Evaluation of ACE in residential aged care: The impact of a point-of-care system on residents and staff Baseline & Interim Reports

2020

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Evaluation of ACE in residential aged care: impact of a point-of-care system on residents and staff - Baseline Report

2020

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Executive Summary

Background

This study aim is to conduct an independent evaluation of SmartCare[1] implementation into residential aged care. The outcomes are expected to contribute to an evidence-base for sustainable technology systems that promote care documentation and decision-support systems in residential aged care that achieve quality, comprehensive and resident-focussed care. The study approach utilises participatory action research with concurrent mixed methods to evaluate and understand how SmartCare affects the acceptability, efficiency and quality of care in the aged care setting in a two-year implementation at Jindalee Aged Care Residence. This report provides information on the baseline data collected prior to implementation.

Research process

After an unexpected interruption requiring isolation of some residents and staff, data collection commenced in March 2019. The response from staff and residents to the research has been very positive. Data collection targets were met in March 2019, with 100 participants consented (return rates were 30.1% of staff, and 35% of residents). Step counts were measured over 66 shifts; and 57 hours of time and motion data were collected (data reliability was excellent with inter-rater agreement at 91.2%-97.4%). The first 4 hours of the morning shift was the focus of data collection as the activities performed at this busy time are reasonably consistent and this time is expected to be most impacted by the implementation of the SmartCare system. Lower than expected response rates were obtained for some quantitative measures of quality of life, missed care, and satisfaction (net promotor) surveys, but the results are sufficient for proposed analyses. The pre-digital service documentation audit is outstanding and a plan is in place to collect this data prior to Stage 2. Residents were thanked for their participation with a well-attended afternoon tea; staff were given gift vouchers as appreciation of their participation, and baseline data analyses were reported to participants at Jindalee and included their communication newsletter 'Jinderjabber'.

Findings

Staff were found to multitask 61% of the time, with nurses multitasking significantly more often than care workers. Staff switched which resident they were focussed on an average of 18 times per hour, or every 3 minutes. Nurses switched care tasks more often than care workers. Staff spend most of their time on 'Direct care' (49.1%), followed by 'Indirect Care' 42.1%. Very little time (only 4.7%) was spent on 'Hunting and Gathering', and the remaining 4.1% on 'System Care'. Within the 'Direct Care' category 'communication with residents/visitor' was the most common activity observed (average 28 care minutes/hour), followed hydration/nutrition care (average 6 minutes/hour), and mobilisation (average 4 minutes/ hour).

Over the four-hour observation periods, communication comprised 40.8% of all care minutes, and documentation was 7% of total care minutes. Nurses spend an average of 5 minutes per hour documenting or searching for documentation, whereas care workers spend less than one minute doing the same. However, it is important to acknowledge that documentation was not a common activity during the data collection period of the first four hours of morning shifts and more

[1] Note software name was changed from Smartcare to ACE in the course of the two year implementation and evaluation.

documentation was done in the afternoons. A significant correlation was identified between the number times that staff switched resident focus and interruptions from colleagues (r=0.41, *p*=0.006) and interruptions by other residents or visitors (r=0.32, *p*=0.04). Documenting (including reading or searching) had mean care time of 8.5 minutes (range 0-56 minutes). Nurses walk an average 4818 steps in the first half of a shift, equivalent of 1km per hour; care workers walked 3977 steps in the first half of their shift, or 0.8km per hour.

Satisfaction scores were generally high, with nearly 60% resident/visitors and 70% staff reporting high agreement (8-10/ 10) indicating they would 'definitely recommend this facility to their family and friends'. Residents and their visitors reported lower rates of missed care when compared to staff, with the majority (67%) of resident respondents reporting no care was missed in the last 48 hours, compared to the majority of staff (79%) who reported between 1-20% of care was missed. This finding suggests staff are mindful of their responsibilities for quality of care and their desire to do more for residents, which was also evident in the qualitative data. The satisfaction with quality of care is likely due to consistency of care. This consistency of care currently happens through a reliance on long term staff and verbal handovers.

The qualitative data revealed that current documentation structures mean that it is not feasible for casual care workers to check all their assigned resident folder front sheets at the beginning of their shift to understand resident care needs. Instead, they rely on verbal handovers from more experienced staff, and a shorthand handover book as well as environmental cues such as a wheely walkers to know what the resident needs. Changes in care needs and staff unfamiliar with routines impacts the effectiveness of the current system. Auditing requirements determine what is documented and it is currently frequently necessary to duplicate this documentation. Consequently, what is documented can be time consuming to read, and not necessarily useful for care planning or evaluation. These qualitative findings from the baseline evaluation are summarised against the project evaluation framework Table 0.1.

Key opportunities for benefits of technology

- Documentation duplication
- Distance to document
- Regularity of documentation, contemporaneousness
- Interruptions
- Patient preferences, changes to care plan
- Complement verbal handovers with digital reminders
- Improved care quality (such as reductions in missed care, increased care activity (quantum), resident and staff satisfaction with delivered care)
- Improved resident outcomes (fewer incidents, fewer hospital transfers, satisfaction (resident reported/nurse reported/relative reported, time outside, participation in recreational activities, earlier recognition of resident deterioration)
- Higher satisfaction/lower stress levels with staff

Table 0.1 Baseline qualitative findings coded to the evaluation framework

Aims	Objectives	Baseline themes – experience of the current system of care prior to implementation
Acceptability	1.Reduced time spent retrieving information and documenting care	- Documentation is time consuming - Reading is time consuming and not necessarily useful - Duplicate documentation currently essential - Care workers can be waiting for verbal instruction
	2.Improved satisfaction of staff and residents with care	- Staff provide needed support to residents and relatives – they are social, friendly, welcoming, trustworthy - Families equate dress, cleanliness and communication with quality of care - Shift hours determine staff activities - It's not satisfying for staff if care quality can't be provided within available resources (including time) - Stable and well-educated staff are valued - Documentation is used to inform and supervise the care workers - There is dissatisfaction with how staff are valued in aged care
Efficiency	3.Improved consistency of staff working with management-approved clinical treatment protocols	- Consistency happens through verbal handovers - Consistency in care happens because staff have known residents for a long time - It is easy and efficient for care workers to assume that care is the same as last shift but may be wrong
	4. Reduced errors by omission and missed documentation 5* Improved management decisions informed by aggregated data on resident welfare for the allocation of resources	- Auditing determines what is documented - Documentation is used to assess staff consistency/compliance for quality control and education needs - Staff trust computer systems to create care plans - Staff use environmental cues rather than documentation to understand resident needs - Staff rely on own 'acquired knowledge' or in the case of short term staff the 'acquired knowledge' of other longer term staff
Quality	6.Improved resident health and quality of life	- The experience of 'health' and 'quality' is varied and related to personality - Close quarter living in shared spaces can be stressful - Person focussed care happens from getting to know the resident - history, preferences, personality, acceptance of risks - Knowing people and having quality relationships equates to quality care
	7.Reduced perceptions of missed care 8.* Increased time spent by nurses and carers with residents	- Staff work around limitations related to break times, and resident 'singles and doubles' staffing needs - Missed care can happen if the resident preferences aren't known - When staff can't do what residents need, including technical support, care feels missed - Staff monitor residents and coordinate and adjust available resources to minimise care being missed - Missed care can be about professional boundaries, where responsibility is unclear
*No data were coded at Baseline into Objective: 5. Improved management decisions informed by aggregated data on resident welfare for the allocation of resources;, as there was no aggregated data for management decisions nor Objective: 8. Increased time spent by nurses and carers with residents as there was no comparable data point to determine whether time has increased or not.		

1 Introduction

1.1 Project Overview

Aged care in Australia is increasingly provided in the persons home. However there remain approximately 4.7% of Australians aged over 65 who are cared for in permanent residential aged care settings, and cost $12.4 billion per year (Australian Institute of Health and Welfare, 2017a). This cost is nearly a quarter what Australian federal and state governments spend on public hospitals (A$53.5 billion) (Australian Institute of Health and Welfare, 2018a). The residential aged care population is complex, with people most likely to be aged over 85 and 31% having high care needs in activities of daily living, cognition and behaviour, and complex health care (Australian Institute of Health and Welfare, 2018b). Over 85% of these residents have at least one mental health or behavioural condition, including dementia and depression. There are over 200,000 places across Australia, 56% of which are managed by not-for-profit organisations (Australian Institute of Health and Welfare, 2017b). The balance between the medical and social models are particularly pertinent in structures that support aged care, as it necessarily recognises the complexity of care needs and co-morbidities (the medical model), balanced with the recognition of the diversity and value of each individual (Warburton & Savy, 2016). Managing this complex population in a climate of increased health and well-being expectations is important, both for individual and community health outcomes and for social and economic aspects of usage of taxpayer funds.

However, aged care is perceived as being poorly resourced to support and sustain high quality care (Chenoweth, Jeon, Merlyn, & Brodaty, 2010), and there is increasing attention being paid to missed nursing care in residential aged care in Australia (Henderson, Willis, Xiao, & Blackman, 2017). Providers are explicitly seeking ways to ‘exploit opportunities for increased efficiency’ (Ergas & Paolucci, 2011) to address concerns about long term affordability and responsiveness to market needs. It is increasingly being recognized that poor quality care is inefficient as well as unsatisfactory, and there is interest in how governance structures can be better used to focus on quality care delivery (Baldwin, Chenoweth, dela Rama, & Liu, 2015). Australian regulation of aged care is a changing landscape, criticised for using quality indicators as measures of service quality rather than care quality (Courtney, O'Reilly, Edwards, & Hassal, 2007; Jiang, Yu, Hailey, Ma, & Yang, 2016). Current developments include unannounced re-accreditation audits for residential aged care which will increase the need for contemporaneous documentation of risks, interventions and evaluations of resident care (Department of Health, 2018).

Health information systems, such as SmartCare, offer an opportunity to contemporaneously capture care delivery, streamline documentation, and provide point-of-care evidence-informed decision-making support for care delivery. However, implementation into existing health organisations with embedded culture, processes and governance structures can be challenging, and may have limited input from aged care recipients, carers and front-line nurses (Henderson, Willis, Xiao, Toffoli, & Verrall, 2016). Implementation of health information systems that are nurse-sensitive and focused on quality point-of-care delivery in Australian residential aged care warrants investigation.

'SmartWard' was developed over the last eight years by SmartWard Pty Ltd in conjunction with clinical nursing and research teams predominantly for hospital settings, with trials at Metro North Queensland, Deakin University and Epworth Healthcare, and ACT Health. The aged care version of the 'SmartWard' is being adapted to the aged care setting from the initial hospital ward setting design. The new product is being referred to as 'SmartCare' (as 'ward' is more suited to hospitals rather than

aged care), with the initial trial implementation being referred to as 'Ageo'. This report will refer to the digital system as 'SmartCare'[2]. Jindalee aged care facility was selected as the first facility for collaboration and implementation of the 'SmartCare' system. This facility can accommodate 169 residents and provides aged care services for people with different care and accommodation needs. This facility consists of eight wings, including four extra service wings and two secure wings for residents with behaviours that warrant additional resources (generally dementia and mental health conditions).

1.2 Goals and Objectives

This study aims to conduct an evaluation of 'SmartCare' implementation in residential aged care, and to contribute to the evidence-base for technology systems that promote sustainable and quality health care in aged care facilities.

The effectiveness of the SmartCare program will be measured and assessed against three key criteria: acceptability, efficiency and quality.

Acceptability:

1. Reduced time spent retrieving information and documenting care.
2. Improved satisfaction of staff and residents with care.

Efficiency:

3. Improved consistency of staff working with management approved clinical treatment protocols.
4. Reduced errors by omission and missed documentation
5. Improved management decisions, supported by aggregated data on resident welfare for the allocation of resources.

Quality:

6. Improved resident health and quality of life.
7. Reduced perceptions of missed care.
8. Increased time spent by nurses and carers with residents.

These three criteria and eight components constitute the Smartcare Evaluation Framework.

1.3 Governance Structures

There are three committees that the Evaluation team contribute to:

- Evaluation Committee, which contains all the University of Canberra researchers as well as the consumer representative Beatrice Vann, meeting bi-monthly.
- Steering Committee, an overarching committee containing representation from SmartWard Pty Ltd, JVS management team (managers of Jindalee) and University of Canberra, meeting as needs.
- Clinical Committee, a working committee, containing representatives from Jindalee, SmartWard Pty Ltd and University of Canberra, meeting weekly.

The Terms of Reference for the Evaluation Committee can be viewed at Appendix 1.

2 Note software name was changed from Smartcare to ACE in the course of the two year implementation and evaluation.

1.4 Baseline Data Collection Timeline

Baseline data collection was scheduled in March 2019 (the pre-implementation period), prior to the implementation of SmartCare expected to commence in July 2019. The key events during the baseline data collection, SmartCare pre-implementation actions and Jindalee agenda were summarised in Table 1.1. The timeline of implementation of SmartCare Stages can be seen in Figures 1.1 and 1.2.

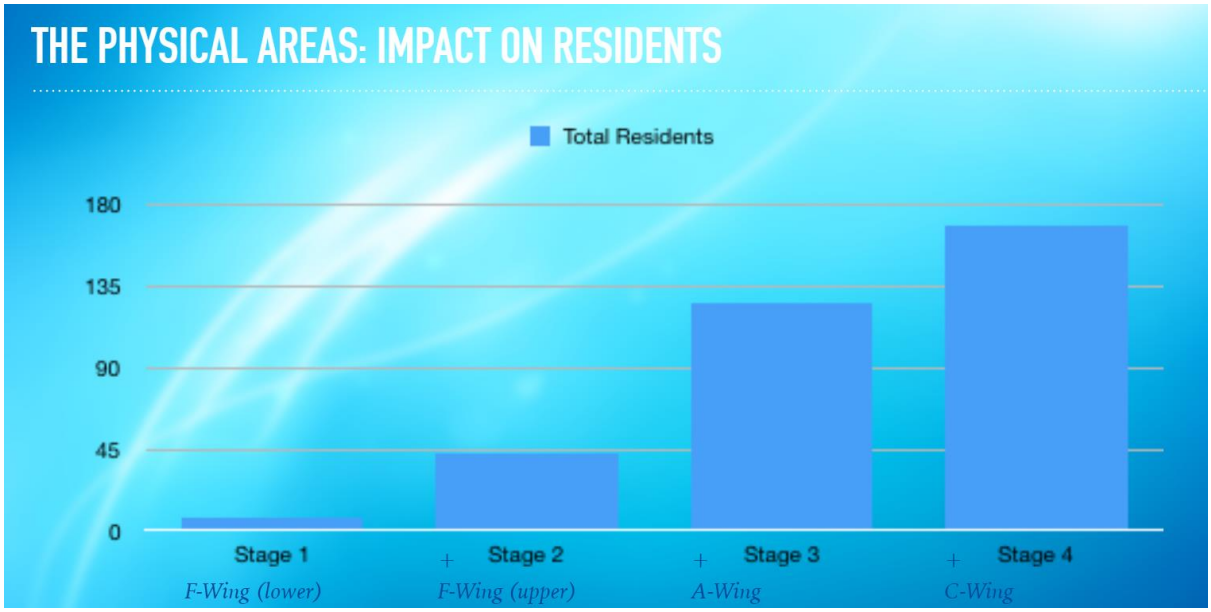


Figure 1.1 Stages of SmartCare implementation.

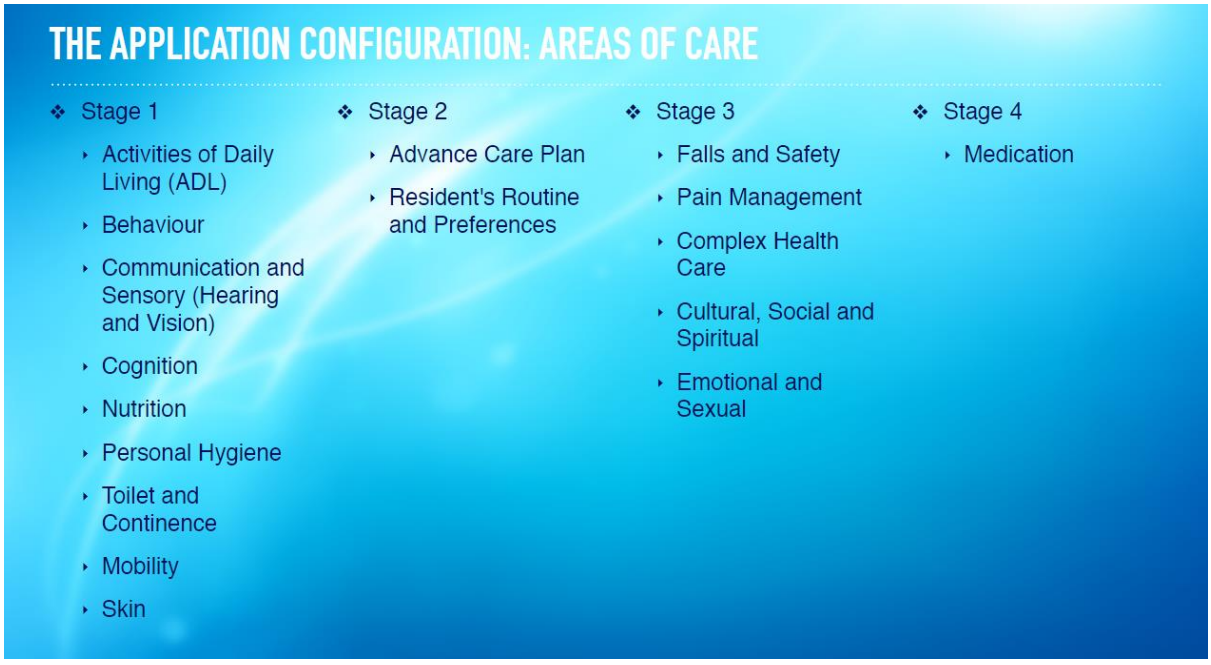


Figure 1.2 Stages of SmartCare Implementation, Care Areas in each stage.

Table 1.1 Key timeline of events February-June 2019.

Date	UC Evaluation Research Team	Jindalee Aged Care
Feb 2019	Presentation of the project to Jindalee and SmartCare Staff information packs distributed at Jindalee	SMS about the UC evaluation is sent to all staff members and added in DONs books
March 2019	Baseline data collection Data collection interrupted by the events onsite 12-25 March	Gastro outbreak in the North wing 12 – 15 March Accreditation onsite 12-14 March
April 2019		JVS delegation at Jindalee
May 2019	Conducted additional DEMQOL interviews; Conducted data analysis	
Jun 2019	Conducted additional DEMQOL interviews; Data analysis and Baseline report	

Table 1.2 Key timeline of Planned SmartCare Go Live Stages.

Date To/Commenced	Stage	Location	Bed Numbers
17 July 2019	Stage 1 Go-live	Lower F Wing only	8
16 Oct 2019	Stage 2 Go-live	Lower F Wing only	8
30 Oct 2019	Stage 2	Upper F Wing	8+18= 26
6 Nov 2019	Stage 2	H Wing	26+18= 44
4 Dec 2019	Stage 2	C Wing	44+33= 77
11 Dec 2019	Stage 3 Go-live	All of the above wings	77
23 Jan 2020	Stage 3	J Wing	77+8= 85
? Jan, Feb	Stage 3	D Wing	85+7= 92
? Mar 2020	Stage 3	A, B, G wing	92+83 = 175
18 Mar 2020	Stage 4 Go-live	All wings	175
27 April 2020	Final Data Collection	All wings	175
17 June 2020	Stage 5 Go Live	All wings	175

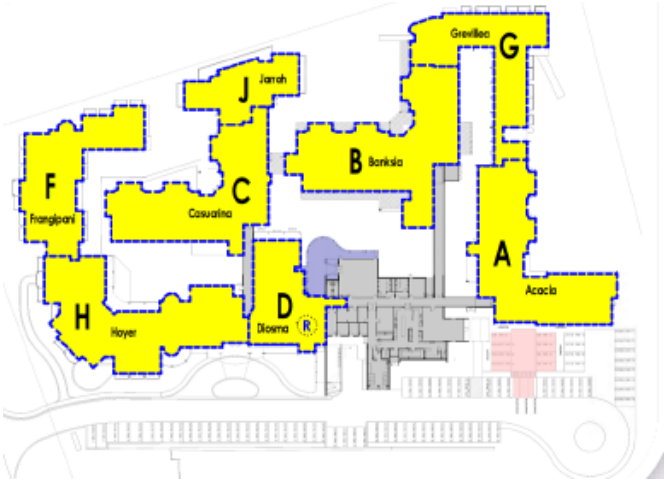


Table 1.3 Key timeline of mechanisms for change management and project development

Date Commenced	Title	Rough time occurrences	Key activities	Total sessions (as of Oct 2019)
Sep 2018	Clinical Working Group (CWG) Meetings	Weekly throughout project	Understanding, scoping, planning, deciding, reviewing. Key staff brought in as required	39
Feb 2019	Countdown to Go Live Phases	1 month before each stage	Includes: High level user training and feedback, updated training material provided, training, UAT Rounds 1 and 2, Preparation of operational environment	2
Feb 2019	Training/Feedback sessions (combined)	Weekly to monthly immediately post Stage implementation	Training Scenarios, Scenario of the day', Forms related, Categorised into response times: Now, soon, later	13
June 2019	User Acceptability Testing UAT	2 meetings a week apart prior to each Stage of implementation	Test scenarios with a checklist used to sign off on agreed product for implementation	4
	Miscellaneous		Review Admission Process, Resident Data Entry, Care Schedule, Additional Follow Up Meetings	8
Feb 2019	Other approaches		Onsite support, "loggable issues", use of educator as troubleshooter	

2 Research Design

2.1 Methods overview

This project employed a mixed methods approach to concurrently collect data both from residents and staff members in the aged care facility. Prior to the baseline data collection, the research team considered the multiple levels of inquiry (Carr, Sangiorgi, Büscher, Junginger, & Cooper, 2011) needed for comprehensive understanding of achieving function in the aged care setting, and identified the key points of data collection needed to understand quality (Donabedian, 2005) (Figure 2.1). Items were then created to capture key levels of inquiry and key levels of health service function in order to create a rich and informative evaluation of the research objectives, with data collection requirements estimated (Table 2.1).

		Donabedien Quality Framework →			
		Structure	**Process**	**Outcome**	**Research Objective**
Level of inquiry ↓	**Organisational**	Staff expectations clearly communicated 3	Compliance with protocols 3	Ease of workflow, consistency, best practice 3	Efficiency
			Length to collect data for ACFI audit 1	Accuracy, resource use 3	Acceptability, Efficiency
		Contemporaneous aggregate performance data 5	Contemporaneous resource allocation decisions 3	High needs get high support, resource use 3	Efficiency
	Staff	Duplicate documentation 1	Time to admit 1	Waste, workarounds 1	Acceptability, efficiency
		Time hunting/gathering 1	Time to document 1	Waste, workarounds 1	Acceptability
		Distance travelled to document 1	Incomplete documentation 4	Errors 4	Acceptability, efficiency
			Contemporanious documentation 4	Errors, risk 4	Efficiency
			Nursing process loop completion	Missed care 7	Efficiency, quality
	Resident		Missed care 7	Complications (infection, skin) 6	Quality
			Time spent with resident 8	Hospital transfers 6	Acceptability, Quality
			Attendance at activities 6	Satisfaction 2	Acceptability, Quality
			Resident-focussed decision making 5	Quality of Life 6	Acceptability, Quality
				Wellness 6	Quality
				Reportable incidents (skin, falls, behaviours) 6	Quality
				Psychotropic medication use 6	

Figure 2.1 Quality framework and level of inquiry.

2.2 Design

The design is participatory action research utilising concurrent mixed methods. Both quantitative and qualitative data collection methods were used to capture pre-implementation data on practice and care at Jindalee. Table 2.1 demonstrates project's objectives and relevant quantitative and qualitative methods to complete each objective. The Phase 1 baseline data collection commenced in March 2019, before the first Stage of SmartCare training. Phase 2 will occur after the Stage 1 implementation. Phase 3 will occur after multiple iterations of implementation across Jindalee. Both Phase 2 and 3 are dependent on and adjustable to the timeline of staff training, User Acceptability Testing and implementation steps conducted by SmartCare (Figure 2.2).

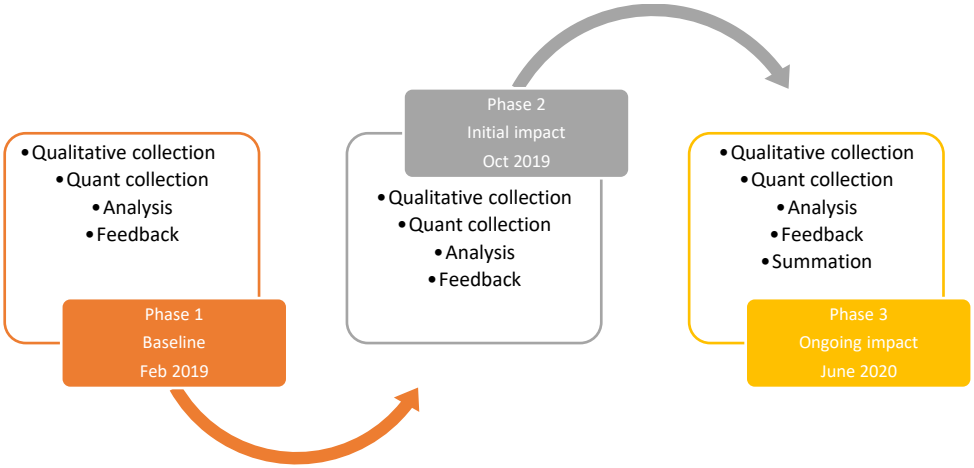


Figure 2.2 Timeline of UC Evaluation of SmartCare project.

Table 2.1 SmartCare Evaluation Framework.

Aims	Objectives	Quantitative data collection methods (per objective)	Qualitative data collection methods (for all aims)	Action research feedback methods (for all aims)
Acceptability	1.Reduced time spent retrieving information and documenting care 2. Improved satisfaction of staff and residents with care	Net Promoter Score Survey - staff, residents	Anonymous comments box Think-aloud' staff work process Resident hallway/bedside interviews	Steering committee reports Clinical committee integration Newsletter updates from Evaluation Committee Presentations to Jindalee
Efficiency	3.Improved consistency of staff working with management-approved clinical treatment protocols 4.Reduced errors by omission and missed documentation 5.Improved management decisions informed by aggregated data on resident welfare for the allocation of resources	Time and motion studies		
Quality	6.Improved resident health and quality of life 7.Reduced perceptions of missed care 8.Increased time spent by nurses and carers with residents	Jindalee data/clinical record review DEMQOL Global estimate missed care - staff, residents		

2.3 Setting

Jindalee is a family owned facility run by a parent company, Johnson Village Services (JVS). JVS has run three of their sites for more than 20 years, with a new acquisition in 2013. JVS uses a localised approach where the facilities themselves are the face of the brand.

Jindalee employs approximately 140 assistants in nursing, 6 endorsed enrolled nurses, 25 Registered Nurses (including 1 DON, 2 DDONs and 2 CNCs), 7 Health and leisure assistants, 47 non-nursing staff (laundry, maintenance, cleaning, kitchen, gardening etc). Each resident chooses their own general practitioner. There are approximately 10 respite residents at any given time. Multiple specialist health providers serve the residents, including: dietician, physiotherapist, podiatrist, speech therapists are on contract; older person mental health, dental, medical specialists and optometry are provided by each resident; and some services such as wound nurse, stoma therapist are supplied through Canberra Hospital.

WHAT THIS MEANS – STAFFING

18% of care staff are nurses

39% of staff are casual

The current documentation system at Jindalee utilises LeeCare to assess residents and develop a Lifestyle Plan, which is then printed for use. All documentation is then handwritten. Pharmacy communication uses MedsComm via phone and faxing; Aged Care Funding Instrument submissions use the government website; rosters use EmpLive, payroll uses RosCare (Client Care). There was minimal to no wifi used onsite, and key staff such as CNCs and DONS use phones to locate each other.

The physical design of Jindalee has 9 wings;

- 3 modern wings (North: G, H and F wings) with single bed with ensuite accomodation;
- 3 shared room accommodation (South: A, B and C) (with 2, 3 and 4 beds per room);
- 2 secure wings (C and J) for people provided additional behaviour support;
- 1 wing undergoing renovation (D wing).

Each wing generally has a kitchenette and up to three different sitting areas (including a shared dining area), and access to outdoor areas. Each wing has regular staff that mainly work in that wing.

