initiative arose from strategic workforce initiatives to address the health of older people in the district, specifically for those living in aged residential care facilities. Interventions were sought that would improve access to and quality of care; ensure service integration, so that the older person would have seamless and timely access to a continuum of health and social services according to their needs over time and across different levels of the health system; and provide front line clinical support and clinical leadership to nurses and healthcare staff.

One innovative model of care to address these issues is the introduction of a Nurse Practitioner: Older Adult service to three aged residential care facilities in the Horowhenua District, namely the Horowhenua Masonic Village, Enliven Presbyterian Support Centrals’ Revedon Home and the Levin Home.

The term ‘Nurse Practitioner’ is the legal title for a registered nurse (RN) who has completed a clinical Master’s degree in nursing and a minimum of four years in specialty practice. Nurse Practitioners are expert nurses who practise both independently and in collaboration with other health care professionals. Their roles are to promote health, to prevent disease and to diagnose, assess and manage people’s health needs, often by working across traditional boundaries.

Nurse Practitioners:

- Take full clinical responsibility for patients.
- Prescribe medications.
- Provide a wide range of assessment and treatment interventions, including differential diagnoses, ordering and interpreting diagnostic and laboratory tests, administering therapies for the management of potential or actual health needs, admitting and discharging from hospital, and carrying out specific procedures.

They work in partnership with individuals, families, whānau and communities across a range of settings and in collaboration with health and social service providers.

Aim

The aim of this study is to evaluate the implementation of the Nurse Practitioner: Older Adult role in three aged residential care facilities in the Horowhenua area.

Objectives

To assess the effectiveness of a Nurse Practitioner Older Adult role in aged residential care settings in:

- Providing early and pro-active assessment and intervention.
- Reducing presentations to the Emergency Department.
- Preventing avoidable hospital admissions.
- Encouraging interdisciplinary care and workforce integration between aged care facilities and other providers.
- Providing nursing leadership in common clinical issues in aged care, developing staff critical thinking and clinical enquiry skills and promoting translation of research into practice.
Background

The fastest growing segment of the population is the oldest old (those over the age of 80 years) (Statistics New Zealand, 2009). Ageing dramatically increases the potential for disability and reduced functionality, possibly resulting in increased dependency and the need for residential care. Frequently older people admitted into aged residential care have complex needs that require expert medical and nursing management. Preparing a workforce that can meet the needs of frail older people has become a global concern (Institutes of Medicine, 2008). Recruitment and retention, coupled with an inadequate critical mass of professionals with expert knowledge and skills to care for older people has become an urgent challenge for health planners (Cornwall & Davey, 2004).

The Horowhenua area has a relatively large population of older people with the proportion 10% higher than the national average (Statistics New Zealand, 2009). General Practitioner (GP) numbers are limited in the Horowhenua area leading to an increase in the use of GP locums. Pressure on GPs and their teams to visit aged residential care facilities necessitated the development of an innovative primary healthcare model. This model of care incorporated the use of a Nurse Practitioner to expand the existing team’s ability to provide the primary healthcare support needed in aged residential care facilities.

Internationally and in New Zealand, delivering healthcare to aged care facilities has been problematic because of a lack of access to prompt GP care, particularly when acute care needs arise. Overall, GP shortages have led to inconsistent and fragmented care (Boul, Counsell, Leipzig, & Berenson, 2010; Boul et al., 2009; Flicker, 2000). These inefficiencies may lead to delays in treatment, and potentially avoidable presentations to emergency departments and hospital admissions (Ouslander et al., 2010).

Since 2001 there have been over 110 Nurse Practitioners registered in New Zealand. They practise in a variety of health settings including mental health, paediatrics, diabetes, aged care, emergency medicine, wound management and primary healthcare (NPNZ, 2013). On-going shortages of GPs in rural areas, and the resulting demands on their time has created an opportunity for Nurse Practitioners with advanced knowledge and skills to provide primary healthcare in the aged care sector. Whilst Nurse Practitioner roles are well established in New Zealand few studies have been undertaken to show the overall impact of the role on health outcomes.

Nurse Practitioner Care

The Nurse Practitioner’s scope of practice utilises high level clinical knowledge and skills providing autonomous, comprehensive assessment and analysis of the person in context (Carryer, Gardner, Dunn, & Gardner, 2007). Most of the literature reports that Nurse Practitioners are highly skilled, cost effective and are able to provide a high-level of care (Burl, Bonner, Rao, & Khan, 1998; Byrne, Richardson, Brundson, & Patel, 2000; Cooper, Lindsay, Kinn, & Swann, 2002). A Cochrane Review (Laurant et al., 2005) reported that Nurse Practitioners in primary healthcare improve patient satisfaction and health outcomes, provide high quality care, decrease admissions to acute care and reduce pharmaceutical costs.

Other identified benefits of the Nurse Practitioner role include reduced waiting times, which in turn allows GP time to be used with more medically complex patients. Nurse Practitioner care also improved communication, consistency and continuity of care as well as patient adherence to care recommendations. Nurse Practitioners enhance the skill mix across the healthcare team, and increase collaboration with medicine and others in the interdisciplinary team (O’Brien, Martin, Heyworth, & Meyer, 2009; 1999). Organisationally, Nurse Practitioner roles support staff education and the use of advanced clinical pathways (Griffin & Melby, 2006; Rowell, Forsythe, Avallone, & Kloos, 2008).

Factors that promote sustainable Nurse Practitioner practices include supportive legislative frameworks, nursing acceptance of the role, and supportive clinical, administrative and organisational leadership (Griffin & Melby, 2006; van Soeren & Micevski, 2001; Woods, 1998). Recognised barriers to the introduction of the Nurse Practitioner role include difficulties with changing patient perceptions around models of care, lack of understanding of the advanced role, non-acceptance by other healthcare professionals and role description ambiguity. There are also challenges providing education, training and resources for Nurse Practitioners (Griffin & Melby, 2006; Ministry of Health, 2006; Willson, Pearson, & Hassey, 2002; Woods, 1998).
Nurse Practitioners in Aged Care

In New Zealand and internationally, the average age of residents in aged residential care is rising resulting in increased dependency and clinical complexity (Boyd et al, 2011; Boyd, Bowen, Broad & Connolly, 2012; Broad et al., 2011). Lack of early medical intervention has been linked to increased adverse outcomes including hospitalisation for residents from aged residential care settings (Grabowski, O’Malley, & Barhydt, 2007; Ouslander, Diaz, Hain, & Tappen, 2011; Ouslander et al., 2010). Increased monitoring and advanced care within aged care facilities has proved to be beneficial (Barber et al., 2009; Boult et al., 2009). The percentage of New Zealanders over 65 years that die in aged residential care is the highest reported in the world and it has been suggested that aged residential care in New Zealand also serves as a ‘de-facto’ hospice for older people (Broad et al., 2012; Connolly, Broad, Boyd, Kerse, & Gott, 2013). Access to, and availability of, health professionals differs at varying levels of service provision (Cornwall & Davey, 2004; NZIER (New Zealand Institute of Economic Research), 2004; Public Health Association, 2010).

Nurse Practitioners in aged care are well established in the United States and United Kingdom and have been shown to improve health outcomes for residents and increased resident and family satisfaction. The role has also been shown to reduce pharmaceutical cost and admission to acute care (Kane, Flood, Bershadsky, & Keckhafer, 2004). Nurse Practitioners have the opportunity to facilitate improvements in interdisciplinary teamwork which maximise the effectiveness of medicine reviews in aged residential care settings (Barber et al., 2009). Nurse Practitioners have been shown to empower aged residential care nurses to work to their potential by providing mentorship, clinical coaching and targeted education specific to the aged residential care population and promoting postgraduate education relevant to the care of older adults. There is evidence to support improved outcomes and job satisfaction when Nurse Practitioners are utilised to their full scope of practice (Newhouse et al., 2011).
Study Design

Geographical Context

The evaluation was carried out in Levin, the largest town in the Horowhenua district, with a population of 20,000. It is situated 48 kms from Palmerston North and is a service centre for the surrounding rural area. Because of its lower cost of housing it is seen as a popular area for retirement. 74% of people in Horowhenua District belong to the European ethnic group, compared with 68% for New Zealand as a whole. 21% of people in Horowhenua District belong to the Māori ethnic group, compared with 15% for all of New Zealand. Approximately 26% of the population is over 65, a considerably higher percentage than the national average (17%) (Statistics New Zealand, 2009).

Aged Residential Care Facilities

Levin is well serviced by eleven aged residential care facilities and retirement villages. Three of these facilities agreed to jointly fund a Nurse Practitioner to facilitate improved care for their residents.

Intervention Facilities

Six aged care facilities participated in the evaluation study within the Horowhenua area: three intervention facilities and three comparison facilities. The intervention facilities had requested the pilot of this innovation.

Facility A provides 25 rest home beds, 30 hospital level beds and 13 stage three dementia beds. The associated retirement community consists of five flats and a house.

Facility B provides 28 rest home beds, 33 hospital beds, and a rehabilitation unit for 6 rehabilitation clients per day. Their associated retirement community consists of 53 Villas and 28 Flats.

Facility C provides 42 rest home beds and has an associated retirement community of two flats and 27 units.

The Nurse Practitioner was required to establish relationships with the three facilities and consider best use of time split across them (0.6 FTE) using opportunities to maximise resources wherever possible. Central PHO employed the Nurse Practitioner and 0.4 FTE of the role was as part of the Health of Older People (HoP) Team, which was complementary to the aged residential care role.

Comparison Facilities

Three facilities agreed to participate as the comparison group. Purposeful sampling was used to select facilities that reflected intervention facilities in both size and type of care but did not have access to Nurse Practitioner services.

Facility D offers 28 rest home care beds and 22 hospital care beds. No associated retirement village.

Facility E has 12 rest home beds, 30 hospital care beds as well as providing a small dementia unit with 8 beds. No associated retirement village.

Facility F has 19 rest home beds and 46 hospital care beds. No associated retirement village.
Intervention

The Nurse Practitioner: Older Adult was based at Central PHO. At the beginning of the trial, it was proposed that the Nurse Practitioner would work 26 hours per week across the three rest home facilities and 14 hours per week for Central PHO. The Nurse Practitioner had weekly scheduled time in each facility and responded to acute clinical events and community referrals as needed, as well as leading the Central PHO Health of Older People (HoP) Team. The Nurse Practitioner worked in partnership with the GPs allocated to each facility. The Nurse Practitioner recorded the following activities from January 2012 to December 2012:

- 1,583 resident interventions related to infections and skin conditions.
- 591 follow up visits.
- 134/month (mean) initial resident assessments.
- 113 acute presentations requiring immediate follow up.
- 44 formal complex case consultations in partnership with the General Practitioner.
- 710 diagnostic tests ordered (mean 59/month)
- 560 medications prescribed (mean 46/month)
- 253 medication reviews conducted.