Table 2.2. Wing Breakdown & Description

Wing	Number of Beds	Bed Types	Wing Related Notes
Acacia (A)	36	(2x) Single room with shared ensuite (2x) Single room with communal ensuite (2x) 2 Bed room with ensuite (4x) 3 Bed room with ensuite (4x) 4 Bed room with ensuite	• Single storey wing. • 1x large lounge/dining area, 1x small dining area, 1x small lounge area, access to additional main dining room. • Nurses' station and Deputy Director of Nursing's office in this wing.
Banksia (B)	32	(4x) Single room with shared ensuite (4x) Single room with communal ensuite (6x) 4 Bed room with ensuite	• Single storey wing. • 2x large lounge/dining areas, 1x small lounge area. • Nurses' station in this wing.
Casuarina (C)	32	(2x) Single room with ensuite (6x) Single room with shared ensuite (6x) 4 Bed room with ensuite	• Single storey wing. • 1x large lounge area, 1x large dining area, 1x sitting area. • Nurses' station in this wing.
Diosma (D)	7	(1x) 3 Bed room with ensuite (2x) 2 Bed room with ensuite	• Single storey wing. • 1x lounge/dining area
Grevillea (G)	15	(15x) Single room with ensuite	• Single storey wing. • 1x large lounge/dining area
Hoya (H)	18	(18x) Single room with ensuite	• Single storey wing. • 1x large lounge/dining area, 2x lounge/sitting areas. • Nurses' station and Deputy Director of Nursing's office in this wing.
Jarrah (J)	8	(8x) Single room with ensuite	• Single storey wing. • 1x large dining area, 2x sitting area. • Nurses' station in this wing.
Frangipani (F)	21	(21x) Single room with ensuite	• Two storey wing. 14 beds first floor and 7 beds ground floor. • 2x large dining areas, 5x sitting/lounge areas
Total Beds	**169**		

Jindalee have expressed an interest in integrating all communication and information, and to minimise the excessive use of paper; to streamline all operations, improve continuity of care and increase care delivery to residents because of increased efficiency, specifically:

- To improve work performance and time management and reduce (ideally eliminate) the use of paper.
- Increase staff efficiency and free up more time for direct resident care/contact.
- Strengthen the documentation in relation to Aged Care Funding Instrument to ensure full compliance with the Department of Health's requirements.
- Reduce the human errors made by staff due to cumbersome paper-based hand-written systems.
- Improve work environment for staff from non-English speaking backgrounds.

Jindalee accommodated 157 residents at the time of the baseline data collection in February 2019. The research team had access to the list of residents, their names, room numbers and names of their relatives to contact if required, which were stored according to Ethics Committee requirements.

2.4 Participants

Jindalee care staff (those that provide direct resident care) were invited to participate, both permanent and casual staff. The evaluation was focussed on care staff as primary users and the bulk of data collection. Specialist health professionals (General Practitioners, Nurse Practitioners, physiotherapists, speech pathologists) will also have the opportunity to participate, but other support staff (eg kitchen staff and cleaning staff) will not. Among 147 staff members, 90 (61%) have a permanent full time or part time position, and 57 (39%) staff members work casually. Registered Nurses (RNs) and Enrolled Nurses (ENs) (hereafter described as nurses) comprised 17.7% of all employees, whereas care workers were the majority of employees (82.3%), Table (2.2).

Table 2.2 Numbers of staff employed at Jindalee.

	Permanent Full time	**Permanent Part time**	**Casual**	**Total by role**
Registered Nurse	5	13	4	22
Enrolled Nurse	1	1	2	4
Care workers	8	62	51	121
Total by employment type	14	76	57	147

2.5 Inclusions and Exclusions

All residents and their visitors were eligible to participate. Researchers worked closely with the Jindalee staff to identify any residents meeting exclusion criteria of being unsuitable to be approached. Some of these were psychosocial reasons – for example, acutely unwell, in the acute dying phase, in difficult emotional and family situations, approach would cause confusion and distress according to DDONs. Some were for more physical and logistic reasons, e.g. severely deaf and/or visually impaired. Cognitive impairment such as dementia was not an exclusion. This was consistent with Ethics Committee review related to minimising harm to participants.

All nurses (enrolled nurses (EN), endorsed enrolled nurses (EEN) and registered nurses (RN)) and assistants in nursing (AINs) (also known as care workers) are eligible to consent. Specialty RN roles included the wound nurse, Clinical Nurse Consultant (CNC), Deputy Directors of Nursing (DDON); specialty AIN roles included the health and leisure staff, and Activity Care Funding Instrument (ACFI) trained AINs.

The focus was on recruiting staff with ‘Direct Care’ relationships with the residents, and hence likely to be using SmartCare in the first stages of implementation. Excluded staff were: cleaners, maintenance and kitchen staff.

3 Methods and Results

For ease of reading the approach to data collection and associated baseline findings are presented together in the sections below.

3.1 Baseline data collection - Overview

3.1.1 Timeline

Data collection for the baseline of the UC evaluation project was planned for two weeks and commenced on 4th of March 2019. However, the research team has had to interrupt data collection on 12th of March due to a gastroenteritis outbreak in the North wing of Jindalee; followed closely by an unscheduled accreditation visit. Thus, the second week of the data collection was rescheduled to 25-29 of March. Time and Motion data has also been collected on Monday, 1st of April, as a compensation of 11th of March, which was a public holiday. Overall, although the research team was present at the aged care facility for one month, in total 12 days were devoted to data collection.

WHAT THIS MEANS – BASELINE DATA

Baseline data collection was achieved successfully.

As the quality of life interviews (DEMQOL) consumed more researcher's time than predicted, additional interviews continued to be scheduled after the Baseline data collection in March. All additional DEMQOL interviews were completed by 10th of June, prior the commencement of the SmartCare at Jindalee.

3.1.2 Consent forms

UC Evaluation Research Team has prepared information packs for staff members and residents which comprised a letter from JVS, Information sheet, Consent form, and a feedback form with NET Promoter Score (NPS) and Global Estimate of Missed Nursing Care (GEM) questions.

On the 22nd of February, ten days before the baseline data collection commenced, 147 information packs for staff members were distributed in Jindalee. Staff members were informed about the incentive of a $25 gift voucher to receive if they return a signed consent form. During the baseline data collection period, 45 signed consent forms were received, which resulted in 30.1% return rate of the 147 permanent, permanent part time and casual staff (nurses and AINs) at Jindalee.

Different tactics were employed to distribute Information packs to the residents, their relatives and guardians. As 81 information packs were prepared, 20 packs were hand-delivered to the residents, 30 packs were hand-delivered to the relatives of the residents, and 21 packs were mailed to relatives. In addition, 90 emails containing all aforementioned documents were sent to relatives and guardians (80 and 10 respectively). Thus, at the baseline we received 39 signed consent forms the residents, 13 from the relatives, two from the guardians and one from a visitor. These 55 signed consent forms accounted for 35% return rate from the 157 residents/visitors.

3.1.3 Data collected – Overview

In total, 100 consent forms (staff plus residents) were received by the end of the Baseline data collection. Although NPS and GEM questions were presented as a single survey form, not every participant answered both questions. Thus, the research team received 59 NPS responses and 55 GEM scores in total. As DEMQOL is a research method focused on residents' quality of life, 31 residents

participated in this research activity. Pedometer steps and 'Time and Motion' observation are research methods specific to staff. However, some staff members have participated in these research activities multiple times, hence the research team obtained step counts over 66 shifts and 57 hours of observations. Overall, all numbers, except numbers of DEMQOL interviews, residents' NPS and GEM responses, and staff' GEM responses reached projected numbers. Numbers of collected data were demonstrated in Table 3.1.

Findings from baseline are presented in conjunction with interpretation of the findings in order to make the Baseline report meaningful and more easily to read, rather than a traditional research approach which would keep findings and interpretation/discussion as separate sections.

The 'Think Aloud' interviews created 105 minutes of audio data, which were transcribed. Additionally, 24 pages of ethnographic field notes were collected.

Table 3.1 Research methods employed to collect data during the baseline data collection.

Research methods - Staff	**Staff Role**	**Targeted min responses**	**Achieved responses**
Consents	Nurses	8	11
	Care workers	22	34
Net Promoter Score	Nurses and care workers^	30	32
Global Est' of Missed care	Nurses and care Workers^	30	24
Pedometer step count	Nurses	8	18
	Care workers	22	41
Time & Motion observations (7-11 am)	Nurses	6	13
	Care workers	30	30
Think aloud	Care workers	1	1
	Admissions staff	1	1
	Activity Based Funding staff	1	1
	Clinical Nurse Consultant	1	1
	Registered nurse	1	1
	Enrolled nurse	1	1
	Deputy Director Nursing/Director of Nursing	1	2
Research Methods – Residents and their Visitors			
Consents		30	55
Net Promoter Score		30	27
Global Estimate of Missed care		30	28
DEMQOL interviews		80	31
^Where possible, nurses and care workers were differentiated			

3.2 Quantitative Methods and Results

A range of quantitative methods were employed for this project. These methods have allowed the research team to assess time spent on various tasks which comprise care, estimate levels of satisfaction with care and quality of life of the residents in care.

3.2.1 Pedometer step counts of care staff

Staff were equipped with pedometers in order to examine whether implementation of the SmartCare service changes the required distance staff members typically walk or travel. For the Baseline stage, pedometer steps were collected during first four hours of the morning shift, between 7 and 11 am. Collected step counts were grouped and analysed by the roles of participating staff members.

WHAT THIS MEANS - STEPS

Nurses walked on average 1km per hour.

Care workers walked 0.8km per hour.

A CNC had the lowest steps of 0.4km per hour, and the longest was a Care worker of 1.9km per hour

Distances searching for documentation may decrease after SmartCare implementation.

Pedometer data were collected predominantly during the first four hours of the morning shift, 7am to 11am, in order to create a comparable cohort. Overall, 82 step counts were received, however, 8 of the counts were excluded due to inaccurate counts (unrealistically small), as pedometers were worn on the waist, not on the shoe, or pedometers were worn for the full working shift of eight hours, instead of four hours. The remaining 74 step counts were grouped by the staff role. Thus, three independent groups were analysed: 1) nurses (RNs, EN and EENs); 2) care workers, and 3) other. 'Other' staff were staff members of unique and different roles, such as Health and Leisure care workers, Admissions Officer, Wounds Nurse (Table 3.2).

18 records of nurses' pedometer steps were collected. The time of wearing pedometer varied between 4 hours and 4 hours 40 minutes. The mean step count for these 18 records were 4,818. The steps were set to .85m, making average kilometres walked 4,095.

In total, 43 care workers reported their step numbers, however, two records were excluded, as the time of wearing pedometers was less than 4 hours. 41 care workers collected step numbers between 4 hours and 4 hours 30 minutes. The Mean step number for care workers were 3,977.

The remaining group 'Other' have comprised steps numbers from 13 staff members of different roles. However, only seven records were included in the analysis, with the time of the step count between 4 hours and 4 hours 15 minutes. Excluded step counts were six that were submitted by staff but had a time of less than 3 hours or longer than 5 hours. The mean step count for this group were 3,070. The longest steps were reported by Health and Leisure care worker of 6,791, and the shortest steps were reported by Clinical Nurse Consultant of 1,474.

Table 3.2 Characteristics of step numbers collected in three groups of staff.

Steps	Nurses (N=18)	Care workers (N=41)	Other (N=7)
Mean	4818	3977	3070
Std. D	1362.2	1573.3	1711.9
Min	3038	1126	1474
Max	7506	7757	6791

3.2.2 Time and Motion Observations

Carers and nursing staff were shadowed by a researcher for intervals of 60 minutes, with all activities and actions performed by staff being recorded on a minute by minute basis (See Appendices 2 and 3). This "Time and Motion" approach is designed to examine what the care time is used for, in breakdowns of direct care, indirect care, hunting and gathering, and system care. The design is used to specifically incorporate the interruptions and multitasking that is normal part of care work. The observation periods that commenced between the 7am to 11am time period was the core comparator. The 11 to 3pm time period was used as scoping, to understand how work is spread across the day.

All data collection occurred on weekdays, with 88% of all observations occurring between Monday and Thursday, the remaining 12% were undertaken on Friday. All observations coincided with the morning shift which begins at 7 am and ends at 3 pm. Of the 57 valid one-hour observations the mean start time was 09:21, the earliest observation began at 07:00 and the latest observation began at 14:30. The majority (43 of 57) of 'Time and Motion' observational hours were collected during the first four hours of the morning shifts as this was identified as the period when a large proportion of direct and indirect care occur (between 7 and 11 am). Consequently 43 observations were included in the primary analysis, which comprised 30 observations of care workers and 13 observations of nurses. The other 14 observations after 11am were used to contextualise the information learned. Whilst demographics are shown for the whole cohort in Table 3.3, statistical data analyses have been performed on 43 observations between 7 am and 11 am (Sections 3.2.2.2 – 3.2.2.8).

Prior to analysis, data were screened for duplicate cases and missing data. No cases were identified with more than 10% of data missing. Case variance was less than 2% across all observations, suggesting accurate observation and data entry. Twenty percent of observations were subject to inter-rater reliability. Inter-rater scores were calculated for two observers for one minute and ten minutes of observation time. Inter-rater reliability ranged from 91.2% - 97.4% agreeance.

3.2.2.1 *Demographics*

Most commonly observed staff were care workers (Assistants in Nursing) (n=43, 75.5%), while 14 (24.6%) of observations were conducted with nurses (Registered Nurses, Endorsed Nurses and Endorsed Enrolled Nurses). Most of the observed staff were employed on a full-time continuing contract (n=45, 79%) with the reminder on either a casual or agency contract. The majority of participated in observations staff members were employed within their professional role for more than four years (n=43, 75.5%), and 29 of them were working at Jindalee for over four years. Only three staff members have completed post-graduate study (5.3%) (Table 3.3).

Table 3.3 Characteristics of staff participated in 'Time & Motion' observations (Total N=57).

Descriptive Characteristics		n	%	
Observations of Staff between 7 am and 11 am (N=43)				
Role	Nurse (EN/RN)	13	30.2%	**7-11am** **Core data for analysis**
	Care workers	30	69.8%	
Postgraduate Studies Complete	Yes	2	4.7%	
	No	30	69.8%	
	N/A	11	25.6%	
Employment Status	Permanent	33	76.7%	
	Casual	5	11.6%	
	Agency	3	7%	
	N/A	2	4.7%	
Years of working in their role	0 to 3 years	9	20.9%	
	4 to 10 years	18	41.9%	
	over 10 years	15	34.9%	
	N/A	1	2.3%	
Years of working at Jindalee	0 to 3 years	21	48.8%	
	4 to 10 years	14	32.6%	
	over 10 years	7	16.3%	
	N/A	1	2.3%	
Observations of Staff between 11 am and 3 pm (N=14)				
Role	Nurse (EN/RN)	1	7.1%	**11am-3pm** **Data for scoping activity spread across the day**
	Care workers	13	92.9%	
Postgraduate Studies Complete	Yes	1	7.1%	
	No	10	71.4%	
	N/A	2	14.3%	
Employment Status	Permanent	12	85.7%	
	Casual	1	7.1%	
	Agency	1	7.1%	
Years of working in their role	0 to 3 years	3	21.4%	
	4 to 10 years	3	21.4%	
	over 10 years	7	50%	
	N/A	1	7.1%	
Years of working at Jindalee	0 to 3 years	4	28.6%	
	4 to 10 years	5	35.7%	
	over 10 years	3	21.4%	
	N/A	2	14.3%	

WHAT THIS MEANS – STAFF OBSERVED

The main observation hours were 7-11am.

The majority of staff observed were permanent care workers who had worked for more than 4 years in their role, but less than 3 years at Jindalee.

3.2.2.2 *Staff switching resident focus*

A key data collection item during the 'Time and Motion' observations is the numbers of residents each staff member provided care to, including 'mental switches', also known as 'cognitive stacking' of nursing and care work (Patterson, Ebright, & Saleem, 2011) where staff switch which resident they are thinking about.

For example, when a staff member is caring for Bob by sitting with him and providing assistance to eat and drink, and then responds to a question about another resident Elaine, and then returns their focus to assisting Bob, this would be registered as three resident 'switches'.

The average number of residents a staff member cared for within an hour (or switched caring for) was 18, with a minimum of 3 and maximum of 46 switches. Nurses on average would switch between 26 residents per hour, which was significantly higher than the 14 average switches among care workers (F=15.8, p<0.001).

WHAT THIS MEANS – RESIDENT SWITCHING

Staff switched which resident they were thinking about 18 times per hour, or every 3 minutes.

3.2.2.3 *Multitasking*

Multitasking is when staff perform two different activities simultaneously, or within one minute. For example, communication with a resident is commonly in conjunction with showering, mobilisation or assisting with meals. Indirect care activities were also frequently performed while multitasking, such as preparing equipment or meal preparation and communication with a colleague. In this study, communication was the most common multitasking activity, but other tasks included: direct care activities of mobilisation and dressing; medication preparation and documenting; showering a resident and preparing equipment (eg a mobile hoist).

The term 'care minutes' is used to account for this multitasking. The research team observed 2,580 minutes (43 hours) of data collection during the first four hours of the morning shift, which equated to 5,055 care minutes (84 hours). On average there were 118 care minutes for every 60 observed minutes, as multitasking occurred 62% of the time (37 minutes of every hour). Activities are reported as how many 'care minutes' were spent on an activity within an hour, recognising that these activities were not exclusive.

When multitasking was compared between nurses and care workers, nurses' average care minutes (129) were not significantly different from the average care minutes of care workers (113) (F=3.36, p=0.07). Similarly, the proportions of care minutes per hour were similar in the compared staff groups (F=0.33, p=0.57). This suggests that although all staff highly multitask during their shifts, nurses' shifts are more concentrated with the tasks.

WHAT THIS MEANS – CARE MINUTES AND MULTITASKING

For every hour of observations there were 118 'care minutes', due to multitasking.

For every hour observed, staff were multitasking for 37 of those 60 minutes, or 62% of the time.

3.2.2.4 *Locations by staff*

The following analysis of care activities observed during 'Time and Motion' demonstrates mean minutes spent at different locations by nurses and care workers, combined by the average starting time of the observations of nurses and care workers between 7 and 11 am, as (Figures 3.1 and 3.2). This includes multitasking minutes as staff can be in two locations within the same minute. Out of 13 observations of nurses, five started between 7 and 8 am, six between 8 and 9 am and two between 9 and 10 am. Out of 30 observations of care workers, 12 started between 7 and 8 am, 11 between 8 and 9 am and 7 between 9 and 10 am. Note that as staff were multitasking, the mean minutes add up to more than 60 minutes per hour (ie. Higher minutes per hour indicates higher rates of multitasking).

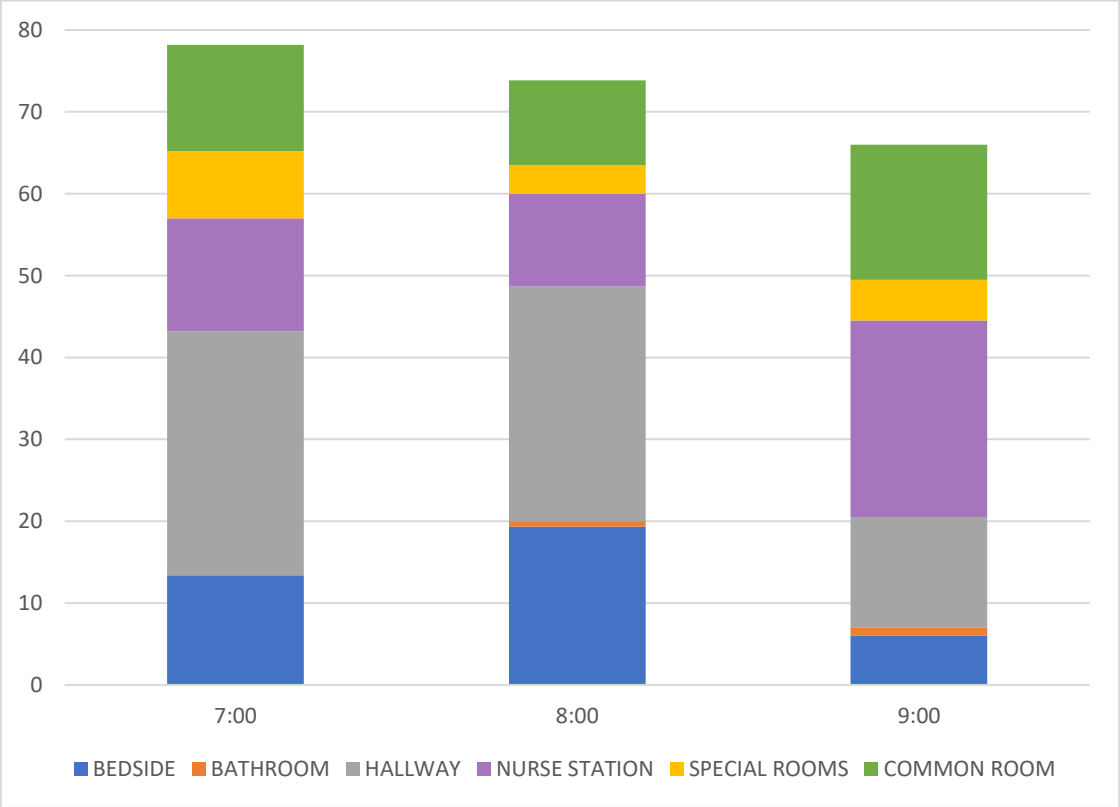


Figure 3.1 Mean minutes by location – Nurses (N=13).

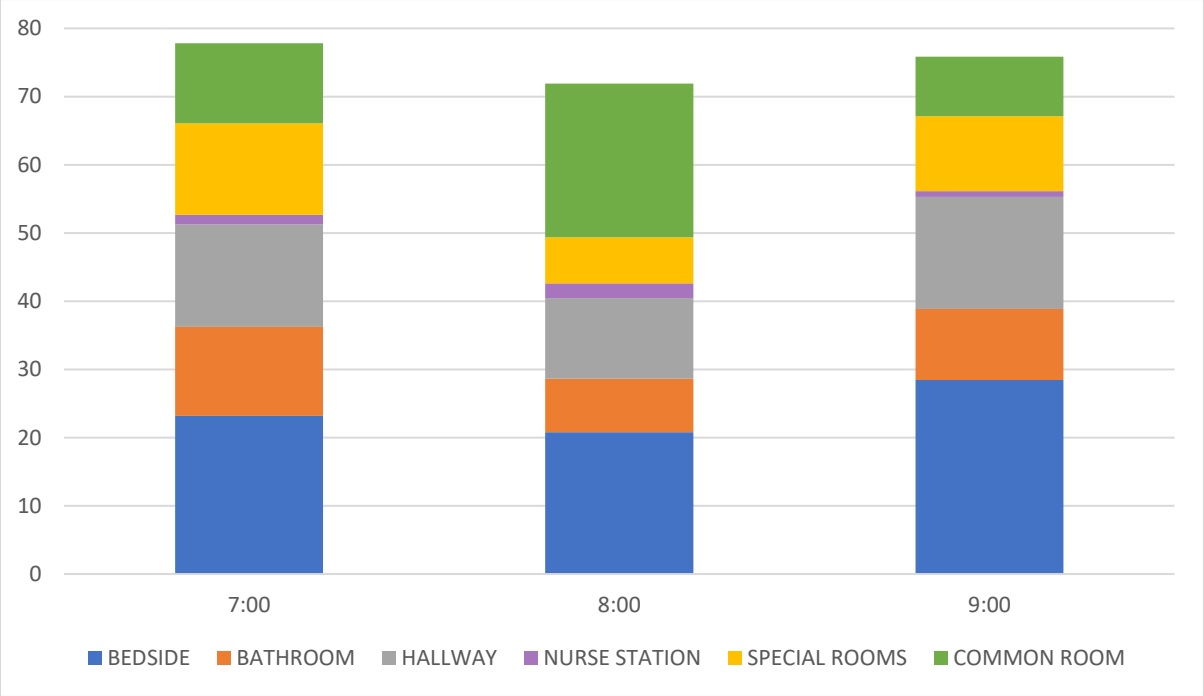


Figure 3.2 Mean minutes by location - Care workers (N=30).

3.2.2.5 *Care activities by staff*

Four main groups of activities were registered during 'Time and Motion' observations: 'Direct Care', 'Indirect Care', 'Hunting and Gathering', and 'System Care'. An average number of total care minutes during these 43 observations has been 118 minutes. On average, staff have spent 60 care minutes on 'Direct Care', which was 50.9% of the average total care minutes. The average time spent on 'Indirect Care' was 48 minutes (40.7%). Only 5.7 minutes (4.8%) were spent on average on 'Hunting and Gathering', and 4.3 minutes on 'System Care' (3.6%) (Table 3.4). care activities within these four categories are demonstrated in Table 3.5.

When average total minutes spent on these for groups of activities were compared between Nurses and care workers, the distributions of minutes spent on 'Direct care' and 'System Care' were not statistically different between nurses and care workers (F=2.9, p=0.094; F=0.062, p=0.805 respectively). However, these distributions were significantly different for average total minutes spent on 'Indirect Care' and 'Hunting and Gathering' (F=14.91, p<0.001; F=36.18, p<0.001 respectively) (Figure 3.3). In addition, distributions of care minutes per hour were similar for nurses and care workers (F=0.33, p=0.57).

Table 3.4 Average care minutes spent within an hour (N=43).

Group of care activities	Min	Max	Mean	Std. D
Direct Care	13	115	60.0	24.5
Indirect Care	17	81	47.6	17.6
Hunting and Gathering	0	29	5.7	6.9
System Care	0	35	4.3	8.4
Total Activities^	78	205	117.6	28.3

^Due to 60% multitasking minutes, totals add up to more than 60minutes per hour

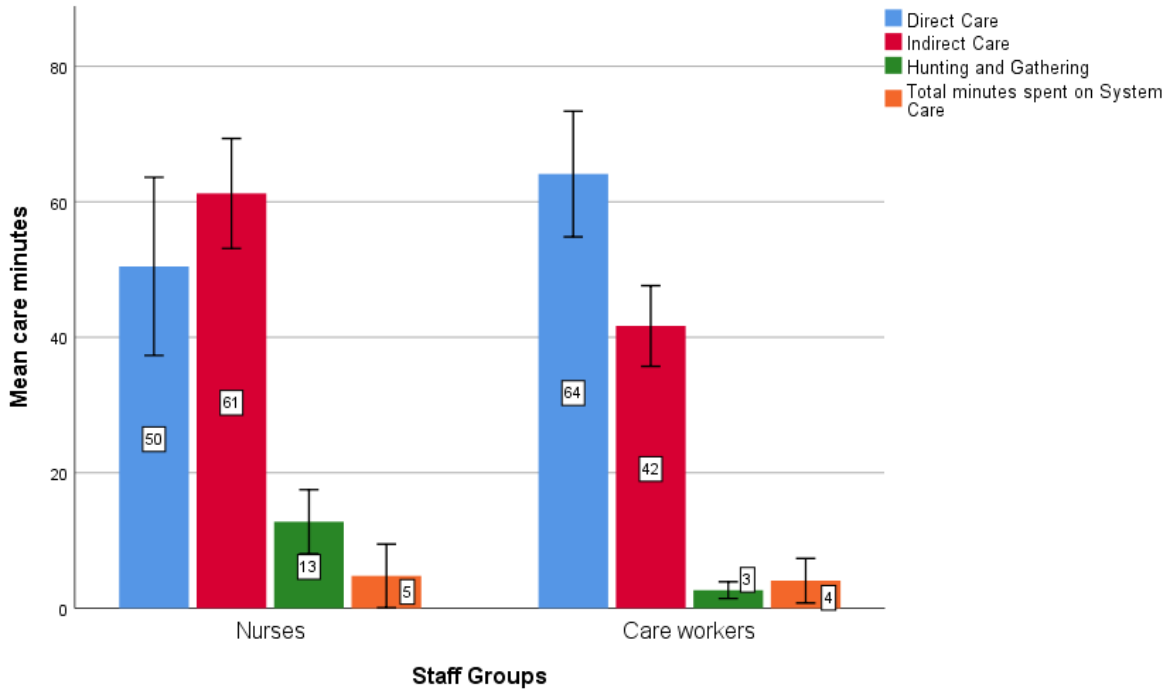
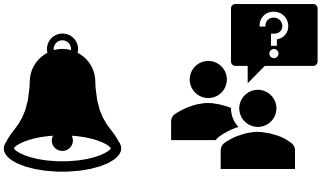


Figure 3.3 Activity care minutes by Nurses and Care workers

Table 3.5 Categories of care activities.

'Direct Care' • Communication with a resident/visitor • Skin care/positioning/wound care • Bathing/showering/mouthcare • Toileting (bed or toilet) • Mobilisation • Hydration/nutrition • Medication administration • Collecting observations/vital signs • New admission, discharge, transfer • Other (written by a researcher)	
'Indirect Care' • Handwashing/gloving/gowning • Medication preparation • Preparing equipment • Communication with other staff • Documentation of observations/vital signs • Other documenting/reading/PC work • Other (written by a researcher)	
'Hunting and gathering' • Searching for documentation • Trying to contact a colleague, relative, etc • Interruption - system failure (eg supplies) • Interruption - colleague (inc phone) • Interruption - resident/visitor (inc phone) • Other (written by a researcher)	
'System care' • Incident reporting • Meetings/inservices/handover etc • Selfcare - toilet/tea/water/chat breaks • Other (written by the researcher)	

3.2.2.5.1 Direct care

'Direct Care' involves care that happens directly with the resident, as shown in Table 3.5. 'Communication with resident/visitor' was the most common 'Direct Care' activity with an average of 28 care minutes and a maximum of 53 minutes, followed by hydration/nutrition with an average of six care minutes. Mobilisation had an average of 5 minutes, but maximum of 26. The remaining activities took less than five minutes. 'Other' types of 'Direct Care' comprised mainly assisting the resident to get dressed or changed, holding a bible to read, doing hair and makeup, finding a magazine, finding glasses, getting a newspaper, taking to hairdresser, changing a bin liner.

There were significant differences in average care minutes spent on care. Care workers provided: skin care (F=7.38, p=0.01), bathing/showering (F=10.4, p=0.002), toileting (F=13.9, p=0.001), mobilisation (F=12.89, p=0.001) and 'Other' care (F=12.75, p=0.001). Whereas nurses spent more care minutes on medication administration (F=103.79, p<0.001) and observations/vital signs collection (F=14.53, p<0.001). However, two compared staff groups were not statistically different in average time spent on communication with a resident and hydration/nutrition (F=1.27, p=0.27; F=0.95, p=0.34 respectively) (Figure 3.4).

WHAT THIS MEANS – NURSES

Nurses spend significantly more time on 'Indirect Care' and 'Hunting and Gathering' compared to Care workers.

These two activities include documentation and interruptions, where SmartCare has an opportunity to streamline work flow and decrease interruptions.

3.2.2.5.2 Indirect resident care

Communication with other staff was identified as the most common activity among 'Indirect Care' activities, averaging 18 care minutes. This was followed by preparing equipment (eg preparing meals, setting up a mobile hoist) with an average 11 care minutes. Medication preparation on average took 7.6 minutes, and the remaining activities on average took less than five minutes (Table 3.7). Other within the 'Indirect Care' included: progress notes, care plan, reading a diary, planning menu for next day, breakfast preparation, throwing old bandaids in a bin, doing dishes, laundry, waiting on resident, moving hazard, cleaning up, laundry bins, checking medications with pharmacists, cleaning bathroom, putting clothes in the laundry trolley, and putting clothes away.

WHAT THIS MEANS – INDIRECT CARE

Communicating with other staff = 18 minutes per hour, up to 48 minutes.

Preparing equipment =11 minutes per hour, up to 45 minutes

When care workers and nurses were compared by average care minutes spent on indirect resident care, three activities – medication preparation (F=115.31, p<0.001), observations/vital signs documentation (F=6.39, p=0.02) and other documenting/reading/PC work (F=53.02, p<0.001) – were activities mainly conducted by nurses, as

nurses are typically in charge of medications and documentation. However, care workers would spend more care minutes on preparing equipment (F=17.53, p<0.001). There were no significance differences in average care minutes spent on handwashing, communication with other staff and other 'Indirect Care' (F=0.15, p=0.7; F=1.56, p=0.22; F=1.29, p=0.26 respectively) (Figure 3.5).

3.2.2.6 *Hunting and Gathering*

As reported in section 3.2.2.5, staff would spend on average less than six care minutes on 'Hunting and Gathering'. Therefore, among all staff, each activity typically would take less than two minutes (Table 3.8). Three types of interruptions in total took on average three care minutes per observation.

However, the analysis of care minutes spent on 'Hunting and Gathering' by nurses and care workers have demonstrated that nurses spent on average significantly more care minutes on searching for documentation and interruptions by colleagues (F=10.75, p=0.002; F=27.31, p<0.001 respectively). Staff groups did not differ by distributions of care minutes on the remaining activities – trying to contact colleague, relative (F=1.07, p=0.31), interruption – system failure (F=0.12, p=0.73), interruption by resident/visitor (F=4.07, p=0.05) and other activities (F=0.63, p=0.43) (Figure 3.6).

WHAT THIS MEANS – DOCUMENT HUNTING

Nurses spend 5 minutes per hour whereas Care workers spend <1 minute.

These may change with the introduction of SmartCare.

WHAT THIS MEANS – INTERRUPTION TIME

Interruptions take up to 3 minutes every hour

3.2.2.6.1 System care

On average, staff would spend just four minutes on 'System Care', which was the least common group of activities. This group comprised four activities, however, the majority of the observed care minutes within this group were spent only on two activities: selfcare, such as toilet break, tea breaks, chat with a colleague (on average three care minutes), and other types of 'System Care' observed by a researcher (Table 3.9). 'Other' kinds of system care included changing air conditioner temperature, checking shift availability, discussions of pain assessment and medication labelling. Average care minutes spent on all four activities were not significantly different between Nurses and Care workers (p>0.05) (Figure 3.7).

Table 3.6 Average 'Direct Care' care minutes (N=43).

'Direct Care' Activity	Min	Max	Mean	Std. D
Communication with Resident/Visitor	9	53	29.0	10.8
Skin care, positioning, wound care	0	12	2.8	3.7
Bathing/Showering/ Mouthcare	0	19	4.0	5.6
Toileting (bed or toilet)	0	9	2.1	2.7
Mobilisation	0	26	5.0	6.2
Hydration/Nutrition	0	30	6.5	8.7
Medication administration	0	24	5.1	8.3
Observation collection	0	8	0.9	1.9
New admission, discharge, transfer	0	0	0.0	0.0
Other (getting resident dressed, holding a bible. etc)	0	20	4.6	5.7
Total Direct Care^	13	115	60.0	24.5

^Due to 60% multitasking minutes, totals add up to more than 60minutes per hour

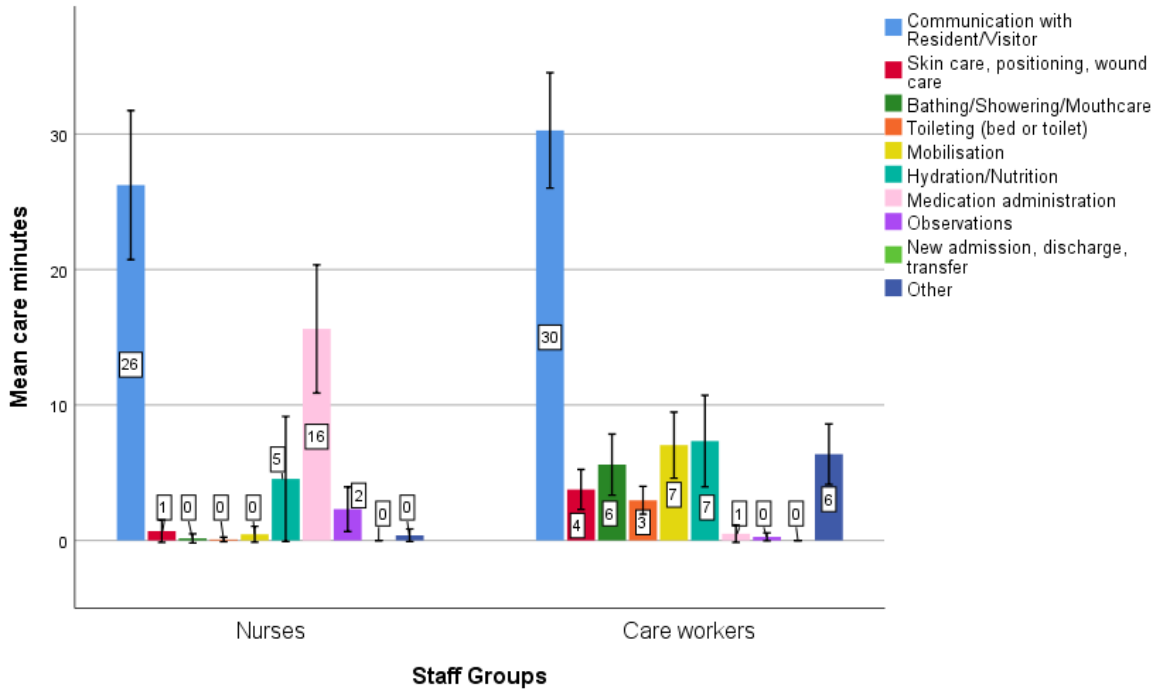


Figure 3.4 Average 'Direct Care' care minutes by Nurses and Care workers.

Table 3.7 Average 'Indirect Care' care minutes (N=43).

'Indirect Care' Activity	Min	Max	Mean	Std. D
Handwashing/gloving/ gowning	0	14	3.6	3.2
Medication preparation	0	37	7.6	11.8
Preparing equipment	0	45	10.9	10.1
Communication with other staff members	3	49	17.6	9.5
Documentation of observations	0	5	0.3	0.9
Other documenting/ reading/PC work	0	34	4.9	9.3
Other (progress notes, care plan, etc)	0	34	2.6	7.0
Total Indirect Care^	17	81	47.6	17.6

^Due to 60% multitasking minutes, totals add up to more than 60minutes per hour

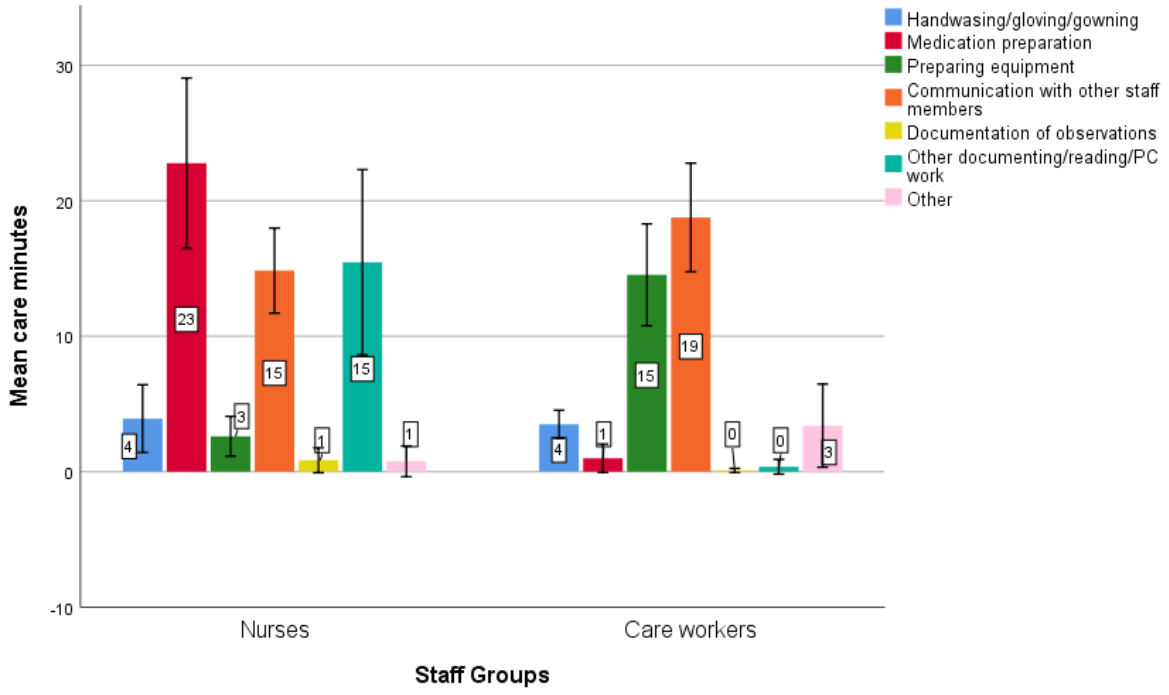


Figure 3.5 Average 'Indirect Care' minutes spent by nurses and care workers.

Table 3.8 Average 'Hunting and Gathering' care minutes (N=43).

'Hunting and Gathering' Activity	Min	Max	Mean	Std. D
Searching for documentation	0	26	1.4	4.4
Trying to contact colleague, relative, etc	0	6	0.6	1.3
Interruption - system failure (eg supplies)	0	7	0.3	1.2
Interruption - colleague (including phone)	0	11	1.7	2.9
Interruption - resident/visitor (including phone)	0	7	1.0	1.8
Other	0	9	0.6	1.6
Total Hunting and gathering^	0	29	5.7	6.9

^Due to 60% multitasking minutes, totals add up to more than 60minutes per hour

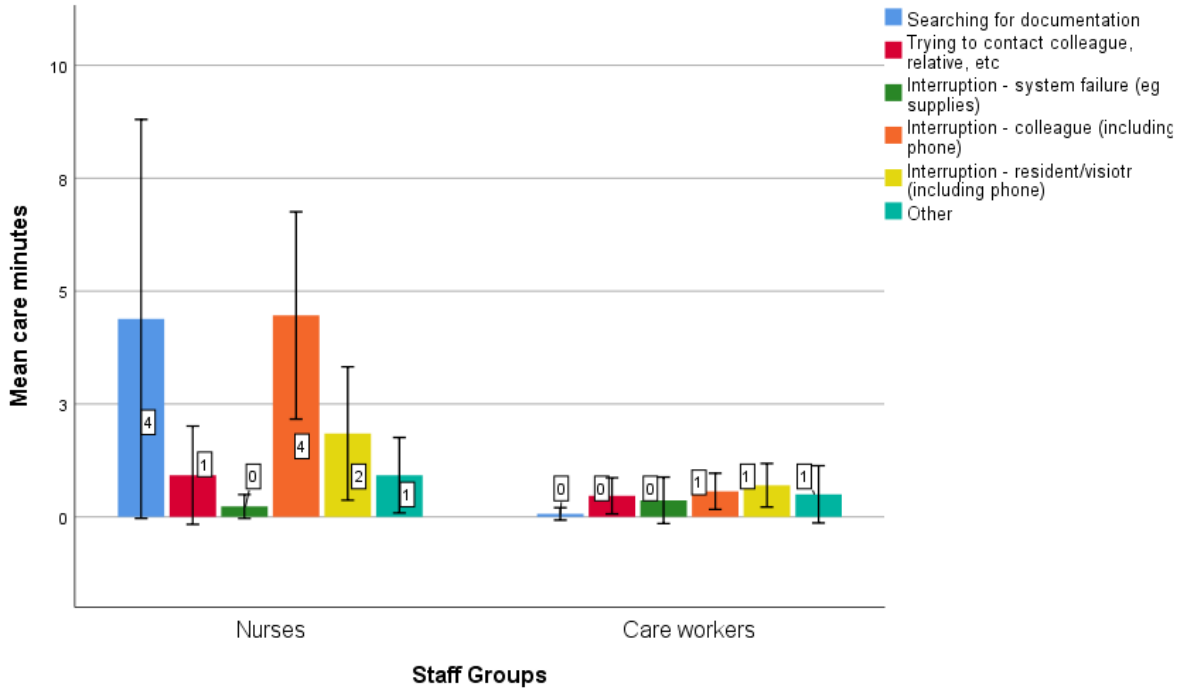


Figure 3.6 Average 'Hunting and Gathering' care minutes by nurses and care workers.

Table 3.9 Average 'System Care' minutes (N=43).

'System Care' Activity	Min	Max	Mean	Std. D
Incident reporting	0	2	0.0	0.3
Meetings/inservices/handover	0	13	0.3	2.0
Selfcare - toilet/tea/water/chat breaks	0	35	3.7	7.7
Other (written by the researcher)	0	5	0.3	1.0
Total System Care^	0	35	4.3	8.4

^Due to 60% multitasking minutes, totals add up to more than 60minutes per hour

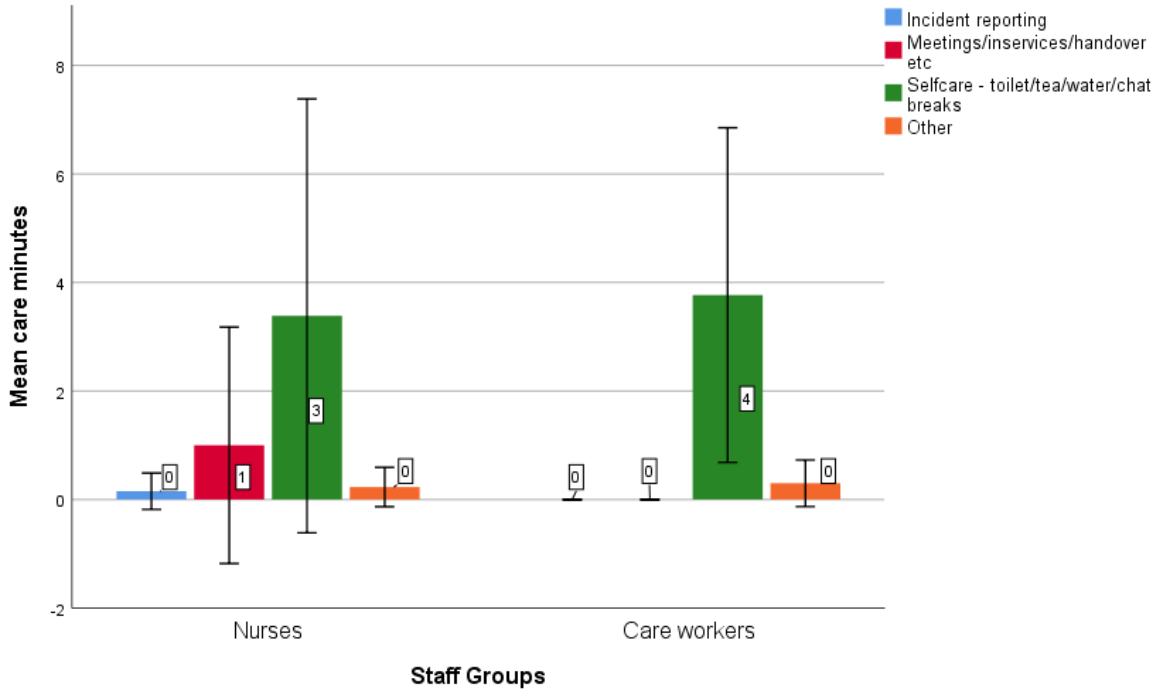


Figure 3.7 Average 'System Care' care minutes by nurses and care workers.

WHAT THIS MEANS - INTERRUPTIONS

As numbers of switching residents correlated with the number of interruptions, this may change after the introduction of SmartCare, if staff can use SmartCare system instead of asking other colleagues.

3.2.2.7 *Relationships between care categories*

Pearson correlations were identified for the four major categories of care delivery. The results suggest that the more time an observed staff member was involved with 'System Care' the less time they spent delivering either 'Indirect care' (correlation coefficient=0.302, p=0.024), or 'Direct care' (correlation coefficient=-0.371, p=0.005). 'Hunting and gathering' was positively correlated with 'Indirect Care' (correlation coefficient=0.321, p=0.016). Linear regression indicates that time spent on 'System Care' explains over 30% of the variance in time spent undertaking 'Direct Care' (β=-0.37) and 'Indirect Care' (β=-0.32). Figure 3.8 illustrates distributions for these variables and the relationships identified.

In addition, a significant correlation was identified between the number of times that a staff changed who they were providing care to or thinking about and interruptions from colleagues (r=0.41, p=0.006), and interruptions by other residents or visitors (r=0.32, p=0.04). Managing interruptions and resident swapping could be a key benefit of new care systems such as SmartCare.

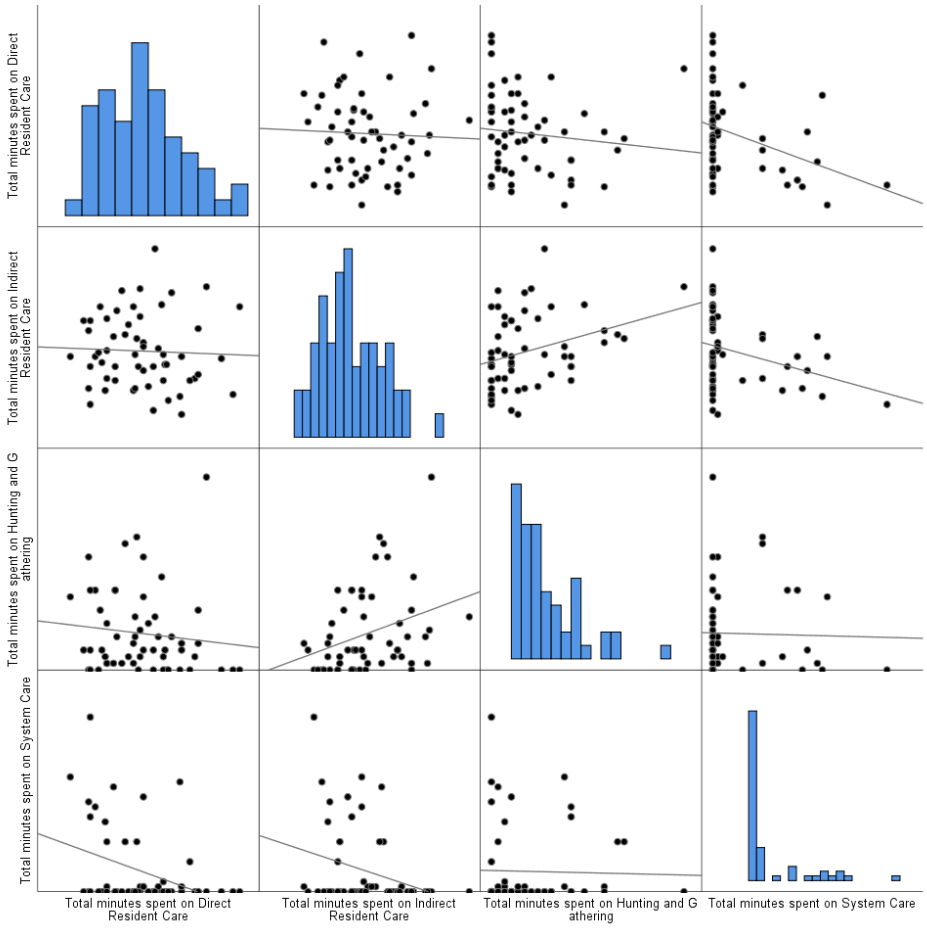


Figure 3.8 Scatter plot matrix of total time spent on care activities (distribution on diagonal).

3.2.2.8 *Communication and documentation in care*

Two activities were analysed specifically: communication and documentation. A composite measure was made which combined the 'communication with residents and visitors', and 'communication with colleagues'. A composite measure of documentation was also made, including 'documentation of observations/vital signs', 'other documentation' and 'searching for documentation'. The average care minutes of communication was 47 minutes, which was 39.8% of the average total care minutes observed. The average care minutes spent on documentation was 7 minutes, which was 5.6% of total care minutes (Table 3.10).

Table 3.10 Combined communication and documentation

Staff Groups		Total minutes spent on communication	Total minutes spent on documentation
Nurses (N=13)	Mean	41.1	**20.7**
	Std. D	9.6	15
	Min	28	2
	Max	60	55
Care workers (N=30)	Mean	49	0.5
	Std. D	17.9	1.5
	Min	22	0
	Max	91	7

Nurses spent on average significantly more care minutes on documentation than care workers (p<0.001), whereas average care minutes spent on communication was not different (p=0.14) (Figure 3.9). Of note is that the data focusses on the time period 7am to 11am; care workers were noted to spend time documenting at the end of their shifts, but as their shift ending times varied from 11 to 3pm this was not collected as core Time and Motion data.

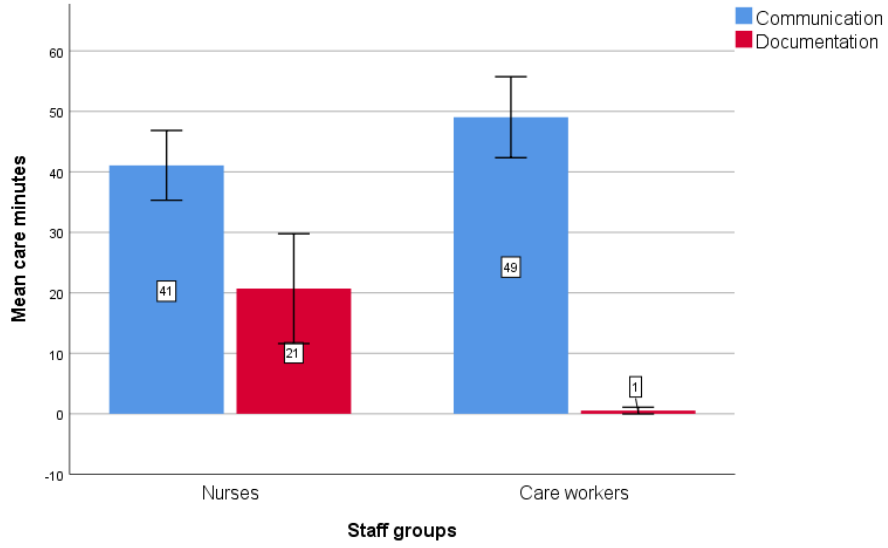


Figure 3.9 Combined communication and documentation

WHAT THIS MEANS - DOCUMENTATION

Nurse hour :

= 40mins communication

= 20mins documentation

Care worker hour:

= 49mins communication

= 1.5mins documentation

3.2.3 Documentation Diaries

The Time and Motion data collection provides detailed information about activity and location of staff between the hours of 0700 and 1100. Documentation diaries were also collected in order to gain greater insight into the patterns of documentation across the day, particularly as the AINs are known to document paperwork particularly at the end of their shift. For some of them that is at 1100, some at 1300, some at 1400, and some continue after their shift at 1500. Diaries were collected from at least 3 different shifts for each role, and a mean calculated for the amount of minutes spent each hour on documentation. Participants were informed to diarise each hour of their work, with a mark in the boxes indicating when documentation was occurring during that hour and for how long, and preferably to include a short description of the type of documentation (eg medication round, progress notes, handover). Documentation was defined to include reading, writing, or looking for information. Starting and finishing time was left to the staff member to enter as these vary shift to shift and person to person. Staff were informed to include any after hours documentation.

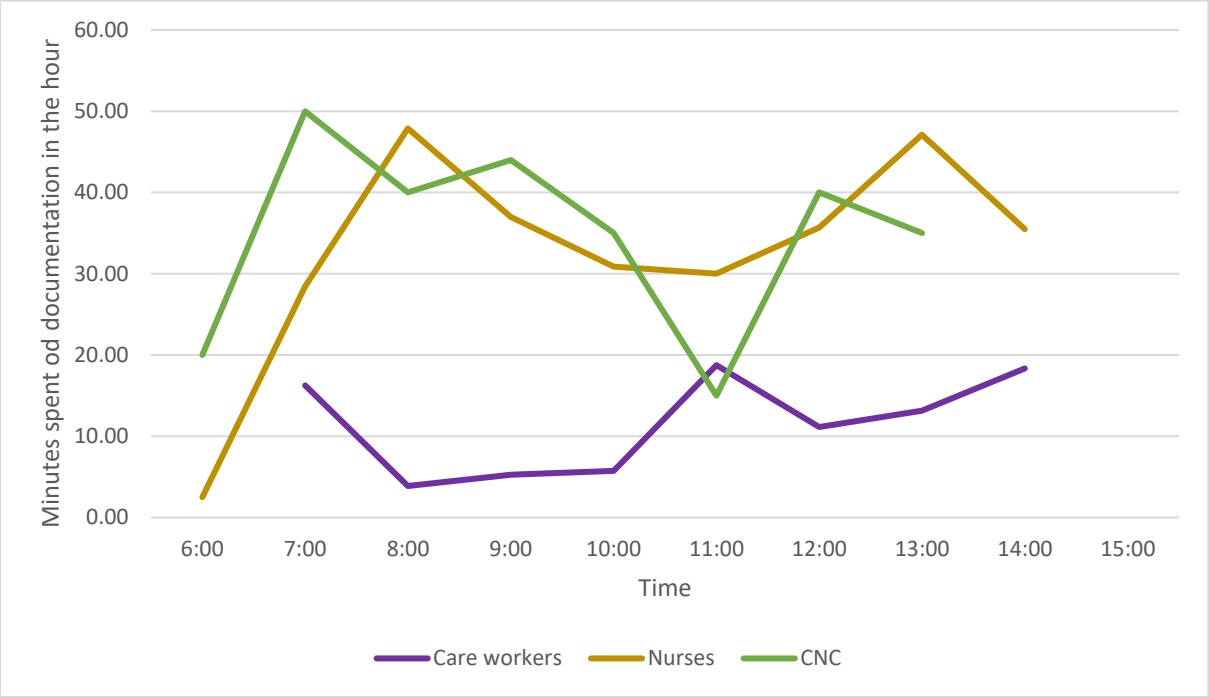


Figure 3.10 Average minutes spent on documentation in the hour during morning shifts by care workers, nurses and CNC.

It can be seen here that Care Workers do, on average, up to 20 minutes of documentation at 1100 and at 1400, whereas Nurses spend most of their day documenting at least 30 minutes in every hour.

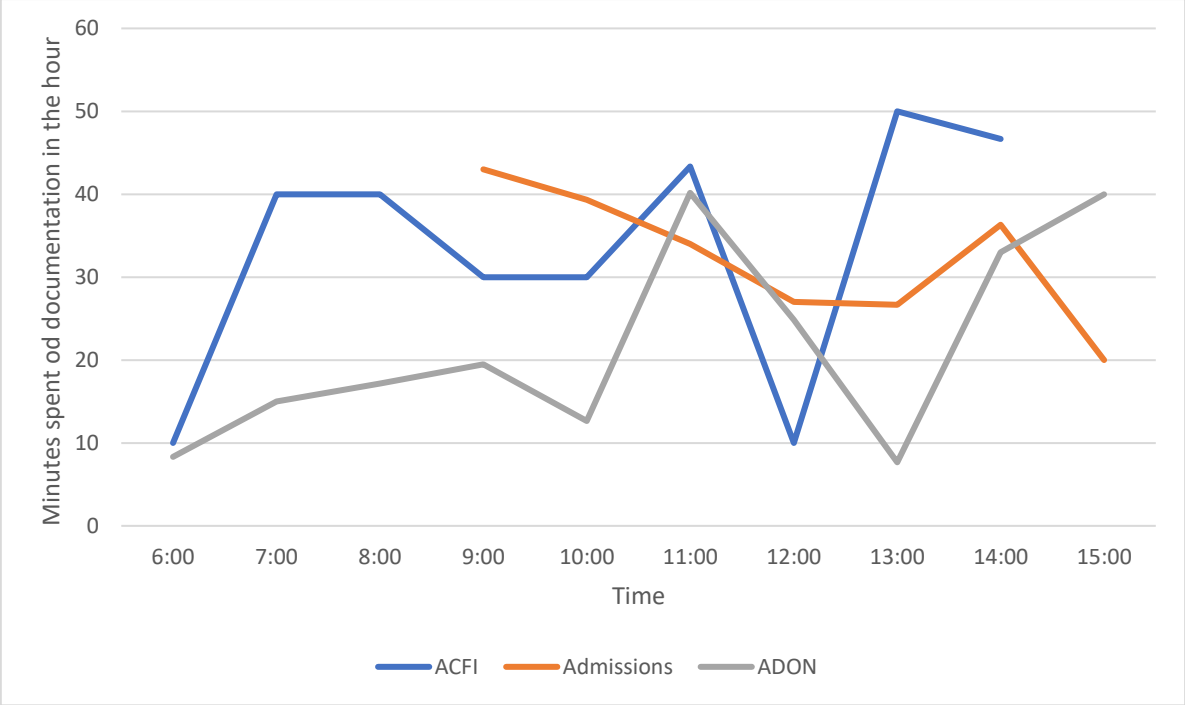


Figure 3.11 Average minutes spent on documentation in an hour during morning shifts by ACFI nurse, Admission nurse and ADONs.