Table 1: Nurse Practitioner Intervention Activity

<table>
<thead>
<tr>
<th>Direct Care (54.8%)</th>
<th>Activity (%)</th>
<th>Indirect Care (45.2%)</th>
<th>Activity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessments¹</td>
<td>23.7</td>
<td>Computer data entry: resident</td>
<td>7.9</td>
</tr>
<tr>
<td>Follow up visits</td>
<td>6.3</td>
<td>Clinical inquiry²</td>
<td>3.6</td>
</tr>
<tr>
<td>Diagnostic investigations</td>
<td>7.4</td>
<td>Referrals¹</td>
<td>0.7</td>
</tr>
<tr>
<td>Intervention/Management Plan</td>
<td>4.5</td>
<td>Health Education⁴</td>
<td>5.2</td>
</tr>
<tr>
<td>Medication prescribing</td>
<td>4.4</td>
<td>Travel</td>
<td>9.4</td>
</tr>
<tr>
<td>Medication review</td>
<td>2.5</td>
<td>Meetings &amp; administration</td>
<td>5.0</td>
</tr>
<tr>
<td>Multidisciplinary meetings</td>
<td>3.2</td>
<td>Continuing professional development: self</td>
<td>2.3</td>
</tr>
<tr>
<td>Telephone calls &amp; consultations</td>
<td>0.7</td>
<td>Provision of professional development: others</td>
<td>0.7</td>
</tr>
<tr>
<td>Consultation with GP</td>
<td>0.5</td>
<td>Project work</td>
<td>7.3</td>
</tr>
<tr>
<td>Consultation with primary/secondary services</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Assessments include initial assessment, holistic assessment and prevention of acute presentation to ED
²Includes accessing evidence for patient care
³Refers to decision making regarding referrals and referral to other services
⁴Education to General Practitioners and others, advice on Nurse Practitioner role
Methods

The evaluation employed a mixed methods approach which included quantitative and qualitative data collection. The evaluation compared outcomes for facilities with the Nurse Practitioner intervention compared to similar facilities that did not have access to Nurse Practitioner care.

Table 2: Evaluation Methodology Framework (Mixed Methods Approach)

<table>
<thead>
<tr>
<th>Evaluation Objective</th>
<th>Evaluation Question</th>
<th>Outcomes</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved care for residents with presenting acute medical conditions</td>
<td>What was the effectiveness/impact of the intervention on quality of care</td>
<td>Reduced avoidable hospital admissions</td>
<td>Community Health Information Processing System (CHIPS) DHB hospital admissions</td>
</tr>
<tr>
<td>Improved prompt response to medically unwell residents</td>
<td>What was the overall impact of the Nurse Practitioner and GP’s collaborative clinical practice</td>
<td>Reduced presentation to emergency department</td>
<td>CHIPS Key informant interviews DHB hospital admissions</td>
</tr>
<tr>
<td>Early assessment and intervention</td>
<td>How were these achieved</td>
<td>Decrease in unplanned hospital admissions Types of Prescriptions</td>
<td>CHIPS Key informants interviews DHB hospital admissions</td>
</tr>
<tr>
<td>Provide nursing leadership</td>
<td>How was this achieved</td>
<td>Success of implementation Rates of education</td>
<td>CHIPS Key informant interviews</td>
</tr>
<tr>
<td>Promote interdisciplinary care</td>
<td>How effective was the process</td>
<td>Success of implementation</td>
<td>Key informant interviews</td>
</tr>
<tr>
<td>Promote best practice guidelines</td>
<td>To what extent was evidenced based nursing practice implemented</td>
<td>Reduced avoidable admission to hospital Documentation</td>
<td>CHIPS Key informant interviews DHB hospital admissions</td>
</tr>
</tbody>
</table>

Quantitative analysis

The quantitative evaluation compared healthcare utilisation (acute hospitalisations, emergency department visits, length of stay and diagnoses) of residents in the intervention facilities and comparison facilities pre and post Nurse Practitioner intervention. The intervention and comparison facilities provided the National Health Index numbers (NHI) for each resident residing in the facility 6 months prior to the Nurse Practitioner being employed. NHI information was also collected during the time the Nurse Practitioner role was evaluated (January 2012 to December 2012). Bed months were calculated as number of beds in the facility multiplied by the number of months of the pre and post intervention study period. The resident month was calculated as number of months individual residents were in the facility multiplied by the number of months of the pre and post intervention study period. No information was collected by the external evaluator that identified individual residents and all data analysed was kept anonymous to the external research team. Obtaining accurate resident data from facilities proved to be difficult because there is no standardised patient information system across facilities and reliable historical resident data was not available. Consequently, in order to assure the most accurate data collection a shorter pre-intervention data collection period than post-intervention was employed for the evaluation. While all effort has been made to collect accurate data, it is acknowledged that resident data collection may not have captured all residents (particularly if they had a short length of stay). Healthcare utilisation data were obtained through MidCentral DHB. All data were coded and resident identifiers removed to maintain anonymity. The Nurse Practitioner recorded her daily activity through the Central PHO Community Health Information Processing System (CHIPS) (Appendix 1).
**Statistical analysis**

All residential care episodes were collected including placement and discharge dates. Residential months were calculated as the difference between placement and discharge from each residential facility. Secondary hospital in-patient admission dates which fell between the residential placement and discharge dates were counted and the bed days of those admissions and subsequent Assessment, Treatment and Rehabilitation (AT&R) transfers were aggregated. Therefore, only admissions directly from the aged residential care facility were counted, and not community admissions which resulted in discharge to an aged residential care facility. The incidence rate for healthcare utilisation was calculated by healthcare utilisation episode per resident per the length of the time in months the resident resided in the facility. The incidence rate ratio was calculated by comparing the post intervention incident rate by the pre intervention incident rate. Poisson regression model was used in the analysis of the rate of number of admissions and the rate difference (‘post’ – ‘pre’).

**Qualitative Evaluation**

Semi-structured interviews and focus groups were conducted by an independent researcher to assess the perceptions of the Nurse Practitioner role from a number of stakeholder sources. All interviews were conducted using a semi-structured interview guide (Appendix 2). The main topics discussed during the interview related to the perceptions of the quality of the service provided by the Nurse Practitioner, accessibility of the service, appropriateness of the service and scope for improving and broadening the current role of the Nurse Practitioner. Views of residents and family members were sought. However only one resident’s family was able to be interviewed – this was due to the health status of the resident at the time of interview and/or the availability of families due to work or travel constraints.
Table 3: Summary of qualitative evaluation findings

<table>
<thead>
<tr>
<th>Informants</th>
<th>Category</th>
<th>NP Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior nursing staff, care managers and caregivers</td>
<td>Continuity of care</td>
<td>Reduced hospitalisations Early intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interdisciplinary care Best Practice</td>
</tr>
<tr>
<td></td>
<td>Role model</td>
<td>Nursing leadership Best practice</td>
</tr>
<tr>
<td></td>
<td>Resident centred care</td>
<td>Nursing leadership Pro-active intervention</td>
</tr>
<tr>
<td></td>
<td>Reduction in anxiety</td>
<td>Nursing Leadership Early Intervention</td>
</tr>
<tr>
<td>Facility level management</td>
<td>Strengthening the nursing structure and education of staff</td>
<td>Nursing Leadership Best practice</td>
</tr>
<tr>
<td></td>
<td>Earlier intervention</td>
<td>Reduced hospitalisations Early intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interdisciplinary care</td>
</tr>
<tr>
<td></td>
<td>Impact on GP recruitment</td>
<td>Nursing leadership</td>
</tr>
<tr>
<td>General Practitioners</td>
<td>Link to secondary care</td>
<td>Reduced hospitalisations Early intervention</td>
</tr>
<tr>
<td></td>
<td>Use of time</td>
<td>Interdisciplinary care Best practice</td>
</tr>
<tr>
<td></td>
<td>Level of skill</td>
<td>Interdisciplinary care Early Intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Best practice</td>
</tr>
<tr>
<td></td>
<td>Collaboration</td>
<td>Interdisciplinary care Proactive interventions</td>
</tr>
<tr>
<td>Operational Management</td>
<td>Availability of GP’s</td>
<td>Reduced hospitalisations Interdisciplinary care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nursing leadership</td>
</tr>
<tr>
<td>Family experiences</td>
<td>Communication channels</td>
<td>Nursing leadership Pro-active interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Best practice</td>
</tr>
</tbody>
</table>

In total, 23 participants were recruited and took part in either a face to face interview or focus groups. The participants included: the Nurse Practitioner, facility and operational managers, registered nurses, pharmacist and caregivers, a geriatrician, three GPs and a resident’s family members. The interviews and focus groups were audio-recorded and transcribed verbatim. The qualitative data were analysed using a general inductive approach (Thomas, 2006). The transcripts were read and evaluated by two independent researchers and relevant categories identified. Following further in-depth analysis relevant categories and codes were grouped into main themes.
Results

Table 4 shows the characteristics of the facilities and residents (17 resident NHIs were incorrect and were excluded from the sample). The facilities are labelled A to F in this report to maintain anonymity. There was a similar proportion of resident months (obtained from DHB databases) to facility beds in pre intervention across all facilities (5.9 overall for both intervention and comparison facilities, with a range of 5.3 to 6.7 across all facilities). For post intervention samples, facility F showed a inconsistent proportion of resident months to facility beds when compared to all other facilities. Facilities A to E resident months to facility bed proportion ranged from 18.1 to 20.3 compared to facility F proportion of 6.3 (likely indicating missing resident data for this facility).