3.2.4 Documentation Audit

Documentation audit was included as one of the research activities to evaluate how SmartCare affects the efficiency of care in the aged care setting. First pre-digital stage of the residents' documentation audit was conducted before the implementation of SmartCare Stage 2. These data were collected in October 2019 and audited between 18th of November and 9th of January, starting from the Frangipani and Hoya wings as these wings were the first where SmartCare Stage 2 was introduced on the 30th of October 2019.

This documentation audit aimed to: 1) examine the quality of nursing documentation on paper to identify strengths and gaps for quality improvement; and 2) provide a baseline to measure and change associated with the implementation of the new technology. The second post-implementation audit will analyse documentation recorded in the SmartCare and the following statistical analysis will seek for any differences in pre and post-implementation documentation.

We audited 21 resident care records, randomly selected from across 49 residents who consented to access their records. Google random number generator was used to create this sample of records, with two random numbers had been replaced with the news ones due to the death and discharge of two residents. At least 6% of the care records in each wing were audited, except Diosma wing, as this wing was under renovation during the period of data collection and none of the residents were based at that wing (Table 3.111, column letters). There was a wide range of proportions of residents who consented to access their records, between 6% and 33%, with the lowest rates in Banksia, Causarina and Jarra. We note that in these wings, secure Casuarina, Jarra wings and Banksia, there are higher numbers of residents with complex mental health needs including dementia. Data collection took place between 27th November 2019 and 14th January 2020, using last progress notes from 3rd September to 29th October to ensure the documentation was 'baseline', i.e. prior to implementation of SmartCare.

Table 3.11 Numbers of audited care records and their proportions from numbers of consents and beds in each wing.

Wing	A Beds in wing	B Number of residents consented to records analysis	C Sample of records audited	D Percentage of audited records contributed by wing (C/21)	E Percentage of records on each wing included in audit (C/B)	F Percentage of wings contributing to total audit (C/A)
Acacia	36	9	4	19.0%	44%	11%
Banksia	32	6	2	9.5%	33%	6%
Casuarina	32	4	2	9.5%	50%	6%
Diosma	NA*	1	0	0%	0%	NA*
Grevillea	15	6	2	9.5%	33%	13%
Hoya	18	15	6	28.6%	40%	33%
Frangipani	21	7	4	9.5%	57%	19%
Jarra	8	1	1	14.3%	100%	13%
TOTAL	**162**	**49**	**21**	**100%**		**100%**

*This wing closed for the renovation after the consent process and the resident moved out of the facility.

Each record was audited using an adapted version of the Quality of Australian Nursing Documentation in Aged Care (QANDAC) instrument, designed to examine the quality of nursing diagnosis, interventions and outcomes in residential aged care (Wang, Björvell, Hailey, & Yu, 2014). Adaptations of the QANDAC moved away from the Likert scale approach to limit the subjectivity of interpretations to a 'Yes/No approach to 'completed' or 'incomplete'. Section 1 was modified to be more specific to the structures of Jindalee's collected items. Examination of the content validity of the adapted tool and inter-rater reliability of data extracted involved members of the research team. Guiding principles for the audit were considering 'what documentation is available to staff on the wing caring for residents. Missing information such as dates or signature or total score were judged to be 'incomplete'.

The tool was used to score the quality of nursing documentation on three dimensions: A. History and assessment; B. Nursing process; C. Nursing progress notes.

A. Presence of complete core nursing history and assessment forms (scored out of 14);

- This was based on the Clinical Data base form as Jindalee's own criteria for documentation, and review of completeness (Yes/No) of each of the 14 assessments (ADL, behavior, bowel, urinary continence, communication, dental and oral, depression, falls, pain, psychogeriatric care, skin observation, Braden pressure injury risk, sleep) (see Table 3.13)

B. Documentation of the nursing process (Assessment, planning, interventions and evaluation) for one specific nursing problem experienced by the resident (scored out of 10)

- For consistency of analysis, specific problems were included in hierarchical approach in the following order: Cognition/Behaviour; Falls/Mobility; Pressure Injury/Wound; Pain; Continence;

Medical. Once the problem was identified, each component of the Nursing Process were examined (see Table 3.14)

C. The quality of nursing progress notes (five most recent nursing entries, each scored out of 10).

- Is the writing of records legible?
- Are statements made by staff entries using clear and succinct language?
- Are the statements factual and objective?
- Do entries use 24hr clock?
- Are entries written in black ink?
- Is/are error(s) crossed out with a single line and signed?
- Are all spaces between entries in progress notes out with a single line?
- Are abbreviations officially recognised?
- Are all pages labelled with the resident's identification?
- Are all documents signed and dates with printed name and designation?

Table 3.12 summarises the baseline documentation approaches utilized at Jindalee, and identifies which components were audited as part of this analysis.

Sources of information to answer Section B were the most complicated.

Goals tended to be identifiable in Lee Care document for behaviour goals, sometimes Health and Leisure for other goals, front sheet for falls or mobility goals

Interventions planned tended to be identifiable in progress notes, ticks at the bottom of lee care sheets, behavior assessments.

Interventions implemented tended to be identifiable in progress notes, ticks at bottom of lee care sheets, behaviour assessments, frontsheet lifestyle plan summary/care plan folder.

Evaluation of interventions implemented tended to be identifable from health and leisure attendance, ticked or with comments (eg 'no change').

Table 3.12 Baseline documentation system used in resident record audit.

BASELINE DOCUMENTATION SYSTEM USED IN RESIDENT RECORD AUDIT					
Folder Type	**Data for Audit**	**What**	**Location**	**Content Summary**	**Used By**
Individual Resident Folders	**Part A, B, C**	Lifestyle Care Plan (thin journal/folder)	Central nursing area of wing	Front page, picture, activity tick sheet, bowel chart, falls prevention plan, physio plan,	All AINs
	Part A, B, C	Blue Folder (large folder including admission, clinical data base, assessments)	Central nursing area of wing	44 forms if relevent (eg top 5, falls risk, pain assessment, incident forms, personal hygiene), progress notes	Nurses, AINS
	N/A	ACFI folders	Downstairs in ACFI office, in locked cupboard	Lifestyle care plan, physio assessment (most accurate pain report), ACFI reports	Nurses, AINS, ACFI, CNC directed
	N/A	Archives	Downstairs in locked cupboards in store room	Incident reports after Manager entry, old notes, older assesments	Nurses, CNCs, ACFI nurses, ADONS
	N/A	Pre-Archives	Filing cabinet - interim stage of archiving, or piles on desk	Incident reports after Manager entry, old notes, older assesments	Nurses, CNCs, ACFI nurses, ADONS
Grouped Folders (multiple Residents, usually individual sleeves)	**Did not use**	Open Assessments, (in progress), blue folder	Central nursing area of wing	eg 7 day verbal behaviours, 3 day bladder, 7 day bowel	AINs enter, CNC then complete and finalise into individual folders
	Did not use	Nurses Medication and Clinical Obs Folder	Medication Trolley	Medications, monthly BP, monthly weight, regular BGLs, sats if necessary	Nurses, CNC
	N/A	Fire Bags	One central bag, +1/ wing	Resident information	
	N/A	Podiatry	Central nursing area of wing - used mainly by podiatrist	Referall, medicare summary (also have one pager print out into individual files)	
	N/A	Wounds, purple folder	Central nursing area of wing - used mainly by wound nurse	Current wounds, healed wounds, initial assessment, continuation form, archives	
	N/A	Weights and obs, red folder	Central nursing area of wing - collected all on the same day, easier to enter and access	Monthly weights, BP, HR, BGLs, birthdays, archives	

Although the records were randomly selected, these records for audit were evenly stratified across all wings of the facility (Table 3.11). Just over half (57.1%) were for female residents, and their average age of was 84 (SD 9.1) years. The residents have been at Jindalee between 1 and 6 years (M3.96, SD1.8). The assessment forms were completed between 19 days and 5 years ago.

Of the 14 nursing history and nursing assessment forms available to be completed for each resident, a mean of 7.7 complete forms were available for each resident. Assessments of depression (91%) and pain (71%) were most frequently complete, while sleep (28%) and dental (43%) assessments were most often incomplete (Table 3.13).

Documentation of the nursing process was examined once in each record, for one specific patient problem that had been identified as affecting the resident; these included cognition (71%;n=15), mobility and falls (23.8%; n=5) or a medical problem (4.8%;n=1). Only one patient record included comprehensive documentation of the nursing process with a perfect score of 10 (100%); 47.6% (n=10) had less than half the required elements documented (Table 3.14).

Of the 105 nursing progress note entries examined, the average quality score was 8.5 (SD 1.3) out of possible 10. The most common gaps in the quality of the progress note were related to presence and readability of the role designation (e.g. AIN, RN), in particular the last name of the care worker was often missing, and reporting time in the 24-hour clock.

Opportunity to improve contemporaneous documentation, as well as nursing assessments of risks, interventions and evaluations of resident care needed to support point-of-care evidence-informed decision-making for care delivery were identified.

Table 3.13 Assessment forms complete and incomplete for each resident.

Assessment form (N=21 records)	Form complete		Form present and incomplete		Not applicable or not present	
	n	%	n	%	n	%
Resident's Clinical Data Base	6	28.6	15	71.4		
ADL assessment	14	63.6	7	31.8		
Resident's behaviour (lee care, or ACFI) assessment	10	45.5	7	31.8		
Resident's bowel assessment	13	59.1	8	36.4		
Resident's urinary continence assessment	13	59.1	8	36.4		
Resident's communication assessment	11	50	10	45.5		
Resident's dental and oral assessment complete	9	40.9	12	54.5		
Depression (lee care, ACFI) assessment	19	86.4	2	9.1		
Falls risk assessment	14	63.6	7	31.8		
Pain assessment	15	68.2	6	27.3		
Psychogeriatric (lee care, cognitive skills checklist) assessment	14	63.6	6	27.3	1	4.5
Skin observation assessment	12	54.5	8	36.4	1	4.5
Braden pressure injury risk assessment complete? (with total score, added up correctly)	6	27.3	15	71.4		
Sleep assessment	6	27.3	15	68.2		

Table 3.14 Examination of the quality of nursing process documentation for a specific resident problem.

Audit of the Nursing process	Yes		No		Unclear or insufficient information	
	n	%	n	%	n	%
Nursing problem Clear nursing problem statement(s) describing the type and nature of the resident's current and/or potential problem(s)/risk(s)/care needs	15	68.2	6	27.3		
Contributing facts Does/do the statement(s)/risk(s)/care needs indicate one or more contributing fact?	11	50	9	40.9		
Signs and symptoms of the nursing problem Is/are sign(s) and/or symptom(s) stated in relation to the nursing problem(s) identified?	15	68.2	5	22.2	1	4.5
Goals Is/are goal(s) set up in relation to the problem(s)/risk(s)/care needs?	12	54.5	8	36.4	1	4.5
Measure of the goals Is/are the goal(s) measurable or observable?	10	45.5	8	36.4	3	13.6
Nursing interventions Is/are nursing intervention(s) planned to address the nursing problem(s)/risk(s) identified	16	72.7	4	18.2	1	4.5
Suitability of the nursing interventions Is/are nursing interventions appropriate or suitable to the goals?	15	68.2	5	22.7	1	4.5
Details of the nursing interventions Is/are intervention(s) specific and detailed?	10	45.5	10	45.5	1	4.5
Intervention implementation Has/have intervention(s) been implemented?	8	36.4	11	50	1	4.5
Nursing evaluation Is/are there nursing evaluation(s) conducted in relation to planned care?	8	36.4	10	45.5	3	13.6
Resident outcomes Is/are resident outcomes in relation to planned care documented in the care plan?	5	22.7	13	59.1	3	13.6
Demonstrated effectiveness of care Does/do evaluation(s) show the effectiveness of care provided in terms of achieving the goal?	5	22.7	13	59.1	3	13.6
Nurse's relevant qualifications Is/are care plan(s) made by a suitably qualified nurse?	16	72.7	3	13.6	2	9.1
Progress notes of the nursing process Is/are the resident's temporary problem(s) or condition change(s) noticed in the progress notes addressed by a care process as documented?	12	54.5	8	36.4	1	4.5

3.2.5 Quality of Life Interview – DEMQOL

The 'Dementia Quality of Life' (DEMQOL) is a 29-item interviewer administered measure designed to examine health-related self-reported quality of life for individuals diagnosed with dementia (Smith et al., 2005). Items measure three factors that include feelings ("In the last week, have you felt worried or anxious"), memory (In the last week, how worried have you been about forgetting who people are") and everyday life ("In the last week, how worried have you been about not having enough company") of the person with dementia in the previous week. Items are scored on a 4-point Likert scale (1 = a lot, 2 = quite a bit, 3 = a little, 4 = not at all), with higher scores reflecting better quality of life. The DEMQOL was previously found to have acceptable levels of internal consistency (a = 0.94; (Smith et al., 2005), and is also suitable for people without dementia. During the Baseline data collection in March, DEMQOL interviews were conducted onsite by two researchers, and additional interviews were completed in April and May. Obtained data were analysed following SPSS syntax provided by the developers of this tool (Smith et al., 2005). This syntax included conversion of Likert scale for positive items, imputation of missing data and calculation of the overall DEMQOL score.

In total, 31 DEMQOL interviews were conducted, which resulted in 19.7% response rate. These data were analysed using SPSS syntax provided by the developers SPSS syntax (Smith et al., 2005). After the imputation of missing data, a mean score of 96.1 was calculated (Table 3.11). This mean score was higher than an average score of 91 in other published studies, which investigated therapeutic effects of variable interventions on the quality of life of aged care residents (Edwards, McDonnell, & Merl, 2013; Fleming, Goodenough, Low, Chenoweth, & Brodaty, 2016; Saravanakumar, Johanna Higgins, Jane van der Riet, Marquez, & Sibbritt, 2014). This suggests that Jindalee residents are highly satisfied with their quality of life. This measurement will assist in monitoring of effects of SmartCare on residents' quality of life at Jindalee.

Table 3.15 Characteristics of DEMQOL Score for Jindalee residents (N=31).

DEMQOL Score	Residents (N=31)
Mean	96.1
Std. D	10.7
Min	66.4
Max	110

WHAT THIS MEANS - SATISFACTION

There were high rates of resident and staff satisfaction

Staff were more likely than residents to recommend the facility to friends and family

Staff were more likely to report higher levels of missed care than residents.

3.2.6 Net Promoter Score (NPS)

Nurse-reported and patient-reported care quality were effectively used as proxies for the quality of a health service and found to be associated with patient outcomes (Kutney-Lee et al., 2009). This study will use a 'Net Promotor Score' (NPS): "How likely would you be to recommend this facility to family and friends on a scale from 1 (definitely not recommend) to 10 (would definitely recommend)?". This form was available to complete for staff, residents and visitors to gain a perspective of service quality. Received answers were grouped

and analysed independently by the status of the respondent (staff or resident/visitor).

During the baseline data collection, 59 responses with the Net Promoter Score were received. Among these, 27 responses were from residents and their visitors, and 32 responses from staff. Ranges of scores were grouped into Detractors (0-6), Passives (7-8) and Promoters (9-10) (Figure 3.10). The distributions of Promoters, Passives and Detractors among residents and staff were not statistically different (X^2_2=1.06, p=0.59).

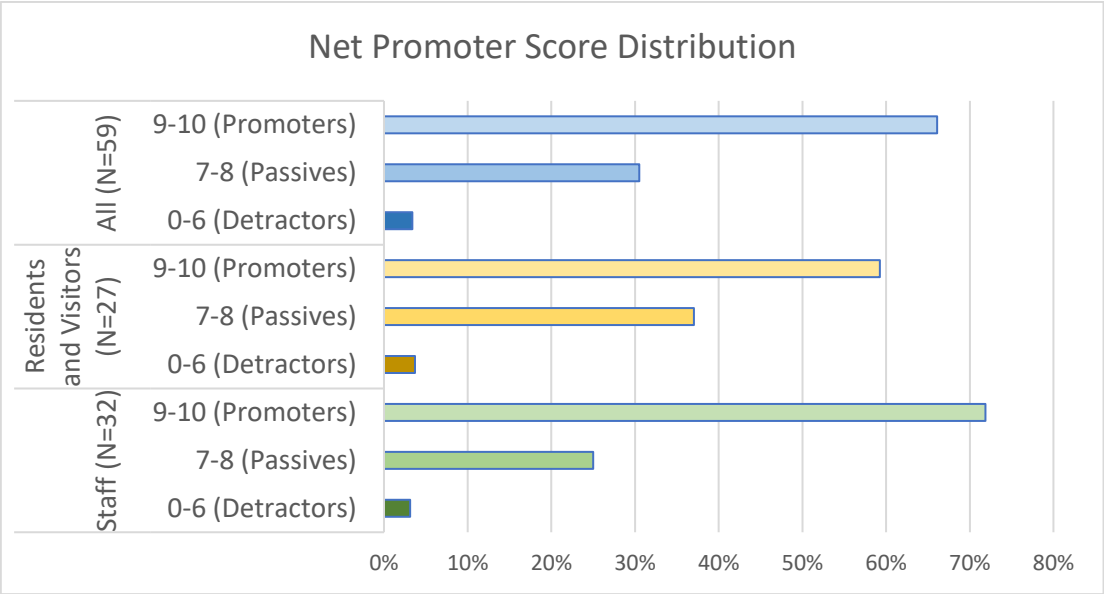


Figure 3.12 Distributions of Detractors, Passives and Promoters among all respondents

Net Promoter Score were calculated by detracting of the proportion of Detractors from the proportion of Promoters. Thus, overall NPS was 62.7%, NPS among residents and visitors was 55.6% and among staff 68.8% (Figure 3.11).

Figure 3.13 Net Promoter Score among all respondents

3.2.7 Global Estimate of Missed Nursing Care (GEM)

The Global Estimate of Missed (GEM) nursing care is a single item measure designed to assess instances of missed nursing care and will be used to examine the quality criterion (Hamilton et al., 2017). This single item measure consists of one item: "To the best of your knowledge what percent of

nursing care is MISSED in the last 48 hours by the nursing staff in your workplace? Please provide your estimate as a number in the comment box below", with higher percentages reflecting higher amounts of missed care. Analysis of the global estimate of missed nursing care revealed acceptable levels of sensitivity and specificity (>0.5; (Hamilton et al., 2017) according to the ROC performance criterion set by Polit and Beck (Polit & Beck, 2008). Received answers were grouped and analysed independently by the status of the respondent (staff or resident/visitor).

Although 'Net Promoter Score' and 'Global Estimate of Missed Care' questions were in one form (Appendix 4), which could be completed by residents, visitors and staff anonymously, the research team received less responses to GEM question than to NPS question, 52 versus 59. Among these 52 responses, 21 (40.4%) suggested that there was no missed care (0%) in the past 48 hours, 28 (53.8%) suggested that 1-20% of care was missed, and 3 (5.8%) reported more than 20% of missed care. Interestingly, among 24 responses from residents and visitors, the majority of reported 0% of missed care, whereas among 28 responses from staff the majority suggested that 1-20% of care was missed (Figures 3.12 and 3.13). Thus, the distributions of Global Estimate of Missed Care were significantly different between residents and staff (X^2_2=15.02, p=0.001).

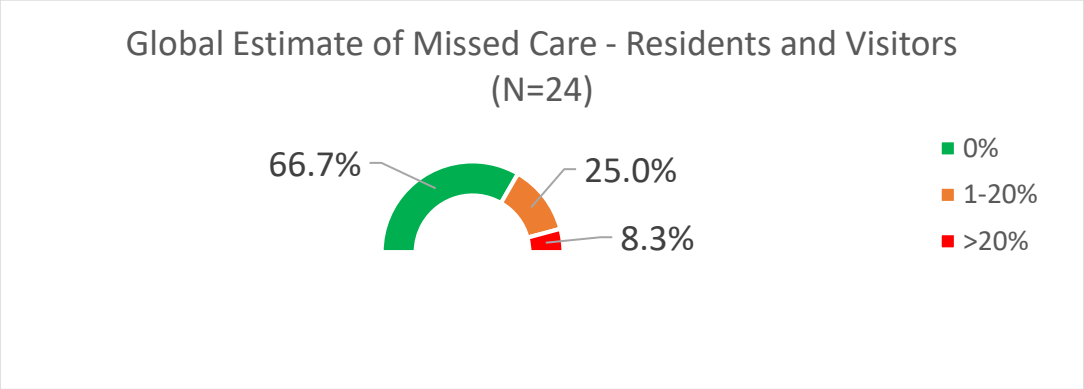


Figure 3.14 Distribution of Global Estimate of Missed care among residents and visitors.

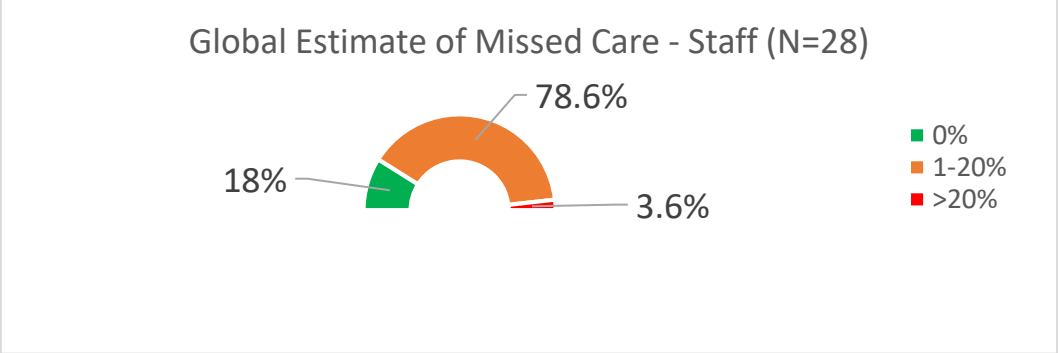


Figure 3.15 Distribution of Global Estimate of Missed care among staff.

Staff were more likely to promote the facility, but also more likely to report higher proportion of missed care. In contrast, residents were less likely to promote the facility compared to staff but also

reported less missed care. Consistent with mixed methods, collected qualitative data will be used for interpretations of trends observed in NPS and GEM responses, both for staff and residents.

3.2.8 Incident Reports and Documentation of Jindalee - TBA

Jindalee management has provided access to accident and incident data from January 2018 to April 2019. The research team is planning to get access to more data during the following stages of SmartCare implementation, and analyse these data grouped by pre-implementation, implementation and post-implementation periods.

Aggregate data were collected from Jindalee's usual reporting and analysed using descriptive statistics. Resident outcome data include falls, skin tears, pressure injuries and episodes of aggression (to staff, residents, and other behaviour), and will be examined with a pre-test post-test methodology being employed with no control to examine whether there were trends in outcomes during the project. If possible, activity-based funding categories of residents will be collected pre and post to identify risk and complexity profiles of the two different cohorts (pre and post). An internal paper documentation audit will be used retrospectively using the Quality of Aged Care Nursing Documentation Audit Instrument (QANDAI). This instrument was designed to examine the quality of nursing diagnosis, interventions and outcomes in residential aged care in Australia (Wang 2014) and thus will be used to examine these variables in the present study (Muller-Staub, 2009). This scale consists of 34 items, measured on a 5-point Likert scale. This scale was found to have acceptable levels of reliability (content validity ratio 0.6-1.0, with one question at 0.2), with reliability ranging from 81-100%. This data will be collected after Stage 1.

3.2.9 Nurse and Care Worker Survey - TBA

The nurse and care worker survey will be utilised to examine and evaluate multiple aspects of the SmartCare system. Including the useability, performance expectancy, effort expectancy, social influence, voluntariness, facilitating conditions, behavioural intention to use the system, functions, user satisfaction, and user perceptions of their skill level using the SmartCare system. The items for each factor will be examined through the use of a 5-point and 7-point Likert scales. The survey will be adjusted based on functions in the aged care version and transferred into Qualtrics so that the survey can be completed on paper, iPhone, tablet or online. This data will be collected after Stage 1.

3.3 Qualitative Methods and Results

Qualitative methods utilised in the Baseline collection aimed to capture practice and care in the aged care facility, complexity of its environment and culture. In addition to this, the following Phase 2 and 3 of data collection will aim to gather staff and residents' feedback on the SmartCare system implementation via focus groups and survey forms. Qualitative data were analysed using thematic analysis (Braun & Clarke, 2006), which involves sifting and sorting through pieces of data to detect and interpret thematic categorisations, search for inconsistencies and contradictions, and generate conclusions about what is happening and why. Data quality will be ensured through the use of triangulation, which will be achieved in the present study by collecting information from different stakeholder populations, using a range of methods, and by having multiple researchers examine the data independently, as recommended by Carter, Bryant-Lukosius, DiCenso, Blythem and Neville (2014).

Future stages of qualitative data will be analysed with the support of the Theoretical Domains Framework, to better understand the barriers and enablers to implementation. Future stages will also include an additional qualitative data method of focus groups.

3.3.1 Think Aloud Interviews

Researchers have followed staff members while they were performing their tasks and discussing different aspects. During the Baseline data collection, a range of staff roles were interviewed in order to capture various perspectives on the current culture in care. In addition, researchers' discussions of the obtained information were audio recorded and transcribed verbatim. This audio recording was only of researcher discussions and did not involve staff or residents.

3.3.2 Ethnographic Notes

Ethnographic notes have comprised notes collected during 'Time and Motion' observations, DEMQOL interviews, comments from NPS and GEM surveys, and notes from the researchers' communication journal. These notes included information gathered both from staff and residents and were analysed using thematic analysis (Braun & Clarke, 2006). Individual researchers independently familiarised themselves with the data, generating categories of noted issues that arose in the data and were related to the aims of the research, and coming to consensus regarding suitable codes for the data.

Qualitative data from baseline is presented below, highlighting key issues for implementation consideration. Composite case studies are used for key illustration of areas that may be useful to address in SmartCare implementation. The grouping of qualitative data was according to the evaluation framework, and the quotations are provided after the composite case studies.

3.3.3 Composite case studies

The use of composite case studies is a way of highlighting key issues revealed in the qualitative data, while protecting identity of individuals and providing complex examples equivalent to real scenarios. The following Case Studies illuminate issues that SmartCare may be able to address, with real and human consequences.

CASE STUDY 1 – OPENING BANANAS

The nurse Judy stopped her medication round and asked one of the care workers to get Phil a banana from the kitchenette. The researcher asked 'how did you know he wanted a banana?' Judy said she noticed he hadn't been given it as per his usual routine. The casual care worker got a banana, and put it on Phil's tray, where Phil sat alert, with his hands lively sitting on the table and who had no appearance of any physical limitations. Judy then went to Phil and opened the banana for him, as he mentally couldn't connect how to open and peel a banana. 'Delicious banana!' Phil said.

In Case Study 1 'Opening Bananas' we can see how known but potentially undocumented knowledge is relied on to ensure care was met. This can be seen in the way the nurse noticed that food was not provided in the manner required by the participant to ensure care. Furthermore, it is implied that had this error not been noticed, or other staff been responsible for this task, that the resident would not have been able to eat their food. This instance provides an example of the challenges of managing unfamiliar staff needing to learn resident preferences to provide quality care, and this information being undocumented or not accessible by other staff. It is foreseeable that banana could have remained unpeeled and that the resident may have then subsequently gone without that meal, which

suggests that missed care could occur when the staff with this acquired knowledge are not working. If left to the care worker it would not have been eaten and may have been presumed unwanted. Interestingly the nurse also chose to open the banana herself rather than ask again for the care worker to attend to it – perhaps not seeing this communication as valuable learning for the casual care worker, but also perhaps because she enjoys caring for Phil herself and making sure his needs are met.

Case Study 2 highlights that while information is readily available, it is not necessarily accessed nor acted upon. Marcella had changed her risk profile in relation to her susceptibility to aspiration pneumonia related to her swallowing ability. This is a common change in dementia and other chronic illnesses, where the person's capacity to protect their own airway through the swallowing (gag) reflex is altered by the disease process. Speech pathologists review patients with changing risks, and determine what kinds of foods, liquids and environmental conditions are recommended in order to minimise the risk of aspiration pneumonia. Pneumonia is one of the highest causes of death in residential aged care. However, it is also important to note that eating and drinking are one of the most important components of quality of life for residents. Hence, getting the right balance is important. In Marcella's case though, the drink provided was not consistent with the recent clinical change in her order, which was thickened fluids. At some point in the morning this had not been attended to by the staff, and the nurse in her supervisory capacity had identified this and rectified it. This case also highlights that it is easy and efficient for care workers to assume that care is the same as last shift but may be wrong

CASE STUDY 2 – RISKY DRINKING

While the nurse Maxine is doing her medication round, she notices that Marcella, who is sitting in a corner of the common room with her tea, keeps coughing. Maxine goes over, looks in the cup, goes to the nursing desk to look in the handover book, goes to the kitchenette, tells a care worker that the fluid should be thickened, as of yesterday. Informs the care worker that this is dangerous as Marcella could end up with aspiration pneumonia and reminds the care worker she must always read the book to check for these changes.

CASE STUDY 3 – TALKING TENNIS

A care worker was visiting residents to check if they needed anything before breakfast, making beds, tidying tables. When she made a bed of one of the residents, she just sat down with him for 3 minutes, talking about tennis that he was watching, his plans for that day. When she left his room, she told the researcher that other care workers struggle to talk to him as he can be abrupt and is not a talkative person. However, she talks to him when she has time as she knows what he likes to talk about, as he needs company.

In Case Study 3 the care worker demonstrates the personal and relationship-based components of care, that may not be documented but are perceived as important to the social, emotional and behavioural aspects of the resident's care experience. There were many examples of this kind of technique of person-focussed care: for instance, a care worker commenting that she knew that Mary wouldn't wear blue pants with a bright pink top, as Mary prefers certain colour combinations. This kind of detail may be captured in documentation through the admittance

procedure or in progress notes, but is not available at point of care or at key moments of care intervention, such as just before showering and dressing change is due to take place.

Case Study 4 highlights that it's not feasible for casuals to check five folder front sheets at the beginning of their shift to understand resident care needs. Much of the care communication to maintain efficiency and consistency is conducted with verbal handovers during the shift. Consequently, much of it is communicated in corridors, as this is one of the most frequented locations of care, and the location where the care workers cross each other's paths. The complexity of managing efficiency in care is highlighted by the management of core factors in each shift that are required: whether residents require two staff to safely care for them (known as 'doubles', compared to residents who can be cared for (showered, toileted, changed clothes) by a sole staff member, known as 'singles'); and when tea breaks, handovers, and shifts end, because this determines how many staff are on the floor to do the care work required.

CASE STUDY 4 – READING TAKES TIME

The casual care worker hadn't worked the wing before so wasn't sure how to look after the 5 residents she was allocated. The team leader kept yelling down the corridor 'Mrs Bingle will be ready for breakfast now, walk her down', 'Mrs Waters likes her shower after breakfast, if you get the towels and clothes ready now she will do it herself afterwards'. 'Help me with Sir Henry's hoist transfer now, and then you can get Mr Bonif's wheelchair ready while he shaves'.

CASE STUDY 5 – KNOWING PEOPLE

The assessing nurse had identified from the preadmission paperwork that the new resident, Bill, was able to wash himself and was continent. However, after a few days it was apparent that, partly due to his very overweight state, he could not reach all areas of his back, sacrum and legs to wash and dry, and this risk hygiene and skin integrity. He also had multiple episodes of incontinence. It was likely that his family who assisted with the preadmission paperwork were either unaware of these issues, or they were maintaining his self perception and identity as able and willing in his own self care.

Case Study 5 highlights that in the interest of dignity of the resident the accuracy of assessment and documentation doesn't need to be determined immediately. Ensuring that the documentation could be updated to include assessments as they occur and information as it is revealed is important. This was also apparent in the way the care workers worked, in that they would assist in the care of a whole room or wing of residents, but only document at the end of their shift. Managing these gaps in action and documentation was normal work for them, and while it was commented that *'old school people used to carry notebooks'*, now care workers remember it, they *'carry it around in their heads: oh yes I took her to the toilet and 10, she opened her bowels, they were semi-formed'*. This information that is in care workers heads but not necessarily collected as part of documentation and resident history is also part of Case Study 6.

CASE STUDY 6 – MANAGING THE MOMENT

It was the beginning of the afternoon shift, with 4 new afternoon staff starting and 3 morning staff due to finish, go on break, or start their documentation. At the same time, two residents Tom and Ruby, were 'escalating' in their behaviours (increasing non-blinking eye contact, raising voices, posturing, unclear intent). The team leader Mohammed was trying to talk down and re-orient the residents, instruct afternoon staff as to their priorities, and delegate to morning staff how to de-escalate the situation. After the residents had been re-oriented, the staff returned to the completing the tasks immediately at hand. Documentation of the contributing factors to the non-altercation, or the care interventions that successfully re-oriented Tom and Ruby, did not occur.

Case Study 6 highlights the complexity of the multitasking and interruptions that are common in aged care. Team Leader Mohammed was able to prevent an incident from occurring, however setting up the circumstances for others to replicate his effective practice is not easily able to be captured. This happened often in practice, primarily because the focus of the care is on the people (which is positive); but also, perhaps, because the focus of the documentation is on audit requirements, which is less positive. Documentation of the behaviours would only be required to occur if it was a 'reportable incident'; ie the behaviours caused physical altercation between two residents without dementia. This case also highlights the challenges in close quarter living.

These composite cases studies have been used to illustrate the qualitative themes identified in the baseline phase, which are presented in Table 3.12. These case studies are not an exhaustive demonstration of these themes, but useful for understanding key emerging issues.

Table 3.16 Qualitative themes

Aims	Objectives	Baseline themes of the experience of the current system
Acceptability	1.Reduced time spent retrieving information and documenting care	- Documentation is time consuming - Reading is time consuming and not necessarily useful - Duplicate documentation currently essential - Care workers can be waiting for verbal instruction
	2.Improved satisfaction of staff and residents with care	- Staff provide needed support to residents and relatives – they are social, friendly, welcoming, trustworthy - Families equate dress, cleanliness and communication with quality of care - Shift hours determine staff activities - It's not satisfying for staff if care quality can't be provided within available resources (including time) - Stable and well-educated staff are valued - Documentation is used to inform and supervise the care workers - There is dissatisfaction with how staff are valued in aged care
Efficiency	3.Improved consistency of staff working with management-approved clinical treatment protocols	- Consistency happens through verbal handovers - Consistency in care happens because staff have known residents for a long time - It is easy and efficient for care workers to assume that care is the same as last shift but may be wrong
	4. Reduced errors by omission and missed documentation	- Auditing determines what is documented - Documentation is used to assess staff consistency/compliance for quality control and education needs - Staff trust computer systems to create care plans - Staff use environmental cues rather than documentation to understand resident needs
Quality	6.Improved resident health and quality of life	- The experience of 'health' and 'quality' is varied and related to personality - Close quarter living in shared spaces can be stressful - Person focussed care happens from getting to know the resident - history, preferences, personality, acceptance of risks - Knowing people and having quality relationships equates to quality care
	7.Reduced perceptions of missed care	- Staff work around limitations related to break times, and resident 'singles and doubles' staffing needs - Missed care can happen if the resident preferences aren't known - When staff can't do what residents need, including technical support, care feels missed - Staff monitor residents and coordinate and adjust available resources to minimise care being missed - Missed care can be about professional boundaries, where responsibility is unclear
No data were coded at Baseline into Objective: 5. Improved management decisions informed by aggregated data on resident welfare for the allocation of resources; nor Objective: 8. Increased time spent by nurses and carers with residents.		

3.3.4 Qualitative quotes coded within Aim 1. Acceptability

3.3.4.1 *Objective 1. 'Reduced time spent retrieving information and documenting care'*

Documentation is time consuming

- *Now they carry it around in their heads 'oh yes I took her to the toilet at 10, and …' they've got to remember it TalkAlouds-BL*
- *Probably 2 hours per residents - transcribing written assessment to digital. There are Admissions on average 5 to 6 per month (some 10 or 11, some 4). (NB – so some months that's a full time job for a week, just transcribing TalkAlouds-BL*
- *Staff spend time outside their shift documenting. At 2.15, they were still doing documentation TalkAlouds-BL*

Reading is time consuming and not necessarily useful

- *For a casual, even if there was perfectly accessible resident information available, doesn't have time to access it, just has to run from one resident to the next and work out what they need as they go. TalkAlouds-BL*
- *It is impossible to read the care plan, it would take 1.5 hours. TalkAlouds-BL*
- *Well, if you're a new staff member, yeah, you'd have to go and look at five different folders if you have five different residents to find out their care plan on that one page at the front if you have time to do that TalkAlouds-BL*
- *The ACAT: Original is 58 pages (of nothing!!). Most down to 19 pages. Some say 'Health Conditions' = see medical summary, but no medical summary attached. TalkAlouds-BL*
- *So every person has two folders – and then has their bowel chart, shower chart, progress notes. there's this care plan that exists on top of these folders, but that would mean going and seeing five folders at the beginning of shift which might not be possible TalkAlouds-BL*

Duplicate documentation currently essential

- *There are four evacuation bags, one for each wing and the master. Need to update and correlate bags regularly – then can use by staff at evacuation areas. Paperwork is always updated into each bag TalkAlouds-BL*
- *They all write too much into the DONs book, they should write in the residents notes (instead they just write 'see DONS book' in resident notes). DONs book is a legal document but it should be is the residents notes which is more legal TalkAlouds-BL*
- *Changes of resident medication needs to be documented in 4 places: Handover for next RN; DONS book; Medication change form on trolley; Resident progress notes TalkAlouds-BL*

Care workers can be waiting for verbal instruction

- *There were about three or four carers around, not really having direction, not knowing what to do. TalkAlouds-BL*
- *Experienced long term Care workers have everything in their heads and have to try to get it all out TalkAlouds-BL*
- *Staff milling around. Their shift finished at 1.30. And they were transferring residents at that time, and it was chaotic. TalkAlouds-BL*

3.3.4.2 *Objective 2. Improved satisfaction of staff and residents with care (system)*

Staff provide needed support – they are social, friendly, welcoming, trustworthy

- *There is attention to detail by all the staff at Jindalee, their willingness to help is outstanding. Resident Ethno-Anon-BL*
- *I feel like it's one big happy family. I have met some very lovely people. Be it staff or residents. Resident Ethno-Anon-BL*
- *I can't speak highly enough about the care they give me here. Resident Ethno-Anon-BL*
- *Near perfect as you get. They are unbelievable. Relative Ethno-Anon-BL*
- *I have to trust implicitly what they are doing here. Relative Ethno-DQ-BL*
- *Everyone says hello, as you need this support when you are coming here. Relative. Ethno-DQ-BL*
- *You're the main [staff] carer they know, the families know, they need reassurance and communication in that time. Staff TalkAlouds-BL*

Families equate dress and cleanliness and communication with quality of care

- *My mother loses clothes frequently. When sent to wash we know some clothes have been binned without her permission and she is not demented. Relative Ethno-Anon-BL*
- *RN was notified about verbal abuse, but RN denied that that person was capable of abuse. Relative Ethno-Anon-BL*

Shift hours determine activities

- *Jobs in mornings, jobs in afternoons, we try to plan it. Staff TalkAlouds-BL*
- *There is a progress note schedule. Staff TalkAlouds-BL*
- *Before 11 am all residents are up, 12-1 lunch usually, after 1pm, toileting. Staff TalkAlouds-BL*

It's not satisfying for staff if care quality can't be provided within available resources (including time)

- *Whereas a casual, even if there was perfectly accessible resident information available, doesn't have time to access it, just has to run from one resident to the next and work out what they need as they go. Staff TalkAlouds-BL*
- *Expressed "I did my best but I'm exhausted". Staff TalkAlouds-BL*

Stable and highly educated staffing is valued

- *we use full pay for staff member while waiting investigation TalkAlouds-BL*
- *we are the only facility in ACT that has RNs overnight onsite, and on Sundays. The law doesn't specify. Jindalee make decisions by principle, always have TalkAlouds-BL*
- *We pay better, made better education experiences TalkAlouds-BL*
- *She talked about how lucky they are to have so many staff who are long term, they have good retention, given how poor the pay parity is with acute or community or any other sectors. TalkAlouds-BL*
- *Some of her staff tell her that when they work in other places they do not recognise a single staff person from one shift to the next. The whole facility is run by casuals TalkAlouds-BL*
- *sometimes they don't understand them or feel confident….. don't really understand pain or behaviours…… not really equipped to assess them. Needs to be overlooked by EN or RN on the wing…… who are usually distracted by med rounds TalkAlouds-BL*

Documentation is used to inform and supervise the Care workers

- *Nurse writes longer spiel on pain relief to 'educate your eyes and ears' (the Care workers) TalkAlouds-BL*
- *Sometimes they don't understand them or feel confident….. don't really understand pain or behaviours…… not really equipped to assess them. Needs to be overlooked by EN or RN on the wing…… who are usually distracted by med rounds TalkAlouds-BL*

Dissatisfaction with how staff are valued in aged care

- *They've got a really hard job, and we're paying them $20 an hour. TalkAlouds-BL*
- *We expect them to have assessment skills of a junior RN TalkAlouds-BL*
- *the demographic of the staff has an impact on care, social situation and level of education. TalkAlouds-BL*

3.3.5 Qualitative quotes coded within Aim 2. Efficiency

3.3.5.1 *Objective 3. Consistency of staff working with management-approved clinical treatment protocols (in care plans)*

Consistency happens through verbal handovers

- *communication is often yelled down the corridor, so, "Just so you know, so and so had a shower, and so and so had their bowels open, so and so," to try and communicate between the staff, because, otherwise, it's not documented until the end of shift. TalkAlouds-BL*
- *Discussed an altercation and how a staff member the next day would know about it, there is no written handover except for the DON's book. Verbal handover. No sheet for the staff.*
- *they'll get the verbal handover that, "Mr Brown's so bad at the moment, especially at 3.00 pm, he's been like this for weeks." And then they go to the notes and nothing's documented about anything about what's happening at 3.00 pm. TalkAlouds-BL*
- *So if I was a new staff member, how would I know if someone was one assist, two assist, thickened fluids, fluids, whatever it was? Well, hopefully, your buddy will tell you. TalkAlouds-BL*

Consistency in care happens because staff have been here a long time

- *She's been working with her colleagues for 15 years together TalkAlouds-BL*
- *She trained me, she was so passionate about depression and pain, she taught me all I know, she started the fire in me 23 years ago! TalkAlouds-BL*
- *I always just ask the regular long term staff and they'll know what is normal for residents TalkAlouds-BL*
- *Been here for a long time know what they like, don't like when... Give tea after porridge, after toast – otherwise she gets stressed if it's all in front of her at once+ she won't eat. (Entry 53) Ethno-TM-BL*
- *'I'm here 8-9 years, I'm like family. This mama she was sick yesterday, she is too tired and weak to explain to a casual how she wants to be showered. I do her, I know how, I make it easier for her, cause she is sick.' AIN G wing*

It is easy for Care workers to assume that care is the same as yesterday (helps efficiency) but may be wrong

- *If we were Mon-Fri 9-5 it would be so much easier! Because I don't see the staff (night duty and weekend staff) TalkAlouds-BL*
- *So if I come on as a new staff member tomorrow, how do I know, then, not to sit Joan and Henry together again?" And they said, "Well, you might not' – when you go to progress note because it's happened again, then you will see that it happened yesterday because you'll read back in the progress notes and go, oh, the same thing happened yesterday. But as a pre-emptive or a preventative measure, how would I know? Well, you're not going to unless I'm working with you and I can tell you that it happened yesterday. TalkAlouds-BL*

3.3.5.2 *Objective 4. Errors by omission and missed documentation*

Auditing determines what is documented

- *So that if the accreditors walk in on any given day, she's got the paperwork organised.*
- *ACFI appears to be priority as far as documentation, so we make sure that that's done first before any other documentation is done. TalkAlouds-BL*
- *We educate across shifts, information to RN, sign in sheet used. Auditors want to see this, they want hardcopy. TalkAlouds-BL*
- *Folder for pain management. Signature evidence that the procedure has taken place in a folder. TalkAlouds-BL*

Documentation can be used to assess staff consistency/compliance ie quality control and education needs

- *Education in aged care means read, regurgitate, sign TalkAlouds-BL*
- *Education is easy to fix, but not compliance. TalkAlouds-BL*
- *I use the progress notes, if they are brought to my attention – eg the guys on A wing are using blue pen (but because it photocopies/scans/faxes it is much worse than black pen). I have to get everyone to use black pen. TalkAlouds-BL*
- *If we were Mon-Fri 9-5 it would be so much easier! Because I don't see the staff (night duty and weekend staff) TalkAlouds-BL*

Nurses trust computer systems to create care plan

- *Lee total care -> does change to palliative and all the things in progress notes -> just added pressure injury care to be 4 hourly TalkAlouds-BL*
- *Once they are completed, they come back here. Then they are all entered into the computer, into Lee Total Care, which develops the care plan eventually. TalkAlouds-BL*

Use environmental cues rather than documentation to understand resident needs

- *They talked about, maybe, verbal – not verbal, environmental cues. So if you see a wheelie walker, probably, they need to use it. If you see a cup with a lid on it with a spout, they probably have thickened fluids. And they said a lot of times, they've known staff to rely on these environmental cues to know what to do because there hasn't been a handover sheet per se TalkAlouds-BL*

- *following other people's directions and environmental cues seems to be a form of handover. TalkAlouds-BL*

3.3.6 Qualitative quotes coded within Aim 3. Quality

3.3.6.1 *Quotes coded within Objective 5. Resident health and quality of life*

The experience of 'health' and 'quality' is varied and related to personality

- *'How worried have you been about forgetting things that happened recently? – A little as 'Nothing I can do about it'. Ethno-DemQol-BL*
- *Have you felt that there are things that you wanted to do but couldn't? – 'Not at all, too lazy'. Ethno-DemQol-BL*
- *Felt lively when listened to the organ playing in church. Ethno-DemQol-BL*
- *Pleasant surprise that staff takes personal interest in residents. Ethno-DemQol-BL*
- *None of them talk to me (residents, staff), a doctor spoke once. Ethno-DemQol-BL*
- *Care can be consuming because people need to talk. Ethno-DemQol-BL*

Close quarter living, shared spaces, can be stressful

- *was this chaos moment that happened, and there was an incident between two residents, just verbal aggression, nothing physical aggression wise, but just an altercation TalkAlouds-BL*
- *It's a balancing act – how to best fit the people with the environment. Confused and disturbed elderly (CADE units) – disbanded 15 years ago. What they need is space, so they are not threatened, or hurt others. And Activity and exercise too TalkAlouds-BL*
- *it's also about how they're placing people based on how other people are there, and whose behaviours are going to trigger other people's behaviours. TalkAlouds-BL*
- *She tries to talks him down, listening, relaxed, in the same common room but a bit (a meter or two) further away from the other resident he was riling up TalkAlouds-BL*
- *They keep stealing my bras, underwear, have taken my perfume, make up and make up purse. Ethno-DemQol-BL*
- *E. is concerned about new neighbour as she intrudes in E's space, forgets a walker and thinks the entire room is hers. So E worries about her Ethno-CommsJournal-BL*

Person focussed care happens from getting to know the resident, their history, their preferences, their personality, their acceptance of different risks

- *The speech pathologist is really good at letting residents eat what they like, even if it is not the consistency they are meant to have. Eg One person was NBM but would steal chips off the trolley. He had Parkinsons. It was at his own risk, his choice. So the speech pathologist had that conversation with him about it – that's her speciality, her expertise, can articulate the risk. Post CVA – pureed diet. But this person loved food, like roast potatoes, so chopped finely and given extra gravy and observed closely TalkAlouds-BL*
- *It is good to have the kitchen and kitchenette here so then the residents can have what they want. Hot food or not. Can change their mind. (entry 54) Ethno-CommsJournal-BL*
- *Staff on from other wings, or nights – they don't know toast details (whether resident needs crust off or they won't eat it). We've lost two regulars just recently so it matters. TalkAlouds-BL*

Knowing people, having quality relationships, equates to quality care

- *Top 5 – really important to help us to know what to encourage, how to decide, eg if resident starts retreating after admission (common), how to get them motivated to come out of their room TalkAlouds-BL*
- *Use social page for HR management (ie allocate staffing to specific residents that might be beneficial) TalkAlouds-BL*
- *To smell gin on breath of resident and know they don't drink and know to tell the nurse to check the residents sugars TalkAlouds-BL*
- *We just keep trying different staff till one works. Different ideas, personalities, different triggers for the resident. Also have to manage pain, wet, hungry, territory – these are also triggers, as well as other residents TalkAlouds-BL*
- *How carefully they will be supervised is considered – some residents are only allowed to eat certain things if certain staff are working - Depends on HOW they eat, not WHAT, eg if they cough, you stop. You help them make sure they're not gulping. TalkAlouds-BL*

3.3.6.2 *Objective 6. Perceptions of missed care*

Staff have limitations related to break times, singles and doubles that they work around

- *the staffing levels change between different hours. So from 7.00 to 11.00, they've got in their little area, there's three of them, so there's one person that does singles and two that do the doubles, being one person assist, two person assist. They are referred to as singles and doubles. And then after 11 o'clock, it reduces by a person. So it becomes more difficult if they need to do things. TalkAlouds-BL*
- *Designation of some residents as doubles and others as singles and the way in which this flows through into entire organisation of staff allocation to patients on the shifts Ethno-TM-BL*

Staff monitor residents and coordinate and adjust available resources to minimise care being missed

- *You can't tell from some assessments that the resident needs a bean bag on the floor, that it takes three people on the floor like that, need multiple staff to aid. Or if there's gastro, 17 people down [sick], but we never went down to ratio [in staff numbers] TalkAlouds-BL*
- *DDON etc would be doing the staffing changes immediately TalkAlouds-BL*
- *Sometimes specials are needed, might put one nurse on that person who keeps trying to get out bed all the time. TalkAlouds-BL*
- *Might need floor bed, and a beanbag and something else, could still raise bed, but needed 2-3 people to get onto. Attempting different strategies – more hours, more staffing, more visibeams, floor mattresses. CNC would ring and say these are changes. TalkAlouds-BL*
- *I tell him we are struggling to meet needs, he will find another way. Constantly re-looking at them [residents] to meet their needs. TalkAlouds-BL*
- *Complex health care: Pain management – weekly massage or heat pack, 4A massage RN, 4B allied health professional 4 days a week 20min massage, - diagnosis and pain assessment –*

ACFI – have to validate that there is pain, and how we are treating it, they look for a diagnosis. CVA, arthritis, physio, TalkAlouds-BL

Missed care can be about professional boundaries – who's responsibility.

- *Eg advanced care plan. Assumptions in advanced care plan -> should be daughter role to discuss and write, it really shouldn't be the nurse who might do CPR. Ethical and conflict of issues issue. The Advanced Care Plan form says things like "If I'm going to recover" – that's not for the CNC to interpret. Always waiting for an overriding infection. They never organise the family. I think it is the GPs job. The hospital has a social worker. Everyone, especially CNCs in aged care, are worried about coroners case, about being interpreted as pushing palliation, or not doing enough active treatment. CNC is pro palliative care -> but residentis anoxic, so are they cognitively competent? TalkAlouds-BL*
- *'Is the client the resident or the dyad?' She reflected whether her role was to support the resident, OR the residents family, when there was a conflict/disagreement/misalignment of preferences. Eg young husband, admitted to RACF, his wife is controlling and limiting his behaviours, wants certain things enforced – what decisions should be made? Who should make them? TalkAlouds-BL*

Missed care can happen if the resident preferences aren't known

- *I asked 'how did you know he wanted a banana?' She said she noticed he hadn't been given it as per his usual routine. Casual AIN got banana, put it on his tray. He is alert, mobile, no physical limitations. RN went and opened banana for him as he mentally couldn't connect how to open and peel a banana. (If left to AIN it would not have been eaten). 'Delicious banana!' he said. TalkAlouds-BL*

When staff can't do what residents need – including technical radios, dvds, support - they feel care is missed

- *Blind people with radio, they can't fix radio themselves. Not enough attention to what we are getting – right station, right programme. DVDs no one knows how to put it on, just a few nurses. Ethno-DemQol-BL*
- *Using computer, how to fix troubles in the computer? Ring a specialist, nurses help with little things, but no special person. Ethno-DemQol-BL*

3.4 Discussion

3.4.1 Key results

Given the data presented, SmartCare has useful information in this baseline report to aid their development and responsiveness to system design requests from Jindalee staff.

In particular, there appear opportunities to 'value add' in documentation that moves beyond auditing requirements, if the documentation entering and retrieval can be accommodating of care worker's flow of work. Value-adding is likely in the sphere of personalised and psycho-social preferences that are key to 'lifestyle and leisure' options at the home, and may also be instrumental in behavioural

modifications in cognitive impairment. Knowing people and having quality relationships equates to quality care, and this can be aided by having the right information at the right moment to contribute to care interactions and minimise any incidence of missed care.

The current approach of care workers using environmental cues rather than documentation may be indictive of likely successful approaches – visual images and icons may be more relevant for care workers who have limited time to read documentation or even open different screens, and who are accustomed to using visual cues to derive care delivery methods.

Models of efficient use of time that can complement the verbal handovers is necessary to coordinate the regular presence of casual and new staff. Recognising how the care workers arrange their shifts in terms of breaks, shift changes and 'doubles' and 'singles' will be key in the effective use of information that staff currently communicate with each other.

Maximising the strengths of the staff who have known the residents for a long time and finding ways to better capture and communicate their important person-focussed knowledge and care will be a key component of the co-design of SmartCare.

A recurring concept of 'knowing the person' as essential in achieving quality care was identified in the qualitative data. This offers key aspects on the individual that could be better captured and accessed using digital documentation. 'Unmet needs' (see Figure 3.14) have importance in the care of people with dementia and those in residential care, where on average there are three identifiable unmet needs per resident (Cohen-Mansfield, Dakheel-Ali, Marx, Thein, & Regier, 2015). Boredom/sensory deprivation, loneliness/need for social interaction, and need for meaningful activity were identified as the most prevalent unmet needs. There is scope for the SmartCare system to better capture the ingredients carers need to meet these unmet needs and to achieve person focussed care in relation to the persons history, preferences, personality, and acceptance of risks. Staff mentioned the importance of the 'Top 5' in helping them to achieve this, and this can be considered for implementation.

Future qualitative analysis will incorporate the use of the 'theoretical domains framework' (Figure 3.15) to better understand the impact and leverage points of the implementation of SmartCare (Michie et al., 2013).

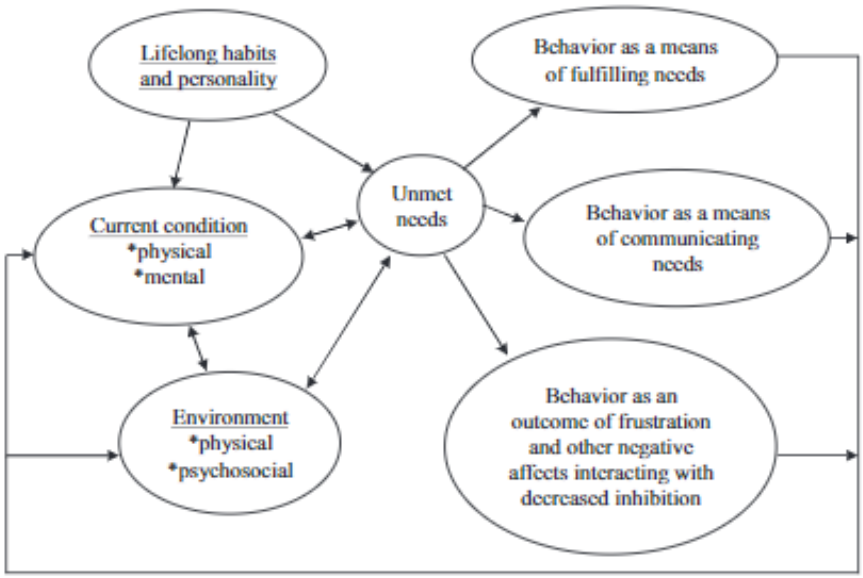


Fig. 1. Unmet needs model of problem behaviors. [42]Cohen-Mansfield, 2009.

Figure 3.16 Cohen-Mansfield 2009 - Unmet needs model of problem behaviours.

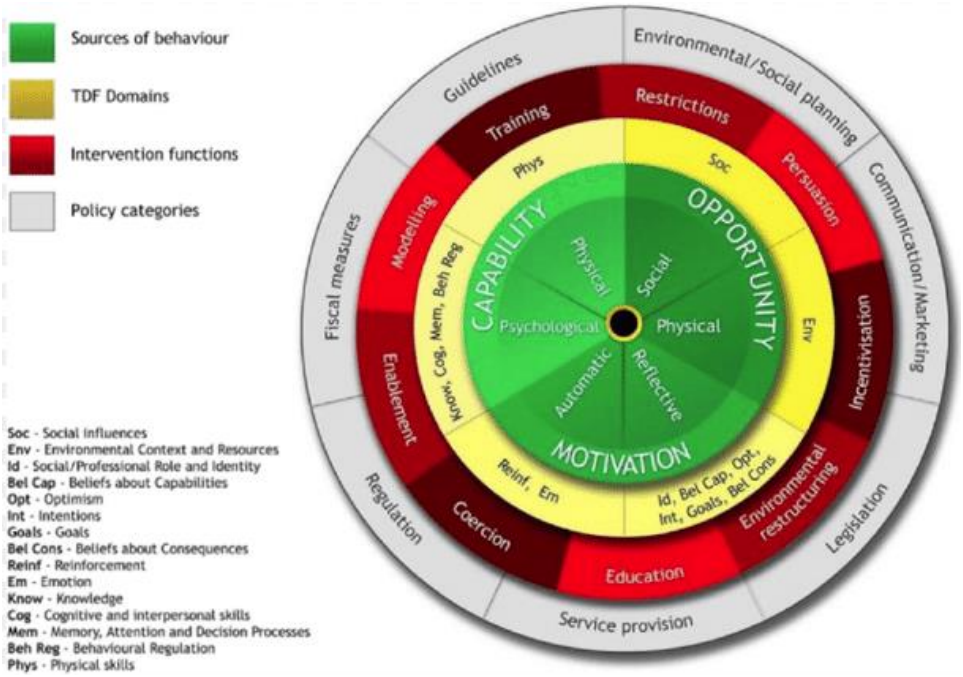


Figure 3.17 Theoretical Domains Framework – Behaviour Change Wheel.