Table 4: Intervention and comparison facility characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention Period (July 2011 – Dec 2011)</th>
<th>Facility A</th>
<th>Facility B</th>
<th>Facility C</th>
<th>Total</th>
<th>Facility D</th>
<th>Facility E</th>
<th>Facility F</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
<td></td>
<td>72</td>
<td>78</td>
<td>47</td>
<td>197</td>
<td>64</td>
<td>48</td>
<td>69</td>
<td>181</td>
</tr>
<tr>
<td>Beds</td>
<td></td>
<td>62</td>
<td>67</td>
<td>37</td>
<td>166</td>
<td>50</td>
<td>46</td>
<td>63</td>
<td>159</td>
</tr>
<tr>
<td>Bed months</td>
<td></td>
<td>372</td>
<td>402</td>
<td>222</td>
<td>996</td>
<td>300</td>
<td>248</td>
<td>378</td>
<td>926</td>
</tr>
<tr>
<td>Residential Months</td>
<td></td>
<td>375</td>
<td>373</td>
<td>227</td>
<td>975</td>
<td>336</td>
<td>246</td>
<td>351</td>
<td>933</td>
</tr>
<tr>
<td>Post-intervention Period (Jan 2012 to December 2012)</td>
<td></td>
<td>Facility A</td>
<td>Facility B</td>
<td>Facility C</td>
<td>Total</td>
<td>Facility D</td>
<td>Facility E</td>
<td>Facility F</td>
<td>Total</td>
</tr>
<tr>
<td>Residents</td>
<td></td>
<td>115</td>
<td>158</td>
<td>50</td>
<td>323</td>
<td>95</td>
<td>77</td>
<td>68</td>
<td>240</td>
</tr>
<tr>
<td>Beds</td>
<td></td>
<td>62</td>
<td>67</td>
<td>30</td>
<td>159</td>
<td>46</td>
<td>44</td>
<td>61</td>
<td>151</td>
</tr>
<tr>
<td>Bed months</td>
<td></td>
<td>1116</td>
<td>1206</td>
<td>540</td>
<td>2862</td>
<td>828</td>
<td>792</td>
<td>1098</td>
<td>2718</td>
</tr>
<tr>
<td>Residential Months</td>
<td></td>
<td>1177</td>
<td>1279</td>
<td>545</td>
<td>3001</td>
<td>933</td>
<td>891</td>
<td>388</td>
<td>2212</td>
</tr>
<tr>
<td>Average resident length of stay (months)</td>
<td></td>
<td>19</td>
<td>33</td>
<td>26</td>
<td>21</td>
<td>31</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Healthcare Utilisation

Hospital Admissions

The rate of admissions per 100 residential months reduced for the intervention group between the pre-intervention period and the post-intervention period (11.18 to 8.73) while the rate increased for the comparison group between the pre- and post- intervention periods (5.36 to 6.51), as shown in table 5. The rate ratios for the intervention and comparison groups were 0.78 (a 22% decrease in admissions) and 1.21 (a 21% increase in admissions) respectively post intervention. The number of admissions excludes AT&R admissions. A test of difference between the two rate ratios shows a significant difference (p= 0.027), as shown in table 5.

Table 5: Comparison of hospital admissions pre and post NP intervention

<table>
<thead>
<tr>
<th></th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Incidence rate ratio (post ÷ pre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intervention facilities hospital admissions</td>
<td>109</td>
<td>262</td>
<td></td>
</tr>
<tr>
<td>Total comparison facilities hospital admissions</td>
<td>50</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>Intervention hospital admissions per 100 resident months</td>
<td>11.18</td>
<td>8.73</td>
<td></td>
</tr>
<tr>
<td>Comparison hospital admissions per 100 resident months</td>
<td>5.36</td>
<td>6.51</td>
<td></td>
</tr>
<tr>
<td>Intervention pre and post hospital admission rate ratio</td>
<td></td>
<td></td>
<td>0.78* CI (0.62 – 0.99)</td>
</tr>
<tr>
<td>Comparison pre and post hospital admission rate ratio</td>
<td></td>
<td></td>
<td>1.21 CI (0.88 – 1.71)</td>
</tr>
</tbody>
</table>

*p = 0.027

Hospital in-patient bed days:

Hospital bed days were calculated as total in-patient bed days (including AT&R bed days) per 100 residential months for pre intervention and post intervention periods. The incidence rate ratio difference between intervention and comparison facility hospital bed days pre and post intervention was not statistically significant (p=0.39), although slightly lower in the Nurse Practitioner intervention group versus comparison group (0.84 vs.0.90) as seen in table 6.

Table 6: Comparison of hospital in-patient bed-days pre and post NP intervention

<table>
<thead>
<tr>
<th></th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Incidence rate ratio (post ÷ pre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intervention facilities hospital bed days</td>
<td>640</td>
<td>1659</td>
<td></td>
</tr>
<tr>
<td>Total comparison facilities hospital bed days</td>
<td>382</td>
<td>815</td>
<td></td>
</tr>
<tr>
<td>Total intervention In-patient bed days per 100 residential months</td>
<td>66</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Total comparison In-patient bed days per 100 residential months</td>
<td>41</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Intervention pre and post hospital admission rate ratio</td>
<td></td>
<td></td>
<td>0.84* CI (0.77 – 0.92)</td>
</tr>
<tr>
<td>Comparison pre and post hospital admission rate ratio</td>
<td></td>
<td></td>
<td>0.90 CI (0.80 – 1.02)</td>
</tr>
</tbody>
</table>

*p = 0.39
Emergency Department presentations:
Pre and post intervention comparison of Emergency Department (ED) presentations were calculated as total ED visits per 100 residential months. There was a 28% decrease in emergency department presentations for intervention facilities and a 21% increase for comparison facilities. Table 7 shows the incidence rate ratio difference between intervention and comparison facility ED visits (*p = 0.001).

Table 7: Emergency Department (ED) events pre and post NP intervention.

<table>
<thead>
<tr>
<th></th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Incidence rate ratio (post ÷ pre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intervention facilities ED events</td>
<td>107</td>
<td>236</td>
<td></td>
</tr>
<tr>
<td>Total comparison facilities ED events</td>
<td>48</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Intervention ED events per 100 residential months</td>
<td>11.0</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>Comparison ED events per 100 residential months</td>
<td>5.1</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>Intervention pre and post ED event rate ratio</td>
<td></td>
<td></td>
<td>0.72* CI (0.57 – 0.91)</td>
</tr>
<tr>
<td>Comparison pre and post ED event rate ratio</td>
<td></td>
<td></td>
<td>1.21 CI (0.87 – 1.72)</td>
</tr>
</tbody>
</table>

*p = 0.001

Potentially avoidable hospitalisations:
Potentially avoidable diagnoses are any conditions that could respond to early assessment and intervention, as identified in the Health Research Council funded (2010) Aged Residential Care Healthcare Utilisation Study (ARCHUS) and in personal communication with Joanna Broad and Professor Martin Connolly (January 2012). Hospital admissions were deemed potentially avoidable if they were assigned any potentially avoidable diagnoses (Table 8). Although the rate was lower by 26% for the intervention group versus comparison group (with a 17% increase), potentially avoidable admissions between the intervention and comparison facilities pre and post Nurse Practitioner intervention was not statistically significant (*p = 0.07) (Table 9).

Table 8: List of potentially avoidable diagnoses

<table>
<thead>
<tr>
<th>ICD Code</th>
<th>ICD Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J18.9</td>
<td>Pneumonia, unspecified</td>
</tr>
<tr>
<td>J22</td>
<td>Unspecified acute lower respiratory infection</td>
</tr>
<tr>
<td>N39.0</td>
<td>Urinary tract infection, site not specified</td>
</tr>
<tr>
<td>I50.0</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>S72.03</td>
<td>Fracture of subcapital section of femur</td>
</tr>
<tr>
<td>J44.0</td>
<td>Chronic obstructive pulmonary disease with acute lower respiratory infection</td>
</tr>
<tr>
<td>L03.11</td>
<td>Cellulitis of lower limb</td>
</tr>
<tr>
<td>R41.0</td>
<td>Disorientation, unspecified</td>
</tr>
<tr>
<td>S72.11</td>
<td>Fracture of intertrochanteric section of femur</td>
</tr>
<tr>
<td>K59.0</td>
<td>Constipation</td>
</tr>
<tr>
<td>S72.00</td>
<td>Fracture of neck of femur, part unspecified</td>
</tr>
<tr>
<td>J40</td>
<td>Bronchitis, not specified as acute or chronic</td>
</tr>
<tr>
<td>S70.9</td>
<td>Superficial injury of hip and thigh, unspecified</td>
</tr>
<tr>
<td>R33</td>
<td>Retention of urine</td>
</tr>
<tr>
<td>L57.0</td>
<td>Actinic keratosis</td>
</tr>
<tr>
<td>R26.2</td>
<td>Difficulty in walking, not elsewhere classified</td>
</tr>
<tr>
<td>R29.6</td>
<td>Tendency to fall, not elsewhere classified</td>
</tr>
<tr>
<td>D64.9</td>
<td>Anaemia, unspecified</td>
</tr>
<tr>
<td>J44.1</td>
<td>Chronic obstructive pulmonary disease with acute exacerbation, unspecified</td>
</tr>
<tr>
<td>R41.8</td>
<td>Other unspecified symptoms and signs involving cognitive functions and awareness</td>
</tr>
<tr>
<td>J44.9</td>
<td>Chronic obstructive pulmonary disease, unspecified</td>
</tr>
<tr>
<td>R21</td>
<td>Rash and other nonspecific skin eruption</td>
</tr>
<tr>
<td>S72.01</td>
<td>Fracture of intracapsular section of femur</td>
</tr>
<tr>
<td>J20.9</td>
<td>Acute bronchitis, unspecified</td>
</tr>
</tbody>
</table>
Table 9: Any diagnosis representing a potentially avoidable hospital admission

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Incidence rate ratio (post ÷ pre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total intervention facilities hospital admission with any potentially avoidable diagnoses</td>
<td>73</td>
<td>166</td>
<td></td>
</tr>
<tr>
<td>Total comparison hospital admission with any potentially avoidable diagnoses</td>
<td>31</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Intervention hospital admission with any potentially avoidable diagnoses per 100 residential months</td>
<td>7.5</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Comparison hospital admission with any potentially avoidable diagnoses per 100 residential months</td>
<td>3.3</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Intervention pre and post potentially avoidable hospitalisation rate ratio</td>
<td></td>
<td></td>
<td>0.74* CI (0.56 – 0.99)</td>
</tr>
<tr>
<td>Comparison pre and post potentially avoidable hospitalisation rate ratio</td>
<td></td>
<td></td>
<td>1.17 CI (0.77 – 1.08)</td>
</tr>
</tbody>
</table>

*p = 0.39

Nurse Practitioner Prescribing Practice

Table 10 represents the main recorded diagnoses of residents seen by the Nurse Practitioner. The most common diagnosis related to infections and skin conditions. Exacerbation of both Chronic Obstructive Pulmonary Disease (COPD) and Congestive Heart Failure also featured highly. Prompt diagnosis of fractured femurs and arms indicates an immediate response to an urgent medical problem. Skin lesions also featured highly, requiring diagnosis, treatment and symptom management.