3.4.2 Strengths and Limitations

During the Baseline data collection, this project aimed to capture existing quality and practice of care in the aged care facility using mixed methods. The utilisation of both quantitative and qualitative methods has allowed the research team to estimate current Net Promoter Score of Jindalee and perception of missed care. Regarding the collected data from staff members, the research team have described current distribution of time staff members spend on direct and 'Indirect Care' and

documentation, staff thoughts and perceptions of current practice. Mixed methods used to acquire information from residents have allowed the team to estimate residents' current quality of life, their perception and satisfaction with current care. These collected at the baseline data are going to be a reference point for the following data collections.

Return rates of signed consent forms were 35% for residents, which is reasonable in an aged care facility which tends to have "a high prevalence of cognitive impairment, involvement of family members and others in decision-making, limited staff in terms of numbers and training, inconsistent involvement of physicians, a high degree of regulation and concern about regulatory sanctions, and an abundance of required time-consuming documentation" (Simmons, Resnick, Schnelle, & Ouslander, 2016).

During the Baseline data collection, the research team have collected proposed numbers of data points across all employed research methods except DEMQOL interviews, residents' NPS and GEM responses and staff' GEM responses (Table 3.1). The research team have aimed to collect 80 DEMQOL interviews, however, only 31 interviews were conducted. Several limitations have prevented the research team from collecting projected number of DEMQOL interviews. Thus, often resident's ability and poor health status have acted as a barrier to participate in the interview ('*Not usual mood, experiencing difficult times'*). Some residents have had difficulties with their hearing and ability to answer some questions. Other residents have found interview questions distressing as they triggered personal memories ('*Hard life as I lost my husband last year.'; 'Have been frustrated about her son and a nurse. Doesn't get any support from her son.*').

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5 Appendices

5.1 Glossary

Care minutes: the time a nurse was observed attending activities. As nurses could be doing two activities simultaneously (multitasking), and move between activities within the same minute, so that there are more than 60 care minutes per hour.

Care worker – a staff member in Jindalee employed as an Assistant in Care (AIN).

Multitasking – when a care worker or nurse does a least two care activities at the same time.

Nurse – a staff member at Jindalee employed as a Registered Nurse (RN), Endorsed Nurses (EN) or Endorsed Enrolled Nurse (EEN).

'Singles and doubles' residents' needs – residents may require an assistance of one or two care workers for some of the care needs (eg shower).

Observations/vital signs collection – care workers and nurses collect information from residents, it may be pain assessments, blood glucose levels, blood pressure, pulse, behaviour assessments, etc.

Observations/vital signs documentation – the documentation of the above collection

AIN – Assistant in Care

EEN – Endorsed Enrolled Nurse

EN - Enrolled Nurse

RN – Registered Nurse

GEM – Global Estimate of Missed care

NPS – Net Promoter Score

DEMQOL – quality of life assessment tool

JVS – Johnson Village Services

Jindalee – Aged care facility where the project is being conducted

UAT – User acceptability training

5.2 Evaluation Committee – Terms of Reference

UNIVERSITY OF CANBERRA

Ageo Evaluation Committee 2018-2020

Terms of Reference

Item	Description
Role	The University of Canberra, Ageo Evaluation Committee meetings will act as an explorative, participative and decision-making forum for the funded research project 'Evaluation of SmartCare in Aged Care' (the implementation of Smartward health information system into Jindalee Aged Care Residence).
Reporting Mechanisms	The Evaluation Committee will identify need for liaison (information seeking, or reporting feedback to: • Ageo Steering Committee • Jindalee Aged Care Residence • Ageo Clinical Working Group • Ageo Technical Working Group • SmartWard Pty Ltd Representatives • Ethics Committee • Others as determined
Functions	a. Provide oversight and selection of evaluation method, tools, processes, and transparency to ensure an evidence-informed and achievable evaluation is achieved in relation to the Ageo Evaluation aims. b. Provide updates on Ageo implementation progress that effect the Ageo evaluation c. Respond to troubleshooting, problem solving and adjustment requirements within the evaluation d. Provide internal review of the suitability and appropriateness of ethics, reports and other project material for external dissemination

Item	Description
Aim	Primary aim: Conduct an independent evaluation of Smartward implementation into residential aged care. Secondary aim: Contribute to an evidence-base for technology systems that promote sustainable care documentation and decision-support systems in residential aged care that achieve quality, comprehensive and resident-focussed care.

Objectives	Evaluate and understand how Smartward affects the acceptability, efficiency and quality of care in the aged care setting, examining: Acceptability: • Reduced time spent retrieving information and documenting care • Improved satisfaction of staff and residents with care Efficiency: • Improved consistency of staff working with management-approved clinical treatment protocols • Reduced errors by omission and missed documentation • Improved management decisions informed by aggregated data on resident welfare for the allocation of resources Quality: • Improved resident health and quality of life • Reduced perceptions of missed care • Increased time spent by nurses and carers with residents
	Investigators: - Assistant Professor Dr Kasia Bail (Lead CI) - Associate Professor Dr Bernice Redley - Professor Karen Strickland - Professor Diane Gibson - Assistant Professor Eamon Merrick - Assistant Professor Sarah Cope - Senior Lecturer Jo Gibson Consumer Representative Research Assistant
Chair	Lead CI
Deputy Chair	In the absence of the Chair, a delegate will be nominated to chair the meeting from Investigators

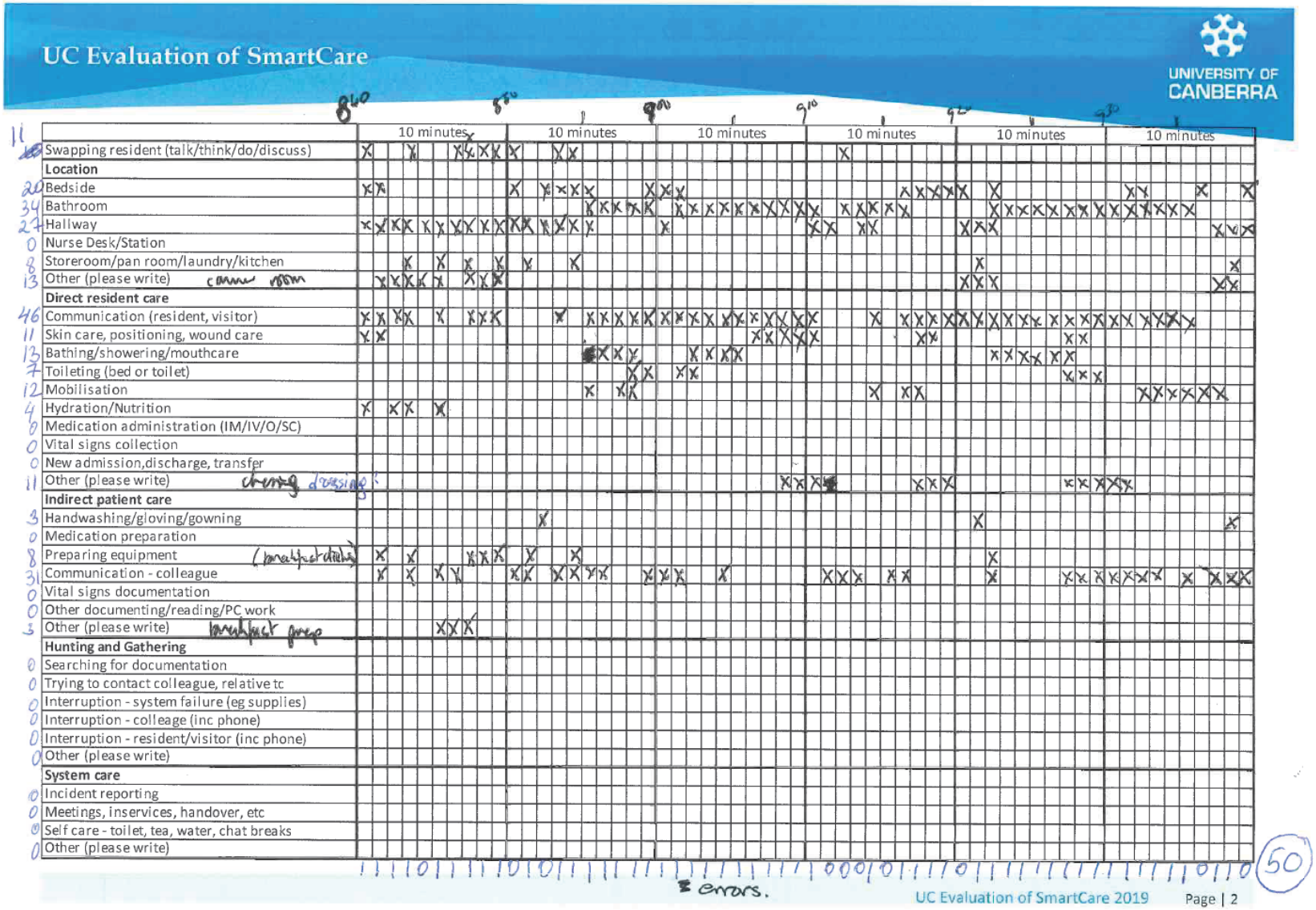
Secretariat	Research Assistant Minutes from this meeting will be located at: - Dropbox\SmartWard\SmartWard 3 - evaluation in Aged Care\Evaluation meetings
Standing Agenda	1. Review of Terms of Reference 2. Endorsement of previous meeting minutes 3. Actions Arising from the previous meeting 4. Ageo Implementation update 5. Ageo Evaluation priorities 6. Other business arising 7. Summary of action items 8. Information sharing
Agenda Requests	Any additional items beyond the standing agenda should be circulated at least 2 working days prior to the meeting via the Chair.
Meeting Frequency / Duration	Bi-Monthly for 1 hour or more frequently if issues of a pressing nature arise.
Minutes Distribution	Reviewed on a regular basis, with minutes to be circulated to members and invited attendees.
Endorsement Date	26 November 2018

5.3 Instruments

5.3.1 Time and Motion Data Collection Case study example - 10 minutes with Eileen, an AIN on G wing.

Observation minute	Activities	Code
1st minute	Is in the hallway, goes to get a pad from the cupboard, then enters Marcel's room	Locations: hallway, resident room Resident swap: 1 (thinks about Marcel)
2nd minute	Talks to the resident, while helping them get out of bed and get dressed	Direct care: communication Direct care: other (dressing) Direct care: mobilisation
3rd minute	Talks to the resident, while helping them get out of bed and get dressed	Direct care: communication Direct care: other (dressing) Direct care: mobilisation
4th minute	Talks to the resident, while helping them get out of bed and get dressed	Direct care: communication Direct care: other (dressing) Direct care: mobilisation
5th minute	Talks to the resident, while helping them get out of bed and get dressed	Direct care: communication Direct care: other (dressing) Direct care: mobilisation
6th minute	Talks to the resident, while helping them get out of bed and get dressed	Direct care: communication Direct care: other (dressing) Direct care: mobilisation
7th minute	Walks down the hallway, goes to a storeroom, finds a wheelchair, brings it to the residents' room During this time another staff member asks her whether Beverly is out of bed yet, she says yes	Locations: hallway, storeroom, resident room Resident swap: 2 (thinks about Beverly, then thinks about Marcel again) Indirect care: Staff communication Hunting/Gathering: Interruption (colleague)
8th minute	Helps Marcel get in the wheelchair, wheels him to his breakfast table, speaks to colleague about Marcel's tea preference today	Locations: Resident room, common room Indirect care: Staff communication
9th minute	Goes to kitchenette, washes hands, prepares added thickener for Marcel's tea	Location: kitchenette, Indirect care: handwashing Indirect care: preparing equipment
10th minute	Returns to Marcel, assists him in holding tea, talks with him	Location: common room Direct care: Hydration/nutrition Direct care: Communication
^*All names are pseudonyms*		

5.3.2 Time and motion Example of collected data



5.3.3 DEMQOL interview questionnaire

DEMQOL (version 4)

To be used with interviewer manual.

Instructions: Read each of the following questions (in bold) verbatim and show the respondent the response card.

I would like to ask you about your life. There are no right or wrong answers. Just give the answer that best describes how you have felt in the last week. Don't worry if some questions appear not to apply to you. We have to ask the same questions to everybody.

Before we start we'll do a practice question; that's one that doesn't count. (Show the response card and ask respondent to say or point to the answer). In the last week, how much have you enjoyed watching television?

A lot **Quite a bit** **A little** **Not at all**

Follow up with a prompt question: **Why is that? Or tell me a bit more about that.**

For all of the questions I'm going to ask you, I want you to think about the last week.

First I'm going to ask about <u>your feelings</u>. In the last week have you felt.

Questions	A lot	Quite a bit	A little	Not at all
1. Cheerful**	○	○	○	○
2. Worried or anxious?	○	○	○	○
3. That you are enjoying life?**	○	○	○	○
4. Frustrated?	○	○	○	○
5. Confident?**	○	○	○	○

6. Full of energy?**	○	○	○	○
7. Sad?	○	○	○	○
8. Lonely?	○	○	○	○
9. Distressed?	○	○	○	○
10. Lively?**	○	○	○	○
11. Irritable?	○	○	○	○
12. Fed-up	○	○	○	○
13. That there are things that you wanted to do but couldn't?	○	○	○	○

Next, I'm going to ask you about <u>your memory</u>. In the last week, how worried have you been about…

Questions	A lot	Quite a bit	A little	Not at all
14. Forgetting things that happened recently?	○	○	○	○
15. Forgetting who people are?	○	○	○	○
16. Forgetting what day it is?	○	○	○	○
17. Your thoughts being muddled?	○	○	○	○
18. Difficulty making decisions?	○	○	○	○
19. Poor concentration?	○	○	○	○

Now, I'm going to ask you about your everyday life. In the last week, how worried have you been about…

Question	A lot	Quite a bit	A little	Not at all
20. Not having enough company?	○	○	○	○

21. How you get on with people close to you?	○	○	○	○
22. Getting the affection that you want?	○	○	○	○
23. People not listening to you?	○	○	○	○
24. Making yourself understood?	○	○	○	○
25. Getting help when you need it?	○	○	○	○
26. Getting to the toilet in time?	○	○	○	○
27. How you feel in yourself?	○	○	○	○
28. Your health overall?	○	○	○	○

We've already talked about lots of things: your feelings, memory, and everyday life. Thinking about all of these things in the last week how you rate…

Question	**Very good**	**Good**	**Fair**	**Poor**
29. Your quality of life overall?**	○	○	○	○

**items that need to be reversed before scoring

5.3.4 Net Promoter Score (NPS) and Global Estimate of Missed Nursing Care (GEM) form

UC Evaluation of SmartCare

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1. How **likely would you be to recommend this facility** to family and friends? _____ out of 10

Scale from 1 to 10 where 1 = definitely would NOT recommend) to 10 = would definitely recommend) (Net promotor score)

2. To the best of your knowledge, **what percent of care was MISSED** in the last 48 hours by the care/nursing staff in your workplace?

_____out of 100%

Please provide your estimate as a percentage
eg 1%, 2%, 10%, 20% out of a possible 100% (Missed care score)

Any additional comments? _____
_____
_____

Resident/Visitor code:_____
(please choose a pseudonym, or write the name of your first pet)

Staff Member code: _____
(your code is your mother's maiden initials and the day of the month she was born. Eg: Ava Sand born Christmas Day = AS25)
Date: _____

5.3.5 Pedometer steps count form

Pedometer Steps

Enter date here:					
Wing (eg Hoya)	Role (eg AIN, EEN, RN)	Pedometer No. (if using supplied)	Shift START Time (~7 am)	Pedometer or FITBIT steps at START of shift^	Steps at END of shift (~11 am)
Example: *Banksia*	*AIN*	*10*	*7 am*	*0*	*3456*
	^ 0 if using our pedometer (or fitbit steps at start and end of shift if you like				

Thank you for collecting this data!

We are looking to see if the implementation of Smartward changes how far you walk. Please don't change how you walk because you're wearing a pedometer! Just work and walk as normal.

5.3.6 Documentation diaries form

	What was your main activity this hour: Handover, reading Dons book.					
Time: 7-8 am	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour:					
Time: 8-9 am	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour:					
Time: 9-10am	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour:					
Time: 10-11am	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour: doing lifestyle care summary					
Time: 11-12am	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour:					
Time: 12-1pm	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour: Report writing and progress notes and mobiles.					
Time: 1-2 pm	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	What was your main activity this hour:					
Time: 2-3pm.	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
	AFTER SHIFT - Any minutes documenting outside your allocated shift time?					
Time:	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Documenting						
Please draw a line through the boxes when you do ANY documentation (reading, writing, planning writing, finding doocumentation).						

6 Supplement – Interim report

Evaluation of ACE in residential aged care: impact of a point-of-care system on residents and staff - Interim Report

2020

Research Team:

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1 Executive Summary

Background

This is the interim mid-project report reflecting Phase 2 of an independent evaluation of SmartCare implementation into residential aged care, conducted by a team led by the University of Canberra.

SmartCare in a novel digital nursing information system purpose build for the facility. A participatory action research approach, with concurrent mixed methods, is being used to evaluate and understand the acceptability, efficiency and quality of care over a two-year iterative implementation of SmartCare into Jindalee Aged Care Residence.

This interim report provides information on mid-point progress towards meeting the key milestones for the project. The findings are intended to inform the ongoing development and implementation of SmartCare, consistent with the action research methodology.

Research process

Data collection for this report took place between 18 and 29 November 2019 and comprised three types of data collection: 1) time and motion observations of care workers and nurses while using the SmartCare; 2) 'talk alouds' involving interviews with staff members who started using SmartCare; and 3) focus groups with care workers, management, residents and Humanetix staff .

Findings

The interim qualitative data analysis indicated staff were satisfied with the SmartCare system for the care they were able to provide, recognising that the system was still under development and progressive implementation. They identified current, and further potential, for time reduction in retrieving resident information. The staff training and involvement in the development of the system was time consuming, and an increased documentation volume was noted, as was an increase in documentation quality.

Improved consistency of staff working with the care plan was strongly noted. Participants commented about improved individualisation and quality of care since using SmartCare; a well as increased nursing time spent with residents. This was tempered somewhat by increased time spent documenting while sitting with the resident, however this was still seen as having a valuable companionship component, particularly for residents with persistent pacing behaviours.

\

2 Overview of progress

2.1 Goals and objectives

The effectiveness of the SmartCare program is being measured and assessed against three key criteria: acceptability, efficiency and quality.

Acceptability

1. Reduced time spent retrieving information and documenting care.
2. Improved satisfaction of staff and residents with care.

Efficiency

3. Improved consistency of staff working with management approved clinical treatment protocols.
4. Reduced errors by omission and missed documentation.
5. Improved management decisions, supported by aggregated data on resident welfare for the allocation of resources.

Quality

6. Improved resident health and quality of life.
7. Reduced perceptions of missed care.
8. Increased time spent by nurses and carers with residents.

These three criteria and eight components constitute the Smartcare Evaluation Framework (see Table 1).

Table 17. SmartCare Evaluation Framework.

Aims	Objectives	Quantitative data collection methods (per objective)	Qualitative data collection methods (for all aims)	Action research feedback methods (for all aims)
Acceptability	1. Reduced time spent retrieving information and documenting care 2. Improved satisfaction of staff and residents with care	Net Promoter Score Survey - staff, residents	Anonymous comments box 'Think-aloud' staff work process Resident hallway/bedside interviews	Steering committee reports Clinical committee integration Newsletter updates from Evaluation Committee Presentations to Jindalee
Efficiency	3. Improved consistency of staff working with management-approved clinical treatment protocols 4. Reduced errors by omission and missed documentation 5. Improved management decisions informed by aggregated data on resident welfare for the allocation of resources	Time and motion studies		
Quality	6. Improved resident health and quality of life 7. Reduced perceptions of missed care 8. Increased time spent by nurses and carers with residents	Jindalee data/clinical record review DEMQOL Global estimate missed care - staff, residents		

2.2 Data collection

Interim data analysis for Phase 2 (see Figure 1) collected data from the first wing – Frangipani Lower, where the implementation of the SmartCare started in July 2019. This data collection stage was conducted from 18 to 29 November 2019 and comprised the following research activities:

- 'Time and Motion' observations of care workers and nurses while using the SmartCare
- Talk alouds
    - Interviews with staff members who started using SmartCare
    - Focus groups with care workers, management, residents and Humanetix staff.

This interim data collection allowed us to conduct comparison data analysis for the time and motion observations between Baseline and Interim stages and analyse qualitative data collected during this interim stage of the SmartCare implementation.

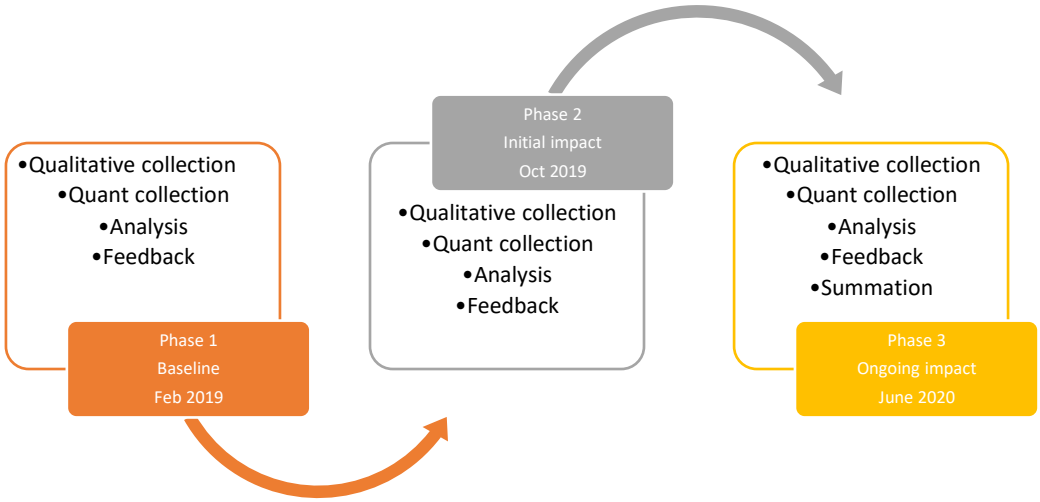

Figure 18. Timeline of UC Evaluation of SmartCare project.

3 Results

Results are presented in the categories of data collected: time and motion observations; talk aloud qualitative analysis; interview qualitative analysis.

3.1 Time and motion observations

3.1.1 Characteristics of participants

During the Interim data collection, four care workers and four nurses were shadowed in Frangipani lower wing during the morning shifts between 7 and 10 am. These collected data were compared to the baseline data from Frangipani lower wing, which also comprised four observations of care workers and four observations of nurses. The descriptive demographics of the observed staff members are displayed in Table 2.

Table 18. Characteristics of staff who participated in 'Time and Motion' observations in Frangipani lower wing during Baseline and Interim data collections.

Descriptive Characteristics		Baseline		Interim	
		n	%	n	%
Role	Nurse	4	50.0%	4	50.0%
	Care worker	4	50.0%	4	50.0%
Postgraduate studies complete	Yes	0	0.0%	1	12.5%
	No	6	75.0%	7	87.5%
	N/A	2	25.0%	0	0.0%
Employment status	Permanent	6	75.0%	5	62.5%
	Casual	1	12.5%	0	0.0%

	N/A	1	12.5%	3	37.5%
Years of working in their role	0 to 3 years	0	0.0%	3	37.5%
	4 to 10 years	8	100.0%	3	37.5%
	over 10 years	0	0.0%	2	25.0%
Years of working at Jindalee	0 to 3 years	3	37.5%	3	37.5%
	4 to 10 years	5	62.5%	3	37.5%
	over 10 years	0	0.0%	2	25.0%

As previously demonstrated in the Baseline report, distribution of time spent on different groups of care activities differed between care workers and nurses. Therefore, the following comparison analysis of Baseline and Interim data was performed independently for care workers and nurses.

3.1.2 Staff switching resident focus

One average, the numbers of residents each staff member cared for during one-hour observations in the Interim stage were lower than at baseline; however, these differences were not statistically significant for either care workers (F=0.69, *p*=0.43) or nurses (F=0.3.72, *p*=0.1) (Table 3 and Figure 2).

Table 19. Average numbers of residents cared for during Baseline and Interim data collections.

Switching resident focus		N	Mean	Median	Std. D	Min	Max
Baseline	Care workers	4	15	13	12	4	32
	Nurses	4	30	30	13	14	46
Interim	Care workers	4	10	8	7	3	19
	Nurses	4	14	11	10	5	28

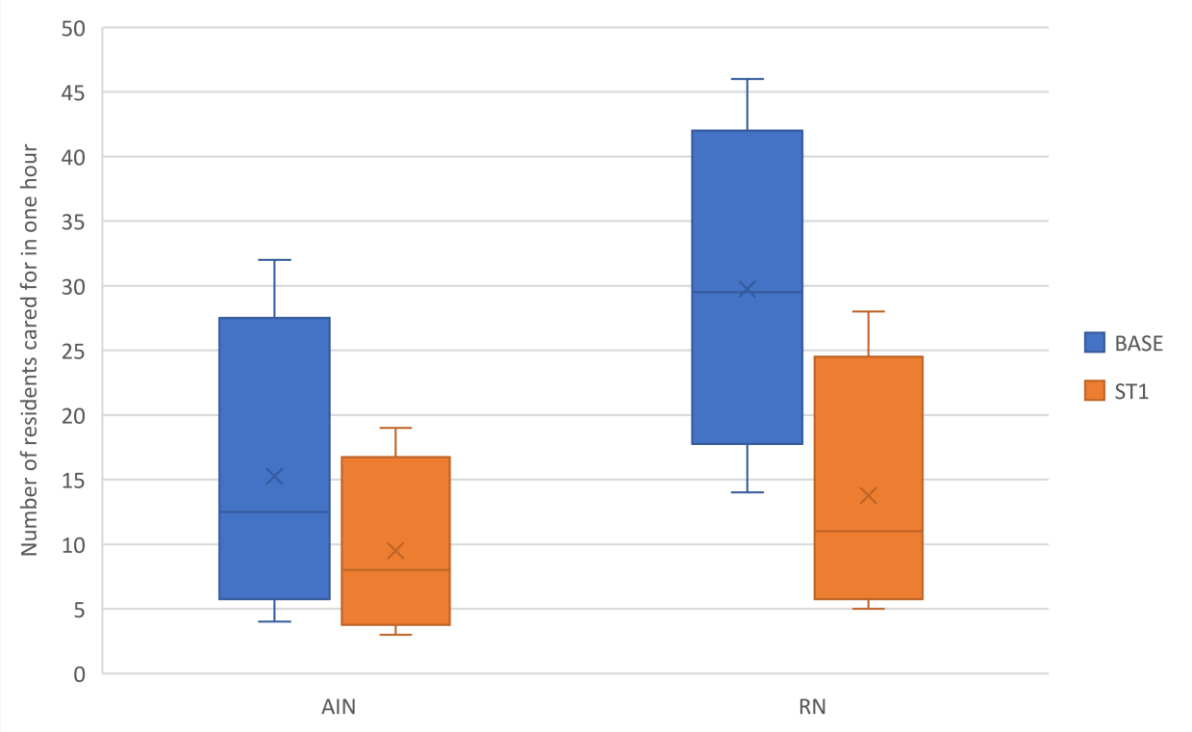

Figure 19. Boxplots of the numbers of residents cared for in one hour.

3.1.3 Multitasking

Multitasking minutes were when staff performed two different care activities simultaneously, or within one minute. Although, average multitasking minutes for care workers was higher during the Interim data collection that at Baseline, and for nurses the average multitasking minutes decreased, these differences between Baseline and Interim numbers were not significant for either of the observed groups (F=2.31, *p*=0.18; F=1.35, *p*=0.3 respectively) (Table 4 and Figure 3).

Table 20. Average multitasking minutes observed during Baseline and Interim data collection stages.

Multitasking		N	Mean	Median	Std. D	Min	Max
Baseline	Care workers	4	108	108	11	96	120
	Nurses	4	157	156	38	112	205
Interim	Care workers	4	128	128	24	103	152
	Nurses	4	132	130	19	112	157

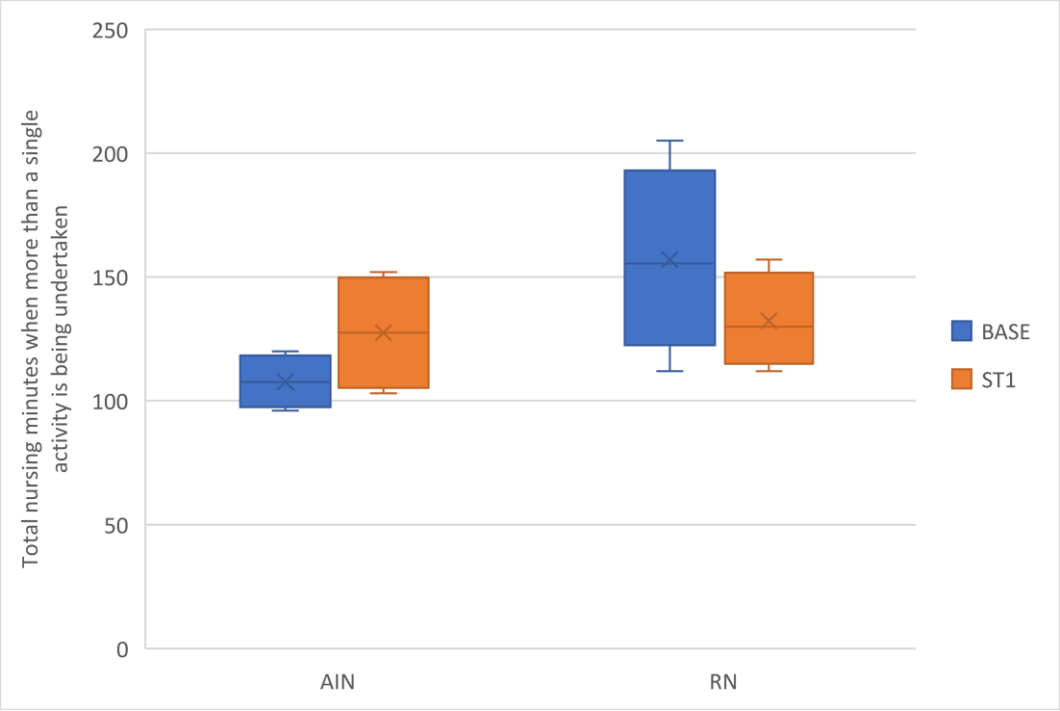

Figure 20. Boxplots of total nursing minutes when more than a single activity is being undertaken.

3.1.4 Location by staff

The following figures demonstrate mean minutes spent at different locations by care workers and nurses during Baseline and Interim observations (Figure 4 and Figure 5). As these observations were conducted only in one wing during the Interim data collection, the comparison analysis is limited. However, the during the Final data collection observations will be conducted in several wings and location data analysis may demonstrate changes in the patterns of staff working at different locations.

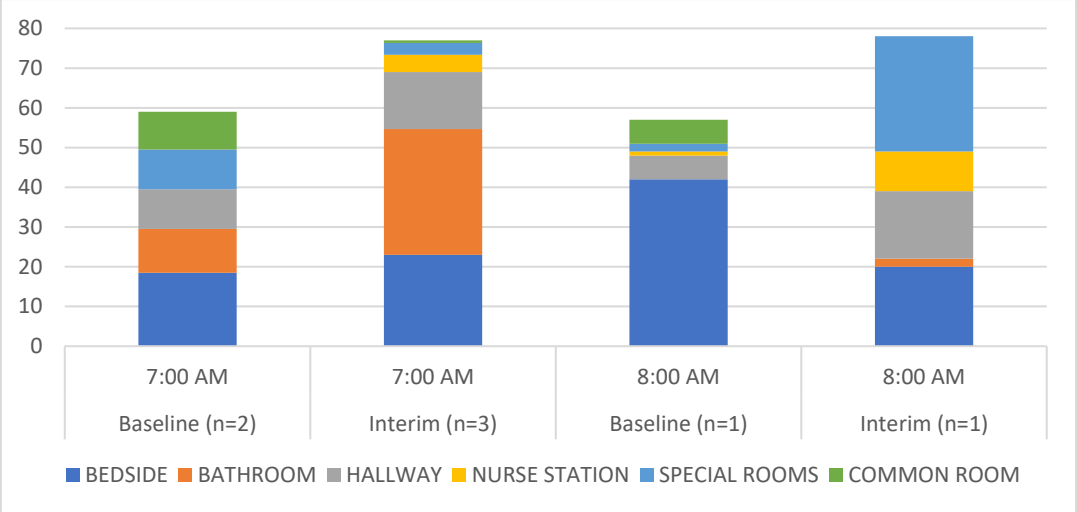

Figure 21. Mean minutes spent at different locations by Care Workers during Baseline and Interim observations.

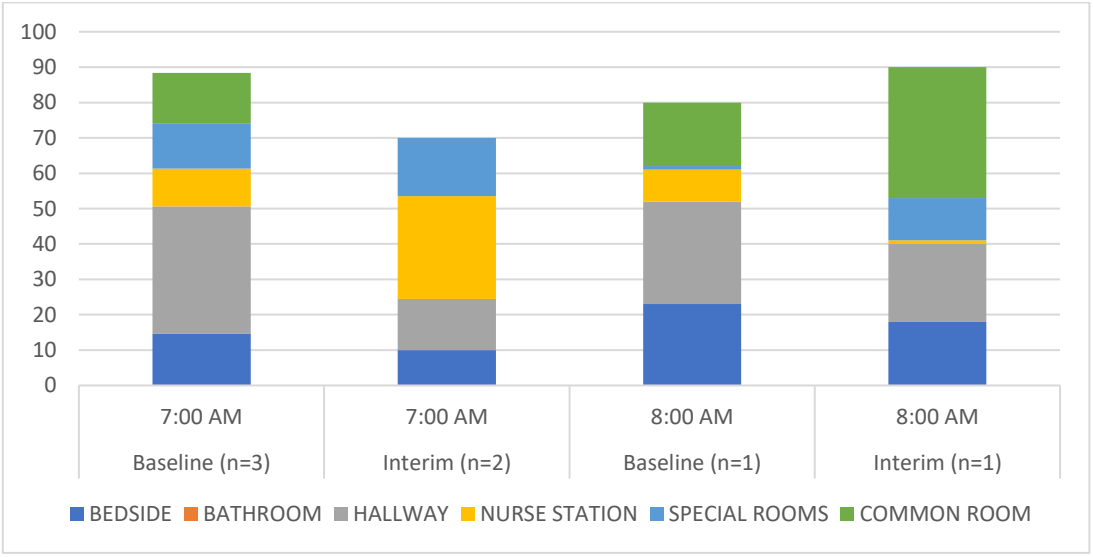

Figure 22. Mean minutes spent at different locations by Nurses during Baseline and Interim observations.

3.1.5 Care activities by staff

During the 'Time and Motion' observations, four main groups of activities were registered. Average minutes spent on each group of care activities are displayed in Table 5. For direct care, inverse changes were observed for average minutes spent by care workers and nurses. Care workers would on average spend more minutes and nurses would spend less minutes during the Interim observations. However, these differences were not statistically significant (F=2.15, p=0.19; F=5.72, p=0.05 respectively). Average minutes spend on the other three care activity groups also did not differ significantly between Baseline and Interim data.

Table 21. Average minutes spent of groups of care activities during Baseline and Interim data collections.

Group of care activities			N	Mean	Median	Std. D	Min	Max
Baseline	Care workers	Direct care	4	73	72	5	69	80
		Indirect Care	4	33	33	14	17	47
		Hunting and Gathering	4	2	1	2	0	4
		System care	4	1	1	1	0	2
	Nurses	Direct care	4	71	71	19	48	95
		Indirect Care	4	73	75	8	62	81
		Hunting and Gathering	4	13	10	12	2	29
		System care	4	0	0	0	0	0
	Care workers	Direct care	4	84	85	13	67	98
		Indirect Care	4	38	35	15	22	58
		Hunting and Gathering	4	6	4	5	2	13
		System care	4	1	0	2	0	3
	Nurses	Direct care	4	38	41	20	11	59
		Indirect Care	4	68	65	11	60	83
		Hunting and Gathering	4	23	27	12	5	33
		System care	4	3	1	5	0	11

3.1.6 Communication and Documentation

One of the aims of the project was to identify potential changes in time spent on communication and documentation (see Table 6).

Table 22. Potential changes in time spent on communication and documentation between Baseline and Interim data collection.

Communication and Documentation			N	Mean	Median	St. D	Min	Max
Baseline	Care workers	Total communication	4	50	45	17	37	75
		Sole communication	4	4	4	1	2	4
		Total documentation	4	0	0	0	0	0
	Nurses	Total communication	4	49	48	8	40	60
		Sole communication	4	2	1	3	0	6
		Total documentation	4	32	29	16	17	55
Interim	Care workers	Total communication	4	56	57	8	47	63
		Sole communication	4	3	2	2	1	6
		Total documentation	4	3	3	3	0	7
	Nurses	Total communication	4	44	42	10	34	56
		Sole communication	4	1	0	2	0	4
		Total documentation	4	32	31	27	0	67

3.2 Talk aloud qualitative data analysis

Three researchers followed six staff for approximately 1 hour each, during which time the Jindalee staff member was encouraged to 'talk aloud' about what they were doing and how it worked. Sometimes the staff member preferred to sit and talk about their experience, depending on what their current workload and activities were. Staff included: one ACFI assessor, one RN, three AINs, and one Admissions officer.

Following these 'talk alouds', the researchers took ethnographic notes regarding the content and observations. The researchers then met and discussed their notes and observations, and recorded their discussion, which was then transcribed verbatim. Concepts that were raised were grouped into codes in order to provide feedback on the current experience of using SmartCare.

It became apparent that many of the comments were related to the 'process of implementation', and so these were grouped accordingly. The aims of the project (acceptability, efficiency and quality) contributed smaller components of the feedback in the interim stage. Many comments were unique and so their coding and quotations are provided in detail for constructive and specific use in the development of the tool.

3.2.1 Process of implementation

Thirteen per cent (13%) of the qualitative talk-aloud data gathered from staff was categorized into the theme of: Specific potential of SMARTCARE that staff look forward to (see Table 7).

Table 23. Process of implementation - Summary Table for Specific Potential of SMARTCARE that Staff Look Forward To. (See Appendix 1. For quotations)

Sub-theme	Explanation
Improve logical activity grouping for common AIN activities.	This will minimise time by clustering activities.
Capturing attendance at 'Activity and Lifestyle' events.	Tracking resident's attendance at leisure activities which they deem a priority.
Jindalee stickers for the phones/iPads.	Ensuring visitors know when staff are working as they are utilizing Jindalee computers, phones and iPads rather than accessing personal phones for personal use such as being on social media.
Easier unscheduling of activities.	Allowing the AIN, as well as the RN, to unschedule activities.
Streamline scheduled periodic assessments.	Streamlining scheduled activities such as assessments to eliminate the number of undone tasks.
Make the medical diagnoses easily retrievable and not duplicated.	Provide easier access to medical history and diagnosis and ensure information is not unnecessarily replicated in different areas e.g. having three lots of the same information in three place.
Include 'carer strain' as a diagnosis option in admission.	Carer strain is a very common cause of admittance and should be included in the admitting diagnoses.
Enable chart review of bowel patterns.	Should be able to see up to a week of bowel patterns to enable better tracking and monitoring.
Include casuals to be regularly using SMARTCARE.	Ensure casual staff are using the technology; this eliminates permanent staff informing them of resident preferences.
Eliminate DONS book and diary by automating alerts within SMARTCARE.	Ensure care plans are available to all.
Ensure that RN sign off happens automatically in SMARTCARE.	Allows RN to digitally sign off on tasks and ensure everything is in order before handover.
Create flags/alerts for extreme observations.	Allows resident issues of high importance to be flagged and to escalate nurse responses.
Being able to easily access data for a person who is discharged.	Ensuring information of discharged residents can be retrieved.
Have electronic admissions forms.	Making admissions forms electronic, so all paperwork can be kept together and signed electronically.
Medications to be part of the system.	This streamlines the process for staff and ensures accurate medication management.
Provide information in key 'Teachable moments'.	This enables access to best practice regarding difficult conversations such as end-of-life issues and assists decision support.

Streamline scanning of hardcopies, emails & PDFs.	Upload electronic applications to enable access from any device and eliminate triple handling of information from paper to digital form.
Include time of 'Leisure and Activities' to help planning.	Allow access to activities timetable so staff can assist in getting residents to where they need to be.
Set times can be problematic.	Set schedules can mean no flexibility. Manual input to allow for adjustment would enable staff to alter times.

Five per cent (5%) of the qualitative talk-aloud data gathered from staff was categorized into the theme of: Demographics of implementation (see Table 8).

Table 24. Process of implementation - Summary Table for Demographics of Implementation. (See Appendix 2. For quotations).

Sub-theme	**Explanation**
Trainer's relationship with staff and approachability is important.	Facilitates critical and positive feedback, reassurance and confidence in a non-threatening relationship. This is particularly important for staff who are not tech savvy.
Calm acceptance of the process of change.	Managing issues calmly.
Still only partial implementation.	Need more involvement from RNs and DONs so they can be approached for advice. Not all staff were accountable for using the system correctly. The ACFI nurses are still doing assessments on paper forms. Ensure access to resident summaries and contact details. Not all information available to see on one page, e.g. requires too much scrolling to monitor a week of incontinence. Staff forget their password and don't enter data correctly.

Nineteen per cent (19%) of the talk-aloud qualitative data gathered from staff was categorized into the theme of: Teething problems (see Table 9).

Table 25. Process of implementation - Summary Table for Teething Problems (19%). (See Appendix 3. For quotations).

Sub-theme	Explanation
After hours technical problems go to the educator	The educator has become the first port of call for tech issues, rather than SmartCare. She is being contacted at home on the weekend and talking through the issues with staff.
Initial input of residents into the system is time consuming	Admitting residents is taking about two hours per resident. The educator appears to be doing the intake rather than the admissions officer. Scanning in documents and printing is time consuming. Renovations does not make it convenient to access files.
Issues not resolved over a weekend has flow on workload effect	The educator was chasing up people for missed activities, which needed to be logged. This was an unresolved issue over the weekend resulting in a back log of work. RNs need to take responsibility for staff on their wing if they're not completing tasks. Other technical issue resulted in entries not being saved, time in loading the page.
Scheduling needs streamlining	Had to chase staff to complete behaviour assessments. Some technical glitches required logging off on again for tasks to get sent, changing flags, placing residents in two places at once. If a problem arises on a Friday, it results in accumulated tasks and additional work on a Monday. The technology wasn't working for three day assessments.
Some things will never be able to be only softcopy.	Enduring power of attorney is always going to be hard copy. If the preadmission pack could be entered online rather than on paper and scanned, it would be easier.
Can't compare this system to functional systems on the market.	Can't compare to other functional systems.

3.2.2 Evaluation Aims

Nineteen per cent (19%) of the qualitative data gathered from staff, was categorized into the theme of: Acceptability (see Table 10).

Table 26. Evaluation Aims - Summary Table for Acceptability. (See Appendix 4. For quotations).

Sub-theme	Explanation
Staff like being able to contribute ideas for the system.	Staff have given great feedback e.g. adding resident birthday alerts. But changes haven't been made yet.
Access by agency and casual staff an important consideration for effective workflow.	Agency and casual staff need to be registered in the system as a user. So often they don't have access to the system. If only one person is entering information it is not reflective of the work being done and can provide inaccurate information regarding workflow data. A train the trainer system would be helpful. Need to ensure everyone has access to email accounts. Staff are at different stages of learning, which can cause expectation issues.
The staff find the system convenient and satisfying 'like candy crush'.	Staff find it satisfying and rewarding to tick off their activities. They report that it is convenient and helpful with activities and medications listed with colour coding for clarity. Familiarity with the system was met with enthusiasm and confidence.
The resident always comes first.	It's mobile so staff can sit with a resident while completing an admission and talk through the form. It's handy in terms of location and sitting.
"The embodiment of the care plan is now flashing in their face, literally."	Staff appear attentive to the new task list, which reduces risk of error. It's reassuring to know staff are looking at the care plan because things can change. The system reminder means the RN does not make the reminder, which can boost staff confidence and resident confidentiality.
Document all details or just enough… and what is 'just enough'?	ACFI documentation has set parameters that are tied levels of funding. ACFI nurses try to capture accurate data, but not all staff may know to document activities such as incontinence issues. ACFI requires more than a tick, it's an explanation for each behaviour, what was used, and what happened, documenting each behaviour that's unique to that person.
Simple presentation differences cause confusion.	Issues with information presented in portrait versus landscape view in the system.
The use of space and sizes on the screen is important.	Some images were confronting or offensive e.g. the faeces picture was bigger than the picture of the client's face. The system needs to reinforce that the resident comes first.

Six per cent (6%) of the qualitative data gathered from staff, was categorized into the theme of: Efficiency (see Table 11).

Table 27. Evaluation Aims - Summary Table for Efficiency. (See Appendix 5. For quotations).

Sub-theme	Explanation
Central training role efficient to make consistent training and decisions.	Educator is instrumental in training staff and implementing the system. Rostering everyone for training and ensuring there is a trained person on every shift. An FAQ troubleshooting manual is being developed. Missed activities keeps mounting and conflicts with trying to do other education.
Efficiency in documentation might compromise quality of delivery.	One person entering all the data makes it look like only one carer's doing all the work. Which isn't reflective of what's happening as far as workflow.
AINs use of triggers determines time efficiency.	A reminder for an activity at a certain time can mean staff wait for the specified time to perform the activity, rather than completing it ahead of time. When work is busy, the system is a great reminder.
Time consuming to learn.	There are 120 different forms e.g. bowel chart, behaviour assessment. It's going to take time to learn all the entry points of each form. But many learn it as they need it.

Eleven per cent (11%) of the qualitative talk-aloud data gathered from staff was categorized into the theme of: Quality (see Table 12).

Table 28. Evaluation Aims - Summary Table for Quality. (See Appendix 6. For quotations).

Sub-theme	Explanation
Specific examples of staff including 'value-add' to resident care quality.	Staff suggest adding alerts such as resident birthdays. Knowing staff feedback helps in the development of the system is important for them. The schedule lets you change so that you can do what the resident wants; it's flexible and adaptable.
Opportunities for improved quality documentation.	It is difficult to know whether staff performed the activity or whether they just didn't tick it off. It's not being monitored closely/accurately enough.
Improved access to options to help choose care specific to individual need.	Some residents and family members want control over preferred equipment used e.g. lifters. Staff are able to search using the Smart Ward App for options for different mobility aids.
Handheld device enables 'companionship' of staff to sit with restless residents.	The mobility of the system allows for staff to enter information and sit with the resident in a companionable way.
Improves information quality and quantity to	Can automatically give information to families e.g. eating habits.

share with resident's loved ones.	
Improved accuracy of care in line with the current care plan for the individual.	Care plans change according to resident needs. The staff are more attentive to change of care plans using the system, which improves accuracy of care.
If staff were disinterested about care before SMARTCARE they can still be disinterested.	Disengaged staff tick off activities in one go in paper form and in the digitized system.
How much is the right amount of information?	What sort of in/accuracy does the system allow? For example, can you enter data on something that occurred "about an hour ago" or do you have to enter an exact time? It depends on the level of accuracy needed. Can you document an increase in behaviours, decrease in behaviours, usual behaviours, or a new behavior? Such constant pacing or tapping. But this information entry can become habitual rather than accurate.

3.4 Focus group qualitative data analysis

	Theme	Sub-Theme
Implementation Process	Specific Potential that Staff Look Forward To	The system still needs to be more personalised, still seems very task oriented, may be about how it gets used culturally (Management FG) Scanning, desktop, transfer – triple handling at the moment (Management FG) Can't schedule the right periods for assessments, nor the right tolerance for showers. The variability is challenging to get the technology to meet (Management FG) Need a sticker on the back of the phone saying 'Jindalee' so that its clear staff are working, not on their personal phones (Management FG) Will really help seeing who has what allocations and when will help managers as they won't have to access rosters to find out resident information (Management FG) System needs to be able to accept PDFs and emails and not need another PC or scanner (Management FG) Can't read PDFs (eg consent form for accreditation) (Management FG) Would be good to have activities due, times, help the whole team to get the resident to activities (Management FG)
	Implementation Demographics	Things still being refined – permissions, access, PVDs, flagging (changes), "there's still a long way to go" (Management FG)

		Not making a big difference yet, but can see that it will down the track (Management FG) [The system of implementation] helps [care managers] to understand their processes better (Humanetix FG) theres a lot of form filling that is historical rather than purposeful (Humanetix FG) no news was good news – no one rang to say it wasn't working! (Humanetix FG) Hope it can reduce the stress for staff, the chaos, for staff to then be calmer, feed into one on one time with residents (Humanetix FG) The trust and skill of the staff between themselves is key to the product success. (Humanetix FG)
	Teething Problems	Wiped data base when scheduled out when doing admission data entry. Autosave function needed. (Management FG) Casual staff using the system end up with lots of unticked scheduled activities which adds to RN workload (Management FG) Staff behavior change the hardest – still using system like they used paper (Management FG) As things are being refined, just as staff get used to a function it can change and they adjust again (Management FG) Being able to schedule activities (like toileting) improves quality of care. But there aren't the right options for what they need, so the system is still in its infancy (Management FG)
Evaluation Aims	Acceptability	Now you know if the resident has had hair washed that week without having to read through lots of paperwork (Junior care staff FG) Especially good for staff making presumptions the care is the same as the last 2 years even though its changed. It's a pathways for everyone to get the same information (Management FG) They can put the information in straight away, and management can access it straight away (Resident FG) Plan for it to be so that staff can leave 'tasks undone' flagged for the next staff member, and not worry about whether it will get done or not (Humanetix FG) They're not doing all the paperwork at 3 in the afternoon anymore (Resident FG) Love it being on a computer, travelling folder for every carer for every allocation (Management FG)
	Efficiency	Hasn't changed walking distances much, a lot of that is resident need related (Junior care staff FG)

		Has changed the amount of information being collected (increased) (Junior care staff FG) Has changed the amount of time spent documenting in the afternoon (decreased) (AIN, resident) (Junior care staff FG) Set times are problematic – makes it look like care left undone or later. Showers shouldn't all be at 8am, some people prefer afternoon shower. Staff end up documenting it at 8am just so it doesn't get flagged as missed care, even though they know it's then incorrect. Using it as data collection (when showered given) rather than set times would also help staff allocations and resource planning. (Junior care staff FG) Means you will end up reducing redundancy the moment you start analysing your processes and your paper forms with other product (Humanetix FG)
	Quality	Has changed the amount of time spent with residents (increased) (Junior care staff FG)

4 Conclusion

The interim qualitative data collection provides indication that staff are satisfied with the care they are able to provide with the developing system, and there is current and potential time reduction in retrieving information. The training and development of the system was time consuming, and the increased documentation volume was noted, as was the increased documentation quality.

Improved consistency of staff working with the care plan was strongly noted.

Improved individualisation of care and quality of care were commented on; as was increased nursing time spent with residents. This was tempered somewhat by increased time documenting while sitting with the resident, however this was still seen as having a valuable companionship component, particularly for residents with persistent pacing behaviours.

5 Appendices

Appendix 1. Full table of theme: Specific potential of SMARTCARE that staff look forward to (13% coverage), including quotation/s.

Sub-theme	Quotation/s
Improve logical activity grouping for common AIN activities	They're working out grouping activities which they think will be really helpful to try and…minimise time…Because at the moment they tick -off showering, and then clothing, and drying even, and then whereas they cluster those activities. Yeah. So you can say has the person showered, you tick clothing and all those different things.
Capturing attendance at 'Activity and Lifestyle' events	Flagging when [residents] go to their leisure activities, so do they go on the bus ride, do they go and play scrabble because that's what they've got in as being their priorities.
Jindalee stickers for the phones/iPads so visitors know the phones are work	One of the comments she did make was that she needed to explain to visitors and staff when she was showing them the tours that these people weren't on their phones. They were doing work. So she'd like them to have better logos on the backs. Something that says Jindalee. So it looks like a Jindalee computer in their hand, rather than it could just be them scrolling Facebook or something. And maybe a newsletter to relatives about what staff are sitting there scrolling to do. She said she would have eaten these people alive before if they'd been on their phones. ……she almost wanted maybe some posters saying, you know, does it look like your staff members checking their Facebook. No actually these are the things they could be doing. And trying to really illuminate it. I think they've been anti-phones for so long. You know you can't have your phone at work, you can't do this, you can't do that. But it's a new way of doing things.
Make it easy to unschedule activities	Unscheduled activities should be the RN not the AIN on scheduling them. So that's how it's run at the moment is the RN does it. And if they've gone to the hospital, then the RN has to still unscheduled things. And determines if things are skipped or redone for another day…..So [at the moment] there's no just putting a resident on hold full stop. You know how the systems you basically just put them on hold. Say they're in hospital you click one button, they're on hold, everything goes on hold for that three days until you unclick that button.
Streamline scheduled periodic assessments	I know there were a lot of issues about scheduling things, so that when they wanted to schedule, say they were doing an [00:32:49] assessment for three days, they couldn't just schedule it for three days and then have it turned off. And the only way to kind of trigger it was to have it coming up basically every minute as an alert. So it meant that there could be a lot of undone tasks because they had to tick them off all the time. Like it was clumsy. They hadn't resolved that kind of overhead activity for the next three days is document any behaviours you notice. Because they're scheduled activities, scheduled at every minute, or every hour or something. So some of those were teething.
Make the medical diagnoses easily retrievable and not duplicated	Some stage one issues about the medical diagnosis, I think being so difficult to access. Oh, that's right. I think there's two blocks. One's got medical diagnosis, and then one's got medical history. And she just writes as above. It's the same thing why are there two different spots. And then the clinical database asks for it again. So there's three lots of the same information in three places. And that's in the Smart Ward system. So that needs fixing.