Table 10: Summary of Residents’ Main Diagnoses following Nurse Practitioner Consultation

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>% of Total NP Consultations</th>
<th>Prescribed Medication</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>3.14</td>
<td>Fracture hip</td>
<td>0.49</td>
</tr>
<tr>
<td>Anxiety</td>
<td>1.98</td>
<td>Fracture ulna</td>
<td>0.16</td>
</tr>
<tr>
<td>Bacterial skin infection</td>
<td>6.11</td>
<td>Gastric reflux / GORD</td>
<td>1.48</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>2.64</td>
<td>Gout</td>
<td>0.99</td>
</tr>
<tr>
<td>Chest Infections</td>
<td>10.08</td>
<td>Haemorrhoids</td>
<td>1.15</td>
</tr>
<tr>
<td>Constipation</td>
<td>7.27</td>
<td>Hayfever / allergy</td>
<td>0.82</td>
</tr>
<tr>
<td>Dehydration</td>
<td>4.13</td>
<td>Hyponatremia</td>
<td>1.81</td>
</tr>
<tr>
<td>Delirium</td>
<td>3.14</td>
<td>Inguinal hernia</td>
<td>0.49</td>
</tr>
<tr>
<td>DVT</td>
<td>0.49</td>
<td>Keratotic lesions requiring treatment</td>
<td>2.8</td>
</tr>
<tr>
<td>Ear infection</td>
<td>0.99</td>
<td>Nausea (unknown cause, requiring treatment)</td>
<td>1.48</td>
</tr>
<tr>
<td>Eczema or rash</td>
<td>6.28</td>
<td>Oral thrush</td>
<td>2.64</td>
</tr>
<tr>
<td>Exacerbation of CKD</td>
<td>4.79</td>
<td>Postural hypotension</td>
<td>2.47</td>
</tr>
<tr>
<td>Exacerbation of COPD</td>
<td>6.94</td>
<td>Skin lesions (possible malignancies for referral and treatment)</td>
<td>3.14</td>
</tr>
<tr>
<td>Exacerbation of congestive heart failure</td>
<td>6.44</td>
<td>Urinary tract infections</td>
<td>9.75</td>
</tr>
<tr>
<td>Exacerbation of Diabetes</td>
<td>2.31</td>
<td>Vit B12 deficiency</td>
<td>0.82</td>
</tr>
<tr>
<td>Eye infections</td>
<td>2.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In total 263 prescriptions were written by the Nurse Practitioner with the majority of prescribed medications for skin conditions. Clearly the prescribing activity reflects the main diagnosis from referral (Table 11). For example, Table 10 highlights a high referral rate for skin conditions which reflects the high numbers of topical preparations prescribed.
Table 11: Nurse Practitioner Prescribing Patterns - Summary of total number of prescriptions by Nurse Practitioner for 12 month period

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye/Ear Drops</td>
<td>11</td>
<td>4%</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>68</td>
<td>26%</td>
</tr>
<tr>
<td>Topical ointments</td>
<td>104</td>
<td>40%</td>
</tr>
<tr>
<td>Inhalers</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Analgesia</td>
<td>20</td>
<td>8%</td>
</tr>
<tr>
<td>Laxatives</td>
<td>14</td>
<td>6%</td>
</tr>
<tr>
<td>Oral Care</td>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>Supplements</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>Cardiac</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>20</td>
<td>7%</td>
</tr>
</tbody>
</table>

Qualitative Evaluation Results

A series of individual interviews and focus groups were conducted by an independent researcher with a variety of stakeholders between January and December 2012. In total three focus groups and 11 face to face interviews were conducted. These were recorded, transcribed verbatim and themes extracted from the transcripts. The main topics discussed during the interviews were: perceptions of the quality of the service provided by the Nurse Practitioner, access to the service, appropriateness of the service and opportunity for improving and broadening the current role of the Nurse Practitioner. Views of residents and their families were also sought.

Senior nursing staff, care managers and care givers

Continuity of care

The most significant message to come from the qualitative interviews as a whole was the improved continuity of care for residents. The ability to call on a Nurse Practitioner to provide extra assistance in making a diagnosis without having to wait for a GP consultation, combined with the ability to prescribe and give direction for the plan of care, has had a major impact on the timeliness with which residents are being treated. Feedback from the nurses indicates that for issues such as UTIs, skin infections and wound care intervention is more timely, residents more satisfied, and staff less stressed as they do not have to consider whether to wait for the GP or call an ambulance.

“The patient care has been improved by more timely intervention. And (NP) has more time to spend with the resident than a GP would. She also spends more time with the family, and she’ll liaise more with the staff”. (CNM)

“The role has had an enormous influence on our ability to remain self-sustaining and manage our residents with the least amount of disruption to their lives really. It allows them to stay in what is technically their own home and I think that’s because of the continuity of care”. (RN)

“I think the care has really improved when we have the NP coming in. Particularly those skin infections, UTIs that require interventions. Like antibiotics when we can’t get the GP straight away, it’s really great because we can get (NP) in on the days when the GP doesn’t come”. (CM)

One of the real benefits of the role is the Nurse Practitioner’s flexibility in being able to visit the facilities two to three times a week, and alongside her prescribing ability is her additional knowledge and skill base. For nursing staff, having that extra person to call on has meant that not only do ill residents get earlier treatment but the anxiety levels of staff are greatly reduced. This reduction in stress levels has been a recurring statement from all levels of care staff.

“You’ve always had to juggle about.... shall I call an ambulance or shall I wait for the GP whereas now you can just call (NP) and say I’m worried about.....”. (CM)

“The management side of things.....you know, we don’t have to wait for a doctor. We know we’ve someone on site who can possibly do something in the interim until we have a review by a GP. So that’s very reassuring for us as RNs”. (RN)

Role model

A secondary theme but one that also was repeated regularly was the amount of education that occurred on site while residents were being assessed. This took the form of formal education sessions around particular issues that were identified as being a problem (e.g.falls) or in providing information or talking with nursing staff in a multi-disciplinary team meeting or informally. This aspect of the role was seen as vital to maintaining currency of the knowledge and skills of the nursing staff within the facilities.

When discussing issues with the nursing staff the Nurse Practitioner often challenges them to justify their decision making. Critical thinking skills are an essential part of nursing care and these skills are enhanced with this regular challenge. This educative aspect has highlighted to the nursing staff that they, too, can advance their career aspirations.
“Having that role model in terms of a nursing role model, someone who has done the hard yards, gone the long distance, can walk the talk. I think that’s a huge role model to the RNs. I think it’s just a positive spin off that we happened to get. It was never an intentional thing but you know in terms of education, the bar has definitely been raised. I think a lot of our staff are stepping up and responding to it. A lot of our staff are encouraged (to do further study). For example, M is doing postgraduate studies now and she’s got a resource”. (RN)

“She educates as she goes. She’s always bringing around new articles with best practice”. (RN)

She always gives us feedback of whatever she has discussed with the GP”. (CM)

“It’s really beneficial that we have a nursing expert available. For example, with the incident and accident statistics that we collect like we had a lot of falls and so then we can target some specific education around falls management and prevention”. (QM)

“From a quality perspective we can use her for targeted education, and that’s been a big thing. For example we talk about skin infection if we had a lot of skin infections or slow wound healing then (NP) came round and did an education session specifically with the RNs around the pathology of wounds so that you’ve got a little more knowledge there”. (QM)

“She challenges you. You’ve got to come up with a reason. You’ve got to have all your facts”. (RN)

Resident-centred care

The multiple facets of the Nurse Practitioner role have enabled nursing care to be much more resident-centred. The inter-relationship between nurses and care givers, the Nurse Practitioner and the GP, families and residents means that interventions are more thorough, care plans are well documented and care is more holistic. The Nurse Practitioners’ ability to liaise with secondary services, such as accessing notes and discussing issues with other specialists has also increased the efficacy and efficiency of intervention. The Nurse Practitioner has been referred to as the “glue in the system” (qualitative interviews) and there is no doubt that this aspect will continue to be important as the role develops.

“From the perspective of client-centred care we can now provide instant change of care”. (RN)

“She’s also taken some of our difficult residents, not just behaviour but with multi-problems to the Elder Health team where they’re discussed. So that can be put up as a case study and so we get a quicker response from them and we get a better response in a sense because of the information that (NP) gives”. (RN)

“The communication flows have definitely improved and I think the other thing is the continuity of care with having a Nurse Practitioner ………..the role is quite different from just the medical model of care. And I think that’s really important – that we now have a resource that can assist with the other side of care, the other side of falls, behaviour management, quality management, chronic infections, and multi-co-morbidities - and problem solving. You tend to get a more ... practical client-centred approach to the management of problems rather than relying solely on a medical model. And I think that’s been a huge improvement”. (QM)

Reduction in anxiety

Another theme, which came from both care-givers and nursing staff, was the drop in anxiety now that they were able to call on the Nurse Practitioner for interventions, particularly when the weekend was approaching, and they thought that there was a resident who might require diagnosis and treatment. Many mentioned the sense of relief at being able to call on the Nurse Practitioner to help with problem solving. This led to the facility being a happier place to work, because there was less stress around.

“It’s less worry for us and the RNs because the people are getting seen quicker”. (Caregiver)

“You’ve got less stress so the charge nurse is happy and we’re happier. The patients are getting attended to quicker”. (Caregiver)

“And the residents are happier too because they are getting seen quicker”. (Caregiver)

“It’s peace of mind to them, (the residents) you can tell. Lots of them they’ll say that to us”. (Caregiver)

“And then you’d sit and stress should I, should I hold on, should I wait another day before I fax him, and .....Now I don’t have that – I couldn’t imagine having that right now”. (RN)

“It’s like you’re more comfortable, I mean you know that you have (NP) coming in on this day. Having a sick resident you used to have to monitor him until the GP comes next week or whenever. Now you know that someone is coming”. (CNM)
Facility level management

Three themes emerged from the two interviews held with facility management. The first of these is:

Strengthening the nursing structure and education of staff

There was strong support for the Nurse Practitioner role from facility managers, most notably because of its ability to improve the decision making of the nursing staff, increasing the knowledge base in education sessions, many of which could be specific to a particular issue, taking part in case studies and being involved in informal conversations.

“The impact of the role is significant in the support for the RNs, decision-making process, education and case studies that we have done with (NP)”.

“It has definitely added a strength and depth to our nursing team”.

“There is a lot of informal teaching going on, whether she has been asked to see them for a query UTI or whatever, and I know that our RNs have all commented on that they’ve learnt by having her here”.

One of the significant factors for managers was the time the Nurse Practitioner could spend with both residents and nursing staff. She is able to provide feedback to nurses and educate at the same time in a way that the GP just is not able to do because of the time constraints. The feedback is also in a nursing framework, so is more easily received and absorbed.

“Our vision was really to strengthen the nursing structure. On a daily basis she shares her knowledge. She’s very good at sharing her experience and knowledge and where we might be heading with pharmacology and what side effects. She also does education sessions here”.

Earlier intervention

The second theme is the importance of time spent with residents and the timeliness of the intervention which resulted in improved resident care. This theme recurred throughout the interviewing process not only with nursing staff but also management and GPs. For management a perceived difference was the timeliness of the intervention that resulted in improved patient care coordination. Not only is the patient seen more quickly, but the Nurse Practitioner was able to spend more time with the resident than a GP, as well as with family and nursing staff. This resulted in improved history taking and documentation.

“The patient care has been improved by more timely intervention. And (the NP) has more time to spend with the resident than a GP would. That’s actually significant because she spends more time with the family. She’s getting feedback from a more complete picture; she’s had time to get it from the family and the staff, from the GP notes, from the resident. It’s just a more thorough process now”.

“So the benefit for our residents is that they are possibly given more time when there is a healthcare assessment. She (NP) does go through their history more in depth, particularly in an informal role with the RN, spends more time, and gets to know the residents”.

“There is still more depth than the best GP would give in the sense of time-wise. And continuity of care – continuity is a great thing particularly when we don’t have it from GPs”.

Impact on GP recruitment

The third significant theme was the increased ability to attract GPs to the area when facilities were able to state that a Nurse Practitioner was visiting. Both managers referred to the lack of GPs in the Horowhenua area forcing them to rely on locums to provide medical oversight. They saw the Nurse Practitioner role being complementary to the GP and identified how important it was for the Nurse Practitioner to build a trusting relationship with the GP and get used to their prescribing practices. However there was no doubt that having a Nurse Practitioner helped lighten the load of the GP. One facility also said that when they lost their GP, it was the fact that the Nurse Practitioner role was in place that helped them to employ another GP.

“It made a huge difference for us – taking the pressure off the GP role, but also for us recruiting a GP that would actually help us because when they knew there was a NP on board we had a better response. We were able to get a doctor that was actually covering some of the other facilities to actually come and cover us. His two reasons for coming here were because we had such good nurses and nursing structure, and we had the Nurse Practitioner role”.

“We considered that the NP would work very closely with a GP but I didn’t realise just how hugely that would be to our benefit until it was actually put in place and we were in that situation”.

Managers were also able to identify that the trust and confidence that the GP has in the Nurse Practitioner is an important imperative to the success of the relationship.
General Practitioners

Link with Secondary Care

Three General Practitioners and one geriatrician were interviewed for this evaluation. Of the GPs, one is the GP for the rehabilitation ward at Facility B, one provides GP support to Facility A, and the third is the GP providing care for Facility B. All three GPs acknowledged the value of the Nurse Practitioner role in supporting them in their work with aged care facilities. They noted that they would not have been as attracted to their role in supporting aged care facilities if the Nurse Practitioner role had not been in place. A key benefit identified by the GPs and the geriatrician was the ability of the Nurse Practitioner to be a link between primary and secondary care.

“I see the NP as being able to not only spend the time so that she can comprehensively assess people but also communicate to gather information. And also the communication to secondary care teams who have outreach into the community, (NP) is able to talk the same language and at a specialist level”. (Geriatrician)

“She’s got access to the medical records at the hospital and I don’t. So she can get the notes out and just see what’s going on. So in a sense because she’s working for the PHO she can act as a liaison between primary healthcare and the DHB”. (GP)

Use of time

As in many areas, GP practices are under considerable strain to serve the general population, and with such a large older population this strain has led some GPs to reduce the provision of medical services to aged residential care facilities. Those that do provide this service acknowledge the time-saving element of the Nurse Practitioner role as being an absolute corollary to their decision to serve aged care facilities.

“They have the time to do an assessment in an in-depth way in a way that is not possible in a general practice. Both the duration of the consultation time and also I think the specialist skills that they have in health of older people whereas the GP is covering the whole life spectrum whereas (NP) is able to offer that specialist gerontology nurse skills”. (Geriatrician)

“(NP) will look at the list (GP’s list) and she’ll maybe cross half of them off. So she gets first look at the list and what she can deal with, and then our GP does the rest”. (CNM)

Level of skill

From a GP perspective the depth of the experience and skill level of the Nurse Practitioner is crucial to the way in which they can integrate into the health care team. Because of the stress on general practitioners generally, they need to be able to trust the Nurse Practitioner to pick up issues and work competently, otherwise GPs are left in a teaching role, which they don’t have time to do.

“I think in terms of the role it’s really good if you’ve got someone who’s actually a good, competent person. You run into all sorts of troubles if the person is not competent because you just can’t rely on or trust them”. (GP)

The Nurse Practitioner role involved the provision of three monthly visits to residents previously seen by a GP, assessment of acute presentation, UTIs, exacerbation of conditions, infections and so forth. The Nurse Practitioner will liaise with the GP when clients have complex health needs:

“As soon as she came on board my workload changed. It actually became harder for me in a sense because I had all the complex stuff and all the simpler stuff had gone. It did mean that I was able to spend more time on the difficult type thing”. (GP)

“In terms of the value and in particular of one who is very good I would say that it has been revolutionary in terms of the workload that I have. It’s been really positive because she has been able to take a lot of the work load off the routine sort of stuff that we’re doing”. (GP)

“We haven’t got the time to spend there and she really does a thorough job of the three monthly checks and makes sure if any tests need to be done”. (GP)
There are some frustrations centred on the extent of the RN role generally, and that for experienced RNs the legislation is very restrictive:

“There are a lot of RNs who could work more independently and take more responsibility for routine type problems but because of the legislation they’re not allowed to do that. So they always have to defer up to the GP. And basically I feel that sometimes I’m just rubber-stamping what the nurse says. I say yep, that’s fine, go ahead”. (GP)

This is where the role of the Nurse Practitioner is so useful:

“As a Nurse Practitioner, of course, they can actually take those decisions and not have to refer up. So I think the role is very useful for them to do that”. (GP)

There are, however, some issues around the extent of their prescribing ability. One GP felt that the Nurse Practitioner should be able to prescribe beyond their practicum. While all of the GPs found that having the Nurse Practitioner oversee the three month reviews has taken a large burden from them, there seemed to be some misunderstanding of the Nurse Practitioner’s ability to rewrite the charts.

“There are some issues around the Nurse Practitioner role in prescribing. There are some problems there I think because they do have this practicum and they design their own practicum which is fair enough. But it’s quite restricting in the sense of I might want them to go away and prescribe something and they say, well, I can’t do that. So then I’ve got to actually organise (the prescription). It’s the same with the three month reviews. She can change certain drugs but she can’t change others even under my instruction. And she can’t rewrite the charts and this is a specific issue in terms of Nurse Practitioners working in residential care”. (GP)

Collaboration

The third critical area where doctors saw the Nurse Practitioner role making a difference is in the area of communication and relationships. The geriatrician and the three GPs interviewed commented on the necessity of having a good working relationship with the Nurse Practitioner. It is clearly a collaborative relationship based on trust and confidence that the skills and also the boundaries are understood by both parties. As stated previously the confidence in the relationship between the Nurse Practitioner and the GP is acknowledged by management as being essential to the success of the role.

“The way that we would do it together is that we’ve both got the abilities to do those things (diagnostic investigations, treatment plans etc) but we have different strengths and weaknesses in different areas really. So I see someone like (NP) with her whole extended role is just incredibly useful for me in that she’s got a lot more experience at working in rest homes”. (GP)

“I will often come in and find that she has done lots of sensible things, intervened at an early stage. Say three or four days after I’ve been there something has developed and she’s sorted it out”. (GP)

“We’re finding it a collaborative partnership so to speak. I’m very comfortable with it and find it’s a positive experience for both. What I find good about (NP) is that she knows her limitations and her capabilities and if she is unsure she comes and checks”. (GP)

It is evident that the relationship between the GP and the Nurse Practitioner is central to the success of the role. For example, there are eight (8) GPs at one facility, rather than one dedicated GP. Only two of these GPs visit the facility. Therefore the relationship between eight GPs and the Nurse Practitioner is made more difficult because of the volume of communication that must occur. For a relationship to work well, the Nurse Practitioner needs to know how the GP works, their prescribing preferences, at what point they like to be called, what they are happy for the Nurse Practitioner to manage on their own – all of these are worked out over time – and it is very difficult to have eight very well-functioning relationships.
Operational management

Funding models

Both general managers of the intervention facilities were interviewed. Their concerns centred on the funding models for the Nurse Practitioner role. At present there are not many examples of Nurse Practitioners practising in aged residential care. The funding for this role is a shared arrangement between Central PHO, The Masonic Villages Trust and Enliven Presbyterian Support Central. All acknowledged the potential value of the role in an area that does not easily attract GPs, and hoped that it would help to establish a model that was sustainable in this environment. However there were differences in their views for the future. One aged residential care provider felt that the shared care arrangement was a useful one in aged residential care.

“From a sector perspective (a shared funding arrangement) has mileage and particularly when you look at a rural setting.....I think it is a very workable model”.

However the other aged residential care provider was looking for cost savings to offset the cost of the Nurse Practitioner. They remain concerned at the continued GP and ambulance costs.

“Our ambulance costs haven’t reduced at all. Our GP costs there (Levin) are higher than anywhere else”.

Availability of GPs

Both aged care organisations are naturally looking for a reduction in GP costs, however at the same time it was recognised that, paradoxically, a stable GP service is essential to maximising the value of the Nurse Practitioner role. Attracting and keeping GPs to provide not only a service to rural areas but also a service to aged residential care remains a major issue. A strong theme throughout identified the relationship between Nurse Practitioner and GP as a vital factor to the success of the role. It was also acknowledged that there was a risk in seeing the role as a replacement for a GP, a view which neither organisation supports.

“If I did this again on any other site I wouldn’t employ a Nurse Practitioner unless we had the whole GP relationship sorted out first. In one of our Palmerston North sites one of our GPs has a Nurse Practitioner in his practice and sometimes he comes and sometimes she comes. So we get a very different service from them”.