Include 'carer strain' as a diagnosis option contributing to admission	She said the carer strain is 99 per cent of admitting diagnosis, so that probably should be included in there.
Enable chart review of bowel patterns	So then when the ACV nurses are trying to do a screen of somebody, they can't see a week of bowel patterns…..On one screen…….Because the stool picture it takes up an image, and so then you sort of can only see three of these at once. And I'm like you need to be able to scan it and go, okay, over the last seven days they've had three cups of output. Or they've had none. So that was just tricky for them to kind of screen through. And at the moment there's only check/change pad as a tick box. So they don't know whether it was checked or changed. And obviously that would be important information, and that differentiation. So that hasn't been requested to be in the Smart Ward system and they're saying they'd like to see that changed, but they hadn't raised it yet. That was for the next meeting. They could still see – so you know one resident had their bowels opened every day at exactly 3 pm, so they felt that was about a documentation pattern, rather than a bowel pattern.
Include casuals to be regularly using SMARTCARE	There were two AINs at the time that were casual on shift and they weren't using the Smart Ward. So she was still saying to him where are his glasses. And he likes his hair combed. The permanent staff would still be telling the causal staff things like that.
Make the DONS book and diary obsolete through automated alerts within SMARTCARE	They still need to check the DONs book and the diary. But now they don't need the care plan because their own personal care plan is in their pocket. And that works okay. What goes into the diary and the DONs is sudden and instantaneous and not in the care system.
Ensure that RN sign off happens automatically in SMARTCARE	But she likes it because she wants everything ship shape before she leaves, and beforehand she would have to get BP and BGLs all signed off by the RNs, and now it's much easier because she make sure it's all done. So I think - - -if she did observations you'd have to get them signed by the RN before….And now you don't. ….Now it will get automatically I think flicked to the RN for signing. Because it'll then come up as a flag for the RN. But she doesn't have to physically go and [sign it].
Create flags/alerts for extreme observations to escalate nurse response	Because I know when I went to do training we were putting in any obnoxious BGLs. So there's no trigger as far as an obnoxious BGL. …. like a dangerous risky reminder that this person might be about to die...Like 35 BGL …or [BGL of] 2. And there was no flag on that. So I'd be interested to see if an AIN enters it now if there is a flag for the RN to check it. If they enter 1.5 you might want to check the person before the end of the shift.
Being able to easily access data for a	There's discharge concerns around all they can really do is unschedule the tasks, but actually discharging the person becomes an issue of where the data then goes. Because the thing is we need to be able to access the data at any time, even if someone's discharged, because there could be some kind of inquest, or

person who is discharged.	inquiry or whatever. But as soon as they un-admit that information goes somewhere where they can't retrieve it easily. SmartCare can. They've got it all backed up, but it's not easy at the moment for the actual facility to see that information.
Having electronic admissions forms	As the admissions nurse was saying, eventually maybe they'll have that automated, and they can sign on an electronic form. But usually people are still taking that paperwork home, fill it in, bring it in. Bring half of it on admission, and the other few more sheets of paper a few days later, and a few more sheets of paper a few days later.
Medications to be part of the system	I think I asked her if the medications were on the system, and she said no, not yet. So there's a lot of backwards and forwards to the medication room. She had to ring upstairs for the RN to bring down the antibiotic. And it didn't appear in the whole time that I was there.
Provide information in key 'Teachable moments'	it was quite a significant conversation about end of life. … and it didn't get documented anywhere. She said, "We have to keep them positive because we can't have them thinking that they're going to die." ….. She's had that conversation with other people and this is the way that she always manages that conversation. …… there is such a teachable moment here about a whole bunch of different ways of doing this and doing this differently…….and we've got a digital system in place that eventually wants to be helping decision support…. So if they actually documented that they had brief conversation regarding patient concerns regarding end of life…then If 'end of life' triggered words to say here is current best practice about how to talk about end of life with residents…
Streamline scanning of hardcopies, emails importing PDFs	if this was a perfect world we're considering, if there was a link, an email link to that device where people send their PDF or their electronic version of their application and it comes up to that and then I can say load that file and it automatically brings it up instead of going to another PC and a scanner. FG Scanning, desktop, transfer – triple handling for paper to digital FG
Include time of 'Leisure and Activities' to help resident planning	Would be good to have activities due, times, help the whole team to get the resident to activities FG It's a good thing for the staff on the floor to be aware of what activities are coming up, because we've got one activities person and you would hope that by having that there for them to see, oh, she's supposed to be going down to coffee by they haven't come and got her yet, I'll take her down. I'd hope they'd be doing things like that. 'Cause it's generally teamwork, to work together. It doesn't mean that this is yours, you focus on that.
Set times can be problematic	And some activities, like, if it's once a day and you complete it at a certain time, the next day it's going to be due the same time that you completed it. So, the system itself is the one who is adjusting the time, so, sometimes it's a little bit difficult for us because we cannot specifically schedule something, we want on a certain period of time because we have limited scheduling times and the computer calculates the time, which is the hard part. FG 'Cause, they actually come to me and say why is it always like this at this time, this resident doesn't go to that, to the toilet at a specific time and I said look at the care plan. Whatever is in the care plan is what we put there, so, now if there are changes then we will put out assessments and that's the time that we only change that and they will say, okay. They know they are supposed to look at the care plan, but they rely mostly on their experience and routines on the floor. FG

	That's probably one of the things that you're struggling with here at the moment, is when we have other staff or agency staff that aren't trained with that, yeah, so, if one person leaves and it leaves the person on the longer shift as the not very well versed, then it's the RNs job to pick up and cross off that all the scheduling's been done. FG

Focus Groups Quotations that support theme: Specific potential of SMARTCARE that staff look forward to:

Probably the most annoying thing is they have got set times for things. Whereas on our day to day routine like things come up regularly and then stuff gets postponed or things get done quicker. It really just depends on how the residents are going and what is planned for the day. And obviously you have got a limited amount of staff in some things on the Smart Care that are set down to be done all at the same time. I think we have a couple of showers in Lower Frangipani all due at 7:30 am but obviously, between two staff, we can only get one or two residents done at that time each. So then, when we are going back and doing them all, we have to change the times back to 7:30 am even if they were done at 8 o'clock or something because, if we don't have it close to the set time, it comes up as not done, and then we have these guys coming down. I mean like, "Excuse me, you haven't showered this resident." That is probably the most annoying thing. Just some things have set times when [they shouldn't] (Junior Care Staff Focus Group)

Like we can go in and change it ourselves so it will come up as the reminder that you know, Bob is supposed to be showered at 7:30 am and we didn't get to do him until maybe 8:30 am or something because of I don't' know, an ambulance or whatever. So we could then manually change it to 8:30 am but it still comes up that we have missed a shower at 7:30 am for him. And you can go in on and click on it and see that he has been done but it still be there as a reminder that this has been missed when it hasn't, it is just a different time. So that gets a little frustrating. …….. And so we have started just correcting it to whatever time the set time is, regardless of what time that resident was done. But realistically, if anything happened or whatever and we had to look back on it, that wouldn't be correct because he was done at 8:30 am instead if that makes sense. (Junior Care Staff Focus Group)
if this was a perfect world we're considering, if there was a link, an email link to that device where people send their PDF or their electronic version of their application and it comes up to that and then I can say load that file and it automatically brings it up instead of going to another PC and a scanner. (Management Focus Group)
The improvements are to streamline what's already on there. The improvements of the system not so much, it's the improvements of how it's used by the people. So, the mentor approach of the users needs to change for it to be effective, would be my thoughts. It's still, going onto the schedule it appears to be still very task orientated, whereas it needs to be a little more personalised or show, but I'm not sure how to achieve that. (Management Focus Group)

And some activities, like, if it's once a day and you complete it at a certain time, the next day it's going to be due the same time that you completed it. So, the system itself is the one who is adjusting the time, so, sometimes it's a little bit difficult for us because we cannot specifically schedule something, we want on a certain period of time because we have limited scheduling times and the computer calculates the time, which is the hard part. (Management Focus Group)

Knowing who has what allocation is going to be wonderful, without having to go off, I can see someone's had an allocation yesterday or the day before, I can then go ahead and contact that person and say I need to see you, so that sort of thing. Chasing up on who was working when, because I don't have access to the rosters, so, that's going to make a big difference. (Management Focus Group)
That's probably one of the things that you're struggling with here at the moment, is when we have other staff or agency staff that aren't trained with that, yeah, so, if one person leaves and it leaves the person on the longer shift as the not very well versed, then it's the RNs job to pick up and cross off that all the scheduling's been done. (Management Focus Group)
it's a good thing for the staff on the floor to be aware of what activities are coming up, because we've got one activities person and you would hope that by having that there for them to see, oh, she's supposed to be going down to coffee by they haven't come and got her yet, I'll take her down. I'd hope they'd be doing things like that. (Management Focus Group)

And now it looks like [what we] will be able to deliver it in stage four, the next stage of the product, where there is kind of a dashboard and that's kind of mixed with also, the dementia thing. So it's not just that you get a life story of the person, but you also get more information about what are the calming factors or what are the triggers for the person. So all the behaviour and the dementia and is all wrapped up in a place where it's easily accessible. So this is a gap in the system. There is quite a long list. (Humanetix Focus Group)

I would much hope and expect that it's realised, the care work. It reduces some of the chaos that is daily care. And I know that in particular in acute, but in residential aged care, I think there is less of that chaos, but there's still quite a bit of it and there's a lot to do for not that many people. And communication about whether something has or has not been done, you know, did Jessica get her shower or not, all of those sorts of things. They should get streamlined. I expect and hope for staff to be calmer, have more time on the residents and then, that reduced stress hopefully feeds back into the one on one time with the resident. (Humanetix Focus Group)

Appendix 2. Full table of theme: - Demographics of implementation (5% coverage), including quotation/s.

Sub-theme	Quotation/s
Trainer's relationship with staff and approachability is important	She seems to be the instrumental person actually contacting SmartCare. And she's getting pretty good relationships with them. Getting feedback. … taking to CWG…. But some things take time. She said that the educator's very approachable if there's any issue or problem, very easy to raise and talk about it. because she was so approachable they would go there. So they weren't threatened by anything. It was she was just so easy to talk to and nothing was a problem. She said the older ones still need verbal support and they get more from us now especially as it's going to C Wing. So that reassurance about how it's going. But she said it's going well. There was one person who's been working for 24 years. And after 11 years of being supported to get a mobile phone actually finally got a mobile phone about three or four years ago. So we're talking about some technologically not that enthusiastic, but he really likes it as well. Another who's been there for 17 or 18 years is very hesitant, never used a computer in her life. And she was feeling really resistive, but is increasingly confident. And she said her naivety's a real asset to us because if it takes five steps to get there, then she won't tolerate that transition in the computer. So it should be just from A to B. So that's actually really useful for them.
Calm acceptance of	But they all seemed calm about that. Like that they had a list of issues and it was going to be dealt with next week.

the process of change	But so she's writing these things down on pieces of paper and giving to Joanna. And so that's their way of managing that.
Still only partial implementation	She didn't feel that the RNs were heavily influenced yet. Like it's not really impacting the RNs' flow as of yet. It's more the AINs. But that's because it's only eight residents downstairs who are long stay. She's wondering if that might change around kick back once the RNs are more involved. But at this point in time it's fine. ADONs. Aren't across the system. So can't be gone to for advice, or can't be checking on the missed activities because they're not across the system to be able to do any of that. So was really feeling a little bit alone, as far as the accountability of staff not using the system correctly. Nobody's testing it then in terms of whether it works for the care. There's 120 forms in the system. And I think the other point being that in terms of; they haven't had admissions – so while we've waited quite a while for Frangipani to kind of be established they've only had one new person going to Frangipani next week. Because they only just recently had a death. So there's only been a new space. So they haven't done a new admission into Frangipani yet. Okay so then talking to the ACFI nurses. So they're not using the ACFI assessment in the system yet. And they're still doing assessments on paper forms for the ACFIs. We need changes so that when we click on a resident we can get the resident summary. We should have contact details on the front page. You have to go back and look for it. She said that was problematic. And yeah they haven't done any changes to Frangipani lower. The previous staff member did all of those in the setup she understands. it took scrolling to see a week, two days didn't go, one day incontinent. But then they have to sort of click in to see what kind of incontinent, I think. Forgot their password, but then remembered it's the same. So they were a bit uncomfortable, they obviously weren't using a lot about entering into it. Rooms only on the iPads. There's no names or photos. And so that's a stage one thing. But in the Smart Ward system you had room 94, and then it had Jenny and Don, Jenny and Don, Jenny and Don. Jenny output, Don output. So it was all mixed together. And then room 93 didn't have anyone in it. So I think it was an entry issue, but that was a clear kind of problem. ….You probably need A and B. ….So then it was confusing for them to learn it because they couldn't go cool I know Jenny and Don, and I'll learn the system by seeing their care plans. Because the system didn't kind of line up. so the breakfast for this couple. One was scheduled at 8 o'clock, and one was scheduled for 8.30. So they're scheduled for different times, but they always eat their breakfast together. So those kind of anomalies made the system a bit obsolete.

Focus Groups Quotations that support theme: Demographics of implementation:

I made a PowerPoint that is separate for AIN, NRN, that explains the functions of the buttons and the colours, so that if I'm not here if they have it they will know what it is. So, that was my only solution. If there's going to be new, then all I have to do is just insert, insert it and distribute if needed. (Management Focus Group)

there's lots of things we're coming across that need refinement and changes, but I'm looking forward to when it's a little more mature, the whole program because it can improve the lives of the nursesif

they use it properly. That's the key thing, is them using it properly, which at the moment they're not, some are, but the majority are still, sticking on the usual routine that they do on paper. (Management Focus Group)

They do a lot of the care and then they go and do it in bulk. That's what we've got to get away from and that's one of the hard things, that's one of the things that's going to be very difficult to changeis people's behaviour. I think it will make it a lot easier for the RN's to keep track of what's happening, but again, we're going to have to educate the RN's on how to move it. (Management Focus Group)
Sometimes the staff will still have the same question. Probably they're forgetting how they're supposed to do it, so I have to remind them. Sometimes they feel panic because it's not working. …… Like earlier, one staff rang me saying that the system was not moving. It was just steady. ….Just earlier today. It was not moving so she could not scroll up or down and then I asked her about, you know, the double tap swipe up thing. She said she's done it all day and then I had to guide her by phone, guide her to look into her phone cause she's using the mobile one, go to the settings, check something and then she mentioned oh, it's on aeroplane mode. So, something like that because, aeroplane mode, it got disconnected from the wi-fi and I said when you turn that off does it sayyou're connected to Jindalee wi-fi and she said yes and then I said have a look and she said it's working. So, something like that they kind of panic, but if I explain it to them. (Management Focus Group)

And if you were a commercial off the shelf, like if you had such a product and you were just (? Writing) it out, you'd probably have three meetings to turn it on, right? And the amount of friction on their end, as a consequence of that, probably are higher than I would assume. I think we managed to minimise friction quite well. (Humanetix Focus Group)

But just trying to see are they able to record the right thing at the right time, without any questions for me, just using the system. And as [XX] said, he got no news. It was also true for me; I got no questions from them. Which was really a very memorable moment. It just means that what we've perceived it to do in the clinical working groups meetings is also true in reality. (Humanetix Focus Group)

So I think they're understanding their processes better, than what they did a year ago. And even if we were just to translate them to Word documents, right? To make tables and care forms for them, we would probably still deliver quite a significant value and on more than one occasion, they've looked at a phone and they were asking us, why is this calling me and they're saying don't really know, we inherited this form from whoever did it before. …… So those sorts of gems and discoveries happen a lot. (Humanetix Focus Group)

it feels like you're driving this car on this road, the road being the project, essentially. And you're going quite fast, so you don't have time to look at the mirror all that much. So you're looking ahead at what's to come. So even though stage three isn't released yet, it's going to get released by the end of this week or next week, we're already looking at stage four and have been for the last three or four weeks. (Humanetix Focus Group)
the staff that we are dealing with in the CWG are trusted by their team members (Humanetix Focus Group

Appendix 3. Full table of theme: Teething Problems (19% coverage), including quotation/s.

Sub-theme	Quotation/s
After hours technical	She's trying to but it's really, really difficult to fit it all in. It also appears that tech issues are coming to her. So as a first port of call all tech issues with it are going to

problems go to the educator	her, and then she's contacting SmartCare. And that's even on the weekend when she's not technically working. They're contacting her at home and she's talking them through tech issues at home.
Initial input of residents into the system is time consuming	The assessment takes 30 to 45 minutes assessing staff members, or whether they can use the system or not. And that's taking that long because of sometimes rephrasing questioning which is hard. Admitting residents. Which was interesting because I thought as the educator it would be more her role to educate the staff on using the system. But it seems that she's also being involved in the process of admitting residents. So admitting residents is taking on average about two hours per resident to admit their information. And it's not such an issue when you just get one or two new admissions a week. But it's because there's that initial upload of everybody that's in the system. And you would have thought that maybe the nurse, or the CMC, where they've got the oversight and they could be updating it a care plan or something at the same time as they put it in the system. But, no. And I said, "Do you think that'll be your role moving forward?" And she said well it's really the admissions officer's role, but she's still providing a lot of guidance to that person. So still really instrumental in actually admitting the residents as well. The pre-admissions form, she wasn't sure who would load all the data. There was some issues because I think there's a label costing acceptance in the form. But in her paper form she didn't require a signature, but it now required a signature. She said scanning in everything is incredibly time consuming. Consent forms, advanced care plan. But she said these were a part of, I guess, those teething issues. There's some teething issues about currently everything goes onto the – has to take everything off the desktop after it's been loaded into Smart Ward. So I think just about they've still got duplicate forms essentially. Because she's got PDF forms that are sitting on her desktop, she's got to remember to make sure they're all in Smart Ward and not on the desktop. There's 900 pages, so she still needs a USB to transfer things over. It'll be good when she doesn't have to drag them over, once they've got past the first stage. Scans are easy to use once they're in there. The printer for her is still a mile down the corridor, so that's partly what's time consuming is getting down to the printer. The pre-admin pack I think in Smart Ward is not exactly the same as her old pack. And just talking about locations, there's a new reception because they've also got – yeah – files are in the new reception in the old bathroom in D wing, and the printer's near the old reception, because they're doing all of the renovations at the moment still as well. So that's obviously impacting on it. So she was saying that she'll spend about three and a half hours – so a lot of the admission work isn't about paperwork, it's a lot of family support work – she's spent about three and a half hours talking to a daughter at the moment. It takes about an hour and a half to do a room review. And then they want to come back and view it again with another family member. They had to do a dummy agreement with the lawyer daughter – so you know eight or nine hours is spent with this family as a potential admission. Plus the tour, plus the day they move in. And she was talking about financial advisors. So I think this stuff isn't quite related to Smart Ward yet.
Issues not resolved over a weekend has flow on	And I think there was one where there was an issue over a weekend though. So then they couldn't access that particular function for the whole weekend which was quite concerning for whatever it was. the thing that really stood out was this thing around missed activities. So at first as the educator she was going and chasing people for missed activities. you can do

workload effect	like a missed activity report. And get them to log back in if you haven't done it or whatever. Looking at five pages of missed activities though. And that just keeps mounting. So it conflicts with trying to do other education things like that. RNs on the floor chasing missed activities is not happening yet. The RNs haven't taken that responsibility of these are my staff on my wing. I should be chasing if they're not doing something. So she was still feeling like it was her doing it, but she can't in her role possibly chase people for that. She didn't really name specific things. But it could be as simple as someone's hair wasn't brushed. Or someone didn't have a shower that was supposed to. Or someone wasn't assisted with a meal that was supposed to be. And whether it was that they didn't actually do it, or whether they just didn't tick it off is - - - At the moment, there was an issue about them double clicking and refreshing. So the entries weren't being saved. So they had to kind of exit. So it was another just technical hiccup. But it would be more time efficient if it just went. At the moment it remains on the care schedule. But I think that was fixed by the Monday. So that's partly why then though they were getting a lot of things being done together. Because she'll do five or six and then exit entry, and exit because it was just to manage this little bug that was in the system. She pointed out though it does take 10 seconds to load. So as you turn it on, it would take 10 seconds to load all of the people. Even just for the eight in Frangipani. And I think that was getting slower as they put more people in. I did mention that to Mal in a conversation and he said that people are logging out too far, so that's why it's having to load. They actually don't need to log out that many steps, so then it's loading again. But so maybe that's a usability thing. She can set it for a Friday and then it can finish on the Sunday night, and then she can come in on the Monday and evaluate it. But now she has to sort of go in and unschedule everything. And so she says, "I need to remember more things," than she did before to try and get it done. But she's only been to two meetings. She's only been there for three months as the RN.
Scheduling needed streamlining	I know there were a lot of issues about scheduling things, so that when they wanted to schedule, say they were doing an [00:32:49] assessment for three days, they couldn't just schedule it for three days and then have it turned off. And the only way to kind of trigger it was to have it coming up basically every minute as an alert. So it meant that there could be a lot of undone tasks because they had to tick them off all the time. Like it was clumsy. They hadn't resolved that kind of overhead activity for the next three days is document any behaviours you notice. Because they're scheduled activities, scheduled at every minute, or every hour or something. So some of those were teething. Trying to get their behaviour assessments last week but she still had to speak with the staff all the time because it was coming up with all these flags. So she scheduled it and then she had to tell the team and they're meant to complete it within three days. And I evaluate the result. But she had to chase her staff if they hadn't completed it. And for some this would be their first behaviour chart, or surveillance chart. So it would help us to actually manage that. But they still don't all have the phones, the CNC, RNs didn't have a phone either. And this is when the – from the Friday it wasn't refreshing itself in the time. So there were issue – the tasks weren't going. You had to log off and log back on again for the tasks to get sent, and then changing the flags so that there was obviously bad timing for doing an assessment. But that also meant that she's stuck on the Monday, with everything that's happened over the weekend. Because they've got all these accumulated tasks. So if there's ever a problem on a Friday then there's additional

	work on the Monday. And there were some anomalies. So there was somebody was in the lounge and the bedroom at the same time I think for some of their behaviour assessments. She's like how does that happen. Maybe they forgot to change the time, but shouldn't that come up with a flag? If they're having the same time different places shouldn't there be a flag saying this isn't possible. And there were three entries at the same time. Yeah and she can ring Smart Care, but usually she'd save these things for the meeting. It's easier to visualise and let them know at the meeting, so she preferred it that way, rather than contacting them at the time. Yeah, they needed a three day timeframe option because they had to schedule everything, even it was only one entry per shift it wasn't sort of working for these three day assessments. And Smart Ward gave a workaround after we rang them, but it's confusing for the staff about it being due every minute. And then they have to try and do it every minute because it's flagging every minute. And I think that's important if they're training staff. You're going to confuse them if you start flagging them to do something every minute. So what we want is one each shift, and an extra can be open for more than one each shift if they want to document more than one a shift. And most RN assessments are three days and then automatically close. So they needed that put in there. Unscheduled activities should be the RN not the AIN on scheduling them. So that's how it's run at the moment is the RN does it.
Some things will never be able to be only softcopy	Enduring power of attorney's – and to make sure the enduring power of attorney and things like that…that are always going to be hard copy. You know when in the future 99 per cent of the preadmission pack could be online, then that would be easier. But she said but most people will be still doing them in paper and then scanning it to her. So that is always going to be time consuming. Only some people wanted a dual admission pack that they have now. And 90 per cent of them drop it off. So she's not sure how much of that will change.
Can't compare this system to functional systems on the market	She's previously used Lee Care, and Autumn Care and Vitro. And so these all have everything she said. So this is just growing, so she can't really compare it to those because they were functional systems. And this one isn't yet. That's the way she sort of described it.

Focus Groups Quotations that support theme: Teething problems

Sometimes the staff will still have the same question. Probably they're forgetting how they're supposed to do it, so I have to remind them. Sometimes they feel panic because it's not working. (Junior Care Staff Focus Group)

With the scheduling at the moment I don't think we have. I think it's still too, I don't know, it doesn't have the options that we need. (Management Focus Group)
It's in its infancy really, isn't it? (Management Focus Group)

Appendix 4. Full table of theme: Acceptability (19% coverage), including quotation/s.

Sub-theme	Quotation/s
Staff like being able to contribute ideas for the system	They've also given some feedback like adding resident birthday alerts and things like that. Which the staff have come to her and said that it's really good that we can give feedback and possibly things can be added from their point of view…But they haven't changed it [yet] – they haven't seen it change but they feel like they're having an impact on it.
Access by agency and casual staff an important consideration for effective workflow	Agency staff access can take time because of the admin, and the system. When I was there the casuals weren't using it. So they [the casuals] have to use the one [computer] on the wall. But really they weren't using it at all. So maybe they're checking their email on one, but then they can't then go into the system or vice versa. One person access in each area. Which means one person can enter all data. So basically they're ensuring that one person in each area has access. But that means that one person could be entering all the data which makes it look like one carer's doing all the work. Which isn't reflective of what's actually happening as far as workflow. So if they're going to take any workflow stats from it at this point it's not going to be really valid. So there's a helping hands, which is like their buddy or champion system, so people that have been trained assisting other people that are learning the system. And access to computers is an interesting problem as well because RNs already have an email, but AINs don't. So to set up an RN is quicker. To set up an AIN you have to set them up with a whole email address and everything like that which is a much more convoluted process. Yeah. Because they have to be registered in the system as a user. So because they don't have the email address you have to set them up in the actual facilities' system. And then to set them up in the actual system. So it's a long process. She talked about different stages as well, and as each new stage comes out it's like catching people up on the education. So if someone's newly being educated and they're up to stage two, then she just educates them as stage two. But other – the stage ones she's going to have to update so they're up to stage two, and that's going to be a flow on effect with all the different stages.
The staff find the system convenient and satisfying 'like candy crush'	The feedback from staff is that the system's convenient. she was always the kind of person who could tick off all her activities, so it was incredibly satisfying for her. And that was what some of the others said is that it's very – people play Candy Crush and things like that – it's a bit of a game sensation that you can tick off your activities. …..Like a Tamagotchi. …..It's a reward. Do they get like a da-ding. There's a whole lot ofpsychology going into that. "Yeah, well done. "she was very happy with it. Well she seemed to be. She was talking to me so I don't know that she was going to say I hate this system. So she was quite enthusiastic when she was showing it to me. So she said, "It automatically comes up and it calculates everything for us." So that was that part. And then she showed me the App. She said it's very helpful. I might have asked her if she thought it was helpful. She said, "All of our activities are listed." And then there's a whole lot of other medication stuff, and going to the kitchen, and doing those kinds of things. She explained about, "I need to check the leg bag." And then she explained the colour coding of the

	activities, so orange, and blue, and green. So she was quite across the whole thing. She had not participated previously in the evaluation because she had a lot going on. But she said she would volunteer that she was very happy now to participate and she obviouslywas feeling confident. It comes up and tells you, otherwise you have to have it in the diary. So it was easier to see. And the weekly linen change for example comes up. So that's really handy, you don't have to remember when the linen change is, it will tell you. "It's easy for me anyway because I know what happens on Mondays and Tuesdays." But for the others who aren't as regular as her she thought it was really good. She was the one that was talking about the Candy Crush addiction. You know, I've got no more tasks overdue, so you get that instant satisfaction. But she likes it because she wants everything ship shape before she leaves,
The resident always comes first	so we'd been sitting on the sofa conversing with the other resident, scrolling and tapping, and then she said, "But the resident always comes first of course." It was like this very pointed - - -she liked it because she could sit with a resident when she was doing one of the admissions, and actually just talk through the form. So enter onto the form rather than on to a paper form which then eventually goes onto a computer form. And just to have a conversation about our core preferences, and could fill it in as he was speaking. So it was more convenient. Not necessarily faster but kind of handy in terms of location and sitting. she liked the iPad. And being able to do it together with the resident. And being able to do handovers with the nurse. Go through a care plan summary part. So walking with a stick, needing supervision, and it was fairly self-initiated, they could scroll though it fairly easily.
"The embodiment of the care plan is now flashing in their face, literally."	"The embodiment of the care plan is now flashing in their face, literally." So she really liked that. …..She felt that all three staff that she was talking about were attentive to the new task list……she was saying she thought it was really good because all the three staff she was talking about are looking at the allocation. I'm really reassured. Because previously they would never go back and look at the care plan. You know she'd always say even if you've looked after that same person for 20 years, things can change. And she said that they wouldn't go back to the care plan and check, and they'd just use environmental cues. And so there'd be a set of dentures next to the bed, so they'd put the dentures in, but they could be somebody else's dentures. And so that was what she was really reassured, that they were using their allocations. And so it was much better task allocations with the staff. It was much more likely to be correct. Now they have to keep looking and it reminds them. She thought it was much gentler that the computer could ask them, can you please remind me to put the barrier cream on her back, rather than the RN having to say by the way, you know, you need to put barrier cream on her back. And then checking did you put barrier cream on her back. Which can be not – doesn't matter how nicely you ask you have to ask, and you have to ask in front of somebody else, in front of the resident. So she felt it was a nicer, gentler reminder, than an RN saying did you do that cream yet. So she felt it was a boost of confidence, and confidentiality. So confidence for the staff and confidentiality for the resident. she was telling me that there were heat protectors, and [00:18:30] (? tubigrip), and catheters, and heel protectors, and something else. And that was for a particular resident. So she was telling me all about his care. But then all of these things were actually documented on the App somewhere.

Document all details or just enough… and what is 'just enough'?	And the problem with ACFI documentation is everyone knows set parameters. So you have to have had so many episodes of incontinence in a day, to get a certain level of funding. And so the ACFI nurses all have that in the back of their head all the time. And so trying to capture three days where you think it's been accurately documented in a row, in a normal system without the staff knowing that it's an ACFI time, often staff are more – because they know that they have to be – more accurate when they're documenting during that time. Other times they'll just forget to document all day if somebody's gone to the toilet. Bowel's not such a big issue. It's more the bladder. then it's just how convenient it is to actually just enter it. Whether it just becomes more habitual to be accurate. then there's this whole thing, if someone's usual pattern is they will use three pads a day. And then on that particular day they only use two, then that's your ACFI day. You're done. even if it's a quick tick it would be – and ACFI doesn't appreciate a quick tick. ACFI is an explanation for each behaviour, and what was used, and what happened. And it actually needs a little blurb about each particular type of behaviour that's unique to that person. Because it's only considered a behaviour if it affects somebody else. So if they're just sitting in their room tapping on the table, it doesn't affect anybody. That's interesting. Because one of the residents was just charging up and down all the time I was there. …..If it doesn't affect anybody else then it's fine. I'm very wary about just making a document for ACFI because that'll change probably in the next two years.
Simple presentation differences cause confusion	Issues with portrait view versus landscape view of the actual system. So how something shows in portrait versus landscape. what it looks like in one view compared to another view confusing people.
The use of space and sizes on the screen is important	The faeces picture was probably 10 centimetres by five. The pictures of the faeces were bigger than the pictures of the client's face. And so I found that a bit, kind of, confronting. …..Offensive. And I think the sizes had been chosen because when I mentioned it to Smart Ward, they said no that's what they requested for those sizes. I'm like yeah, you need that picture for when people are doing their entry. The ACFI nurses know what a three on the scale means. Or you can have some words. So I think they needed to maybe think about that. And that whole, the patient comes first, the resident comes first, I felt like the system could be reinforcing that.

Focus Groups Quotations that support theme: Acceptability

I like it's on the computer. (Management Focus Group)

I like that it is, essentially, it's the care plan and it's the resident folder travelling with the nurse that's caring for them for every allocation……That's one of the best things about it. (Management Focus Group)

They can hopefully clear their head of what happened on that day more than did it before and

know that anything that didn't get done is still on [the] list and someone else will take care of them. (Humanetix Focus Group)

Appendix 5. Full table of theme: Efficiency (5% coverage), including quotation/s.

Sub-theme	Quotation/s
Central training role efficient to make consistent training and decisions	it became fairly apparent that the educator was really instrumental in implementing the system. And ensuring that all staff were up to date, as far as being trained in the system. So she talked about actually trying to roster everyone for training. And how to actually get enough people trained so there's enough breadth across the facility, that there's at least a trained person on every shift, all that kind of stuff. So just trying to coordinate that. There's an assessment schedule, and she's actually written a pretty in-depth assessment on whether they've passed using the software or not. Which was interesting because if they didn't she kind of went back. So it's a kind of long process with each person. in nightshift education in general's always an issue. But she's worked it out so the night RNs can teach the AINs on nightshift, so that she doesn't have to come in and actually do the training at nightshift. I think she's working towards a kind of FAQ troubleshooting manual as well to just take some of maybe that pressure off her of always troubleshooting things. there's an issue whether you're set up on one PC, not necessarily set up on all the PCs. Looking at five pages of missed activities though. And that just keeps mounting. So it conflicts with trying to do other education things like that. RNs on the floor chasing missed activities is not happening yet. The RNs haven't taken that responsibility of these are my staff on my wing. I should be chasing if they're not doing something. So she was still feeling like it was her doing it, but she can't in her role possibly chase people for that.
Efficiency in documentation might compromise quality of delivery	But that means that one person could be entering all the data which makes it look like one carer's doing all the work. Which isn't reflective