Both organisations commented on the fact that the funding models currently in place create an impediment to change, so to add a resource to providing quality aged care is very difficult.

“They are (the models) very prescriptive, they run on bed occupancy, and they don’t allow a lot of variation. The additional resource that has been put in by us and PSC is not funded obviously, and I think it ultimately delivers a better quality care”.

Family experiences

Families of residents who had been involved with the Nurse Practitioner were contacted for interview, but only one was available to meet with the researcher. This was a useful interview as the interviewee had supported two parents in residential care, both in different facilities, so was able to compare the care given to both. She reported that she felt the care of her mother had been enhanced by the presence of the Nurse Practitioner as her higher level of training meant that things “did not get missed”.

“the experience I’ve had with the two different sort of rest home situations was....you know....I couldn’t actually speak highly enough of (NP) because she has got so much training, so much knowledge......and I felt confident that all the policies and procedures were in place, I suppose, you know, so that certain things don’t slip through the net unnoticed, that sort of thing”. (Mrs B)

She also reported that she felt confident in the communication channels within the facility, and was relaxed about the relationship between the GP and the Nurse Practitioner.

“She (NP) was obviously involved with my mother’s care as was the GP for the rest home. So any issues or anything that needed discussing with the family it was either (NP) or the GP. But often (NP) perhaps was the first point of contact”. (Mrs B)

“I felt their (NP) professional boundaries are greater than a registered nurse would be. So they have the ability to have their own case load. In that respect therefore I guess that I felt quite happy talking with (NP) regarding my mother’s care rather than necessarily having to talk with the GP. I think at one stage they were having trouble with one particular drug, getting the right level. So she did talk to me about that and also about discontinuing a medication as well, which I was quite happy about”. (Mrs B)
Discussion

Accessibility, appropriateness and effectiveness of care

Numerous work studies have indicated nurses spend less than half their time delivering direct patient care. The few published studies in aged care have estimated that registered nurses provided only 12 minutes of direct care per resident per day, considerably less than the estimated 2.5 hours per day per patient in an acute care setting (Poppleton and Cox 1988). A more recent study investigating Nurse Practitioner work patterns across Australia found the nurses spent an equal amount of time across direct care, indirect care and service related activity (Gardner et al 2010). This raises questions concerning the most efficient use of a Nurse Practitioner’s time.

Prescription data was obtained from the Nurse Practitioner’s clinical records. The pharmaceuticals most frequently prescribed by the Nurse Practitioner were oral antibiotics, skin applications, and laxatives. These results correlate with the medical diagnosis of residents (Tables 10 and 11). The timeliness of prescribing and the administration of pharmaceuticals are suggested as key benefits to residents as indicated by the informants. Treating older frail residents early in this trial has reduced avoidable admissions to hospital and unnecessary presentations to the emergency department.

Prescribing information was collected by the research team from a random sample of residents’ charts from the three intervention facilities. These audit results showed that, compared to General Practitioners, the Nurse Practitioner stopped a number of medications previously prescribed. This suggests that as part of direct care the Nurse Practitioner actively monitored the residents’ medical conditions and discontinued medications no longer required.

Reduction in Acute Presentations to the Emergency Department and Hospitalisations

In 2010, the International Association of Gerontology and Geriatrics identified several clinical concerns and quality of care issues within aged residential care, thus highlighting a growing urgency to improve care for frail older people. The need to value the expert knowledge and skills of advanced nursing has been identified as the number one priority to enhance quality of care in the sector (Tolson, et al 2010).

This evaluation of the Nurse Practitioner role in aged residential care has shown that a Nurse Practitioner with expert gerontology clinical skills and knowledge who works in collaboration with the primary health team (primarily the General Practitioners) can significantly reduce hospital admissions and emergency department presentations. It is evident that there are a number of areas where the role of the Nurse Practitioner contributes to a reduction of unplanned admissions to hospital. Informants viewed the ability to respond promptly, to organise diagnostic tests, prescribe appropriately and quickly, and to be available for consultation as key success factors.

These positive outcomes and cost benefits are not only significant for aged care residents and MidCentral DHB overall, but will contribute to the small but growing body of international evidence supporting the impact nurse practitioners have on resident outcomes. This evidence can encourage healthcare organisation to design and implement new models of care in aged residential care facilities and educationalists to design advanced nursing courses to prepare the workforce to engage in these new roles.
Primary Health Care led collaborative partnerships and integrative working

The perceived acceptance of the new role within a traditional medical model was critical to the success of the project. Previously, most initiatives in the residential care sector have focused on improving quality of care including reducing falls, medication errors and pressure ulcers. Very little has been invested in improving the overall health of the residents as described in this intervention. Qualitative insights from informants reflect an underlying acceptance of the Nurse Practitioner role within the interdisciplinary team. The project findings have demonstrated that acceptance of the role is a prerequisite to collaboration and therefore one of the success factors of the intervention.

General Practitioners recognised the benefits of collaborating with the Nurse Practitioner and the building of relationships and trust were two key factors that contributed to successful partnerships in care. This open communication between General Practitioners and Nurse Practitioners undoubtedly contributed to the reduction in avoidable hospitalisations and presentations to emergency department. Internationally, evidence has shown the acceptance of an aged care Nurse Practitioner into a primary health team promoted early response to acute health problems which lead to improved health outcomes for residents. This included reduced hospital admissions and emergency department presentations. The recent evaluation of the Nurse Practitioner role in six pilot aged care facilities in Australia showed the level of support and acceptance of the role increased from 65% prior to the pilot commencing to an overwhelming 95% at its completion as staff understood the impact that the Nurse Practitioner role provided to the wellbeing of the residents (Joanna Briggs Institute, 2007).

Some informants indicated that the acceptance of the Nurse Practitioner role was affected by funding issues. Currently, the Nurse Practitioner position is funded by the Central PHO and the two Aged Care providers and it has been suggested that this is unsustainable. For ongoing success of the role sustainable funding models need to be developed.

Issues regarding the recruitment and retention of expert nurses to the aged care sector have been well documented over the past decade (Tolson, 2011). These issues include lack of peer support and working in isolation as well as relatively low status and lower rates of pay than nurses working elsewhere in the health care sector (Tolson, 2011). With an ageing nursing workforce and a growing ageing population attracting nurses to work in this sector is paramount. Although staff retention rates were not recorded during the intervention period there were qualitative insights that identified happier staff make for a happier work environment. The support and mentoring provided by Nurse Practitioners may be associated with retaining registered nurses.

Attracting GPs to work in rural areas (including Horowhenua) has been a challenge in New Zealand for a number of years. The existence of a Nurse Practitioner working specifically in the local aged residential care facility was the main draw card for one GP considering working in Horowhenua. The broad skill-set, including advanced clinical diagnosis and prescribing, that a Nurse Practitioner brings to the multidisciplinary team helps manage the heavy workload that is common in many rural practices.

Although the General Practitioners in this trial embraced the Nurse Practitioner role, other groups may oppose it due to the limited understanding of the role amongst the general community and health professionals. It is worth noting that, in this trial, 5% of the Nurse Practitioner’s non-contact time was spent educating health professionals and others about the role.

A focused public awareness campaign designed to explain the role and its benefits will be an important precursor to its wider dissemination.

Two emerging themes regarding the characteristics of clinical leadership were made explicit by the informants in this trial. They viewed leadership firstly as demonstrating expert nursing knowledge and clinical skills, and secondly as promoting and facilitating learning opportunities for all staff both at the bedside and in formal education sessions.

Previous evidence has suggested that Nurse Practitioners in aged care can play a significant role in providing clinical leadership to this sector (Hogstel and Cox, 1995; Arbon et al, 2008). There is considerable evidence both nationally and internationally, that suggests registered nurses in the aged care sector generally work in isolation, have limited post graduate education and are less likely to access evidence based practice resources to inform practice (Tolson et al, 2011). This is partially due to lack of computer skills, limited access to computer and time constraints. While it is sometimes a challenge to engage registered nurses in evidence-based practice the Nurse Practitioner in this pilot encouraged the registered nurses to practice according to best practice guidelines at every opportunity.
The clinical support and education provided by the Nurse Practitioner to the registered nurses was valued by them and contributed to the clinical leadership in this model of care. A recent review showed a correlation between the clinical leadership from a Nurse Practitioner and the quality of care provided to residential care residents thus demonstrating that a Nurse Practitioner can have considerable influence on the overall quality of life of residents in aged care settings (Arbon, 2008).

Clinical leadership was further demonstrated by the Nurse Practitioner’s ability to work across boundaries. The Nurse Practitioner in this trial worked with various agencies and systems, integrating health services for residents. This has been termed ‘trans-boundary practice’ in the literature. The term refers to flexible practice across boundaries that improve quality of care (Bail et al, 2009). This view is supported by recent research that suggests effective clinical leadership requires the clinician to understand the complexities within the health care system and to be comfortable working both within and without these systems for the benefit of their clients (Swanwick & McKim, 2011). Arbon et al (2008) refers to clinical leadership in the aged care sector as promoting expert nursing care, facilitating learning and initiating system changes, where necessary (Arbon, 2008). The willingness of the Nurse Practitioner to straddle both primary and secondary health systems reflects the commitment and dedication to the role and which has resulted in positive outcomes for the residents.

**Increased capability, competence and confidence**

The interventions of the Nurse Practitioner have been effective in reducing healthcare utilisation for older people residing in aged residential care. In effect, the Nurse Practitioner intervention increased the capacity of the primary care team to deliver co-ordinated care to their older population. The advanced skills of the Nurse Practitioner complement the medical skills of the General Practitioner and this relationship is built on a foundation of good communication and trust. The Nurse Practitioner does not replace GP care, but rather enhances the overall capability and capacity of the primary healthcare team. It was the view of all informants that a combination of these factors contributed to the success of the model. GPs felt that they were constrained by lack of time and heavy workloads and they reported that the Nurse Practitioner alleviated pressure points. Time flexibility and the ability of the Nurse Practitioner to visit the facilities regularly were unanimously agreed by interviewees to improve the care of residents. Timeliness of the intervention in diagnosing and treating acute medical problems in this frail population clearly had a positive effect on healthcare outcomes. Additionally facility staff felt that working with the Nurse Practitioner had a positive impact on reducing their anxiety and stress.

It is evident that the advanced clinical skills and knowledge of the Nurse Practitioner allow her to initiate treatment earlier rather than waiting for direction or a visit from the General Practitioner, as occurred prior to the pilot project. Informants noted that a combination of advanced clinical skills and critical thinking grounded in evidence-based nursing practice differentiates the Nurse Practitioner from the registered nurse working in a facility and this Nurse Practitioner difference has been reported internationally as well (Gardner et al, 2010). It was the view of all informants the ‘point of difference’ between the Nurse Practitioner and the GP working in the intervention facilities was ‘the overall patient care coordination’. This approach led to overall improved quality of care for residents. Patient care coordination focuses on obtaining an in-depth resident history, care planning and concise documentation and as a result increases timeliness of care. Clearly this integrated approach is effective and reflects more focused resident-centred care.

Administration activities featured highly in non-direct care activities. This evaluation found that addressing the capability and compatibility issues across MedTech, secondary care patient information systems and aged care information systems would alleviate a considerable amount of unnecessary administration activity for the Nurse Practitioner and General Practitioners. There is growing international evidence that administration tasks relating to patient care is onerous and decreases time available for resident care. Studies in the USA show that administration tasks have become a key activity for Nurse Practitioners primarily because of the legislative documentation requirements across all states. A recent Australian aged care Nurse Practitioners evaluation noted that the ‘burden of administration activities’ required in the sector is well recognised and consistently reported (Pearson, 2002).

Clinical responsiveness by the Nurse Practitioner to provide timely assessments and interventions for residents was valued by respondents. This was in part due to the Nurse Practitioner’s ability to ‘act as the glue’ across primary and secondary care and the local community. The exemplary personal qualities of the Nurse Practitioner contributed to this positive outcome and promoted an integrated service delivery...
model. Internationally, fragmented rural healthcare services hamper best practice. However, the Nurse Practitioner role has been found to improve access and timeliness of care for vulnerable populations including older people (Martin-Misener et al, 2004; Arbon et al, 2009). Not only has the Nurse Practitioner closed the gap by providing timely care, but the model transcends boundaries to provide a flexible and integrated nursing service to improve the resident’s care journey and healthcare outcomes.

The presence of the Nurse Practitioner played a role in reducing anxiety and stress levels in the intervention facilities which contributed to a ‘happier’ workforce. Although job satisfaction was not measured formally, the informants’ enjoyment at work and job satisfaction was noted in the qualitative interviews and they attributed this to the direct involvement of the nurse practitioner in their facility. In future Nurse Practitioner evaluation trials, it would be valuable to measure job satisfaction of aged care staff in a systematic way.

Providing a resident-centred approach to care delivery in aged care has a role in changing staff’s behaviour (Kane, 2001). Long term care facilities that practise resident centred care which included a Nurse Practitioner have been associated with less staff burnout and turnover (Cohen-Mansfield, 1997). Providing feedback about quality of care indicators to staff resulted in performance changes and decrease in falls and constipation. Rantz et al. (1996) also found that additional intensive support from a Gerontology Nurse Specialist or Nurse Practitioner, significantly changed clinical practice and improved resident outcomes.

The aged care facilities have indicated that funding the Nurse Practitioner role is not sustainable long term, unless the direct cost benefits can be evidenced. Lack of standardisation across the aged care sector made it difficult collecting data on quality indicators as identified above.

Limitations

The lack of a standardised patient information system in the aged care facilities made it difficult to obtain quality residential care data and reliable historical resident data as evident by the anomalous resident months in one comparative facility and therefore the accuracy of the comparison post-intervention data may under-represent resident numbers.

Furthermore lack of standardisation across the aged care sector made it difficult collecting data reporting quality indicators such as falls, urinary tract infections and pressure injuries. This problem will be solved to some degree following the introduction of the interRAI assessment instrument.

There is the possibility that having one Nurse Practitioner as the focus of the evaluation may influence the overall evaluation because the personal qualities of the Nurse Practitioner may be different from other Nurse Practitioners in similar roles.

The intervention facilities self-selected prior to the evaluation and agreed to fund the Nurse Practitioner position. The independent research team used purposeful sampling to match the comparison facilities in ownership type and size of intervention facilities. Despite this matching, some selection bias may have occurred because the total number of facilities across the Horowhenua area is limited. The research team were not blinded to the intervention and comparative aged care facilities nor blinded to the Nurse Practitioner providing the service. This may have had an overall effect on the rigor of the evaluation. In order to minimise this possible effect, only one member of the research team collected the quantitative data and conducted the majority of in-depth interviews and focus groups with informants.

No residents and only one family were able to be interviewed as part of this evaluation.
Conclusion

The implementation of the Nurse Practitioner role in three aged care facilities was effective in preventing presentations to the emergency department and in reducing hospital admissions. The role was viewed positively by General Practitioners, hospital specialists and aged care staff and the collaborative partnerships established were critical to the success of the initiative. The Nurse Practitioner role provided effective clinical leadership within the aged care facilities, reducing stress and improving work performance. General Practitioners were more attracted to working in the sector knowing they had the clinical support provided by the Nurse Practitioner role. Given the success of this initiative, serious consideration should be given to the spread of this model of care with Nurse Practitioners: Older Adult working in partnership across primary and secondary services and in Aged Residential Care settings.

Recommendations

1. The current Nurse Practitioner: Older Adult model of care in aged residential care in the Horowhenua is continued.

2. A standardised patient information system for aged residential care facilities is developed. (Though it is noted that this problem may be solved to some degree following the introduction of the interRAI assessment instrument.)

3. Address the capability and compatibility issues across MedTech, secondary care patient information systems and aged care information systems to alleviate a considerable amount of unnecessary administration activity for the Nurse Practitioner and General Practitioners.

4. A standardised information system is developed that will assist in measuring the savings to the health system including ambulance transport; hospital admissions; bed stay days; and polypharmacy.

5. A further evaluative study is conducted to further measure the impact of the Nurse Practitioner on reducing emergency department presentations per potentially avoidable diagnoses.

6. A public awareness campaign is developed to inform the sector about the benefits of the Nurse Practitioner in aged care.

7. The Nurse Practitioner role must be established in a collaborative partnership with general practice teams, primary health care, acute and specialist services and facility staff.

8. The outcomes of this initiative on GP recruitment, retention and job satisfaction be shared with national GP leaders through, for example, publications and presentations.

9. Strategies for the spread of the innovation are established, through the Ministry of Health, Health Workforce New Zealand and the Regional Training Hubs.

10. The improved workforce knowledge and move towards aged care settings as learning organisations through Nurse Practitioner led practice development is significant and should incorporate the interdisciplinary team to maximise resources and ensure sustainability.

11. The number of Nurse Practitioners working in the MidCentral DHB aged care sector is expanded. This will allow more aged care facilities in the area to have access to the advanced nursing practice expertise provided by the Nurse Practitioner.

12. The funding model currently used for the employment of the Nurse Practitioner is reviewed by MidCentral DHB, Central PHO, Masonic Villages Trust and Enliven Presbyterian Support Central including the use of financial modelling and benefits realisation.

13. Scoping of potential models of care for providing primary health care services to Aged Residential Care Facilities be undertaken.
References


Cornwall, J., & Davey, J. (2004). Impact of population ageing in New Zealand on the demand for health and disability support services, and workforce implications. Welling, New Zealand: New Zealand Institute for Research on Ageing (NZIIRA) and the Health Services Research Centre (HSRC), Victoria University of Wellington.

Gadman, JRF, Chikura, G. (2011). *Medical Crises in Older People: Nurse practitioners in UK care homes*. University of Nottingham and the Nottingham University Hospital NHS Trust, UK. Discussion paper series ISSN 2044 4230.


Appendix 1: CHIPS Data
– Nurse Practitioner Activity

CHIPS Summary Data

Nurse Practitioner Activities

Graphs for January 2012 – December 2012
Figure 1: Total Number of patients Seen by NP by Month

Figure 2: Total Units by NP by Month

Figure 3: Initial Visit ARC by NP by Month
Figure 4: Follow-up ARC by NP by Month

Figure 5: MDT Meetings by NP by Month

Figure 6: Initial Phone Call and Phone Consult by NP by Month
Figure 7: Preventing Acute Presentation by NP by Month

NP "Prevent Acute Presentation" (PAP) by Month

![Graph showing Prevent Acute Presentation by NP by Month]

Figure 8: Holistic Health Assessment by NP by Month

NP "Holistic Health Assessment" (HHA) by Month

![Graph showing Holistic Health Assessment by NP by Month]

Figure 9: Consult with GP by NP by Month

NP Consult with GP by Month

![Graph showing Consult with GP by NP by Month]
Figure 10: Diagnostic Investigations by NP by Month

NP Diagnostic Investigations (DIA) by Month

October | November | December | January | February | March | April | May | June | July | August | September
---|---|---|---|---|---|---|---|---|---|---|---
100 | 128 | 74 | 6 | 3 | 102 | 85 | 55 | 87 | 70

Q2 | Q3 | Q4

Figure 11: Consult with Other by NP by Month

NP "Consult with Other" (CON) by Month

October | November | December | January | February | March | April | May | June | July | August | September
---|---|---|---|---|---|---|---|---|---|---|---
12 | 20 | 13 | 21 | 15 | 21 | 9 | 4 | 5 | 11 | 16

Q2 | Q3 | Q4

Figure 12: Client Intervention/Management Development (CID) and Client Intervention Review (CIR) by NP by Month

NP Client Intervention/Management Development (CID) & Client Intervention Review (CIR) by Month

October | November | December | January | February | March | April | May | June | July | August | September
---|---|---|---|---|---|---|---|---|---|---|---
8 | 20 | 28 | 15 | 34 | 38 | 52 | 65 | 53 | 40 | 13 | 15
Figure 13: Medication Prescribing (MP) and Medication review (MED) by NP by Month

NP Medication Prescribing (MP) and Medication Review (MED) by Month

Figure 14: Consultant Including Strategic Plan/Project Work by NP by Month

NP Consultant inc. Strategic Plan/Project Work (LC) by Month

Figure 15: Supervision given/Received by NP by Month

NP Supervision Given/Received by Month
Figure 16: Education re NP role to GP/Individual by NP by Month

NP Education re. NP role to GP/Individual (LE) by Month

Figure 17: Clinical Inquiry General & Clinical Inquiry Specific Patient Problem (CI) by NP Month

NP Clinical Inquiry General (CIG) & Clinical Inquiry Specific Patient Problem (CI) by Month

Figure 18: Health Promotion/Advice to GPs (EDG) & Health Advice/Promotion to Client/Whanau (EDI) by NP by Month

NP Health Promotion/Advice to GPs (EDG) & Health Advice/Promotion to Client/Whanau (EDI) by Month
Figure 19: Study Leave by NP by Month

NP Study Leave by Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Study Leave by Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>30</td>
</tr>
<tr>
<td>November</td>
<td>25</td>
</tr>
<tr>
<td>December</td>
<td>112</td>
</tr>
<tr>
<td>January</td>
<td>14</td>
</tr>
<tr>
<td>February</td>
<td>4</td>
</tr>
<tr>
<td>March</td>
<td>5</td>
</tr>
<tr>
<td>April</td>
<td>19</td>
</tr>
<tr>
<td>May</td>
<td>11</td>
</tr>
</tbody>
</table>

NP Activity January 2012 - December 2012

- Initial Visit ARC, 16.57%
- Follow-up ARC, 6.15%
- MDT meeting, 3.13%
- Study leave, 2.29%
- Patient not available, 0.02%
- Travel, 3.33%
- Consult with other, 1.60%
- Acceptance of referral and decision, 0.22%
- Referrals other, 0.14%
- Acceptance of referral and decision, 0.22%
- Diagnoses investigations, 7.39%
- HHA/NP, 5.98%
- Consult with GP, 0.62%
- Phone consult, 0.62%
- Patient not available DNA, 0.02%
- Initial phone call, 0.11%
- Prevent acute presentation, 1.18%
- Initial paper investigation, 0.30%
- Consult with GP, 0.46%
- Consult with other, 1.60%
- Administration re patient notes/MedTech, 7.88%
- Consult with GP, 0.46%
- Consult with other, 1.60%
- Diagnostic investigations, 7.39%
- Travel, 3.33%
- Consult with GP, 0.46%
- Prevent acute presentation, 1.18%
- Initial phone call, 0.11%
- Referral to other, 0.14%
- Client intervention/management, 3.64%
- Administration re patient notes/MedTech, 7.88%
- Consult with other, 1.60%
- Consult with GP, 0.46%
- Prevent acute presentation, 1.18%
- Initial phone call, 0.11%
- Referral to other, 0.14%
- Client intervention/management, 3.64%
- Administration re patient notes/MedTech, 7.88%
- Consult with other, 1.60%
- Consult with GP, 0.46%
- Prevent acute presentation, 1.18%
- Initial phone call, 0.11%
- Referral to other, 0.14%
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- Consult with GP, 0.46%
- Prevent acute presentation, 1.18%
- Initial phone call, 0.11%
- Referral to other, 0.14%
- Client intervention/management, 3.64%
- Administration re patient notes/MedTech, 7.88%
## Appendix 2: Qualitative Interview Guide

### Semi Structure Interview Guide and Prompts

**Evaluation of Nurse Practitioner Role**

<table>
<thead>
<tr>
<th>Interview Guide</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell me about your experiences working with the NP</td>
<td>Has it meet your expectations&lt;br&gt;Vision&lt;br&gt;Strengthen/weakened the workforce</td>
</tr>
<tr>
<td>Has the role made a difference to the quality of care of the residents</td>
<td>Reduced admissions to hospital&lt;br&gt;Prescribing activity&lt;br&gt;Impact on the staff in the facility&lt;br&gt;Improved outcomes for unwell residents&lt;br&gt;Ask for examples of cases to illustrate view points</td>
</tr>
<tr>
<td>Tell me what you see as the differences between the NP role and the GP’s role</td>
<td>On the residents and families&lt;br&gt;On staff and other members of the health team.</td>
</tr>
<tr>
<td>How well do you think the role was explained prior to the NP commencing in her role</td>
<td>Communication&lt;br&gt;Was it adequate? if not what would have helped to understand the role better.</td>
</tr>
<tr>
<td>What impact do you think the role has had on up skilling the nursing workforce</td>
<td>Critical thinking&lt;br&gt;Accessing evidenced based material&lt;br&gt;Clinical assessments&lt;br&gt;Nursing leadership</td>
</tr>
<tr>
<td>Describe how the relationship with the NPs and GPs works</td>
<td>Collaboration&lt;br&gt;Case and medication reviews&lt;br&gt;Allocation of residents/triaging</td>
</tr>
<tr>
<td>In relation to the expectations of the role has it meet your expectations or exceeded or not?</td>
<td>Obtain examples to illustrate how these expectations were met or not met.</td>
</tr>
<tr>
<td>Talk to me how you work with the NP and how well it does work.</td>
<td>Explore the strengths and weakness of the role</td>
</tr>
<tr>
<td>Can you think of anything that might be added to her role to support you</td>
<td>explore in-depth those that they have stopped/ started or continued and why</td>
</tr>
<tr>
<td>NB</td>
<td>Explore the negative and positive responses during the interviews</td>
</tr>
</tbody>
</table>
## Appendix 3:
### Nurse Practitioner Prescribing Data

<table>
<thead>
<tr>
<th>Prescription Description</th>
<th>No. Prescribed</th>
<th>Prescription Description</th>
<th>No. Prescribed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye/Ear Preparations</strong></td>
<td>4% Total RX</td>
<td>Antibiotics</td>
<td>26% of Total RX</td>
</tr>
<tr>
<td>Chloramphenicol eyedrops</td>
<td>8</td>
<td>Doxycycline 100mg caps</td>
<td>6</td>
</tr>
<tr>
<td>Waxsol</td>
<td>1</td>
<td>Amoxycillin 500mg</td>
<td>12</td>
</tr>
<tr>
<td>Naphcon forte 0.1%</td>
<td>1</td>
<td>Amoxycillin 250mg / 5mL suspens</td>
<td>4</td>
</tr>
<tr>
<td>Polytears</td>
<td>2</td>
<td>Fluclaxacillin 500mg</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11</td>
<td>Fluclaxacillin 250mg</td>
<td>3</td>
</tr>
<tr>
<td><strong>Skin Preparations and Creams</strong></td>
<td>40% of Total RX</td>
<td>Curam Duo</td>
<td>1</td>
</tr>
<tr>
<td>DP HCI% lotion</td>
<td>3</td>
<td>Norflaxacin 400mg</td>
<td>10</td>
</tr>
<tr>
<td>Cocoasclp lotion</td>
<td>4</td>
<td>Ciproxin 500mg</td>
<td>1</td>
</tr>
<tr>
<td>Daxlozin cream</td>
<td>32</td>
<td>Ciproflozin 250mg</td>
<td>1</td>
</tr>
<tr>
<td>HealthE cream</td>
<td>5</td>
<td>Nitrofurantoin 50mg</td>
<td>11</td>
</tr>
<tr>
<td>Viaderm KC cream</td>
<td>11</td>
<td>Trimethoprim 300mg tabs</td>
<td>10</td>
</tr>
<tr>
<td>Vitamin A cream</td>
<td>6</td>
<td>EES 400mg/5L</td>
<td>1</td>
</tr>
<tr>
<td>Clotrimazole 1% cream</td>
<td>4</td>
<td>Cefuroxime tabs 250mg</td>
<td>2</td>
</tr>
<tr>
<td>Aqueous cream</td>
<td>10</td>
<td>TOTAL</td>
<td>68</td>
</tr>
<tr>
<td>Moucol</td>
<td>4</td>
<td>Cardiac Medications</td>
<td>1% of Total RX</td>
</tr>
<tr>
<td>Miconazole cream</td>
<td>1</td>
<td>Metaprolol 75mg</td>
<td>1</td>
</tr>
<tr>
<td>Voltarin emulgel</td>
<td>4</td>
<td>Frusemide 40mg</td>
<td>1</td>
</tr>
<tr>
<td>Daktaclor cream</td>
<td>1</td>
<td>Quinapril 10mg tabs</td>
<td>1</td>
</tr>
<tr>
<td>Pinetarsol lotion</td>
<td>3</td>
<td>TOTAL</td>
<td>3</td>
</tr>
<tr>
<td>Pimafucort ointment</td>
<td>1</td>
<td>Diabetes Supplies</td>
<td>2% of Total RX</td>
</tr>
<tr>
<td>Hydrocortosone cream 1%</td>
<td>9</td>
<td>Insulin syringes ½ ml</td>
<td>2</td>
</tr>
<tr>
<td>Batrafen nail lacquer</td>
<td>3</td>
<td>Accuchecck strips</td>
<td>3</td>
</tr>
<tr>
<td>Ultraproct ointment</td>
<td>3</td>
<td>TOTAL</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>104</td>
<td>Inhales</td>
<td>1% of Total RX</td>
</tr>
<tr>
<td>Supplements and Vitamins</td>
<td>5% of Total RX</td>
<td>Solbutamof Inhaler</td>
<td>1</td>
</tr>
<tr>
<td>Fortisip 200ml</td>
<td>1</td>
<td>Ipratropium Inhaler</td>
<td>1</td>
</tr>
<tr>
<td>Twocal cans</td>
<td>2</td>
<td>TOTAL</td>
<td>2</td>
</tr>
<tr>
<td>Sustagen hospital formula</td>
<td>1</td>
<td>Pain Relief Medication</td>
<td>8% of Total RX</td>
</tr>
<tr>
<td>Multi Aid capsules</td>
<td>1</td>
<td>Paracetemol 500mg</td>
<td>13</td>
</tr>
<tr>
<td>Ferratob</td>
<td>1</td>
<td>Paracetemol 250mg/5ml syrup</td>
<td>5</td>
</tr>
<tr>
<td>Vitatabs</td>
<td>1</td>
<td>Codeine Ph 300mg</td>
<td>1</td>
</tr>
<tr>
<td>Cholecalciferol</td>
<td>6</td>
<td>Panadeine 500mg</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13</td>
<td>TOTAL</td>
<td>20</td>
</tr>
<tr>
<td>Laxatives</td>
<td>6% of Total RX</td>
<td>Oral Care Preparations</td>
<td>3% of Total RX</td>
</tr>
<tr>
<td>Lactulose</td>
<td>6</td>
<td>Nilistat oral drops</td>
<td>2</td>
</tr>
<tr>
<td>Laxsol tabs</td>
<td>9</td>
<td>Nystatin oral drops</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15</td>
<td>Chlorhexadine mouthwash</td>
<td>2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>6% of Total RX</td>
<td>Strepsil lozenges</td>
<td>1</td>
</tr>
<tr>
<td>Lucusol drops</td>
<td>1</td>
<td>TOTAL</td>
<td>7</td>
</tr>
<tr>
<td>Stematil 5mg</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone 1mg</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone 5mg</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microme-H</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evelyte sachets</td>
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<td>Bonjela</td>
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TOTAL Medicines Prescribed = 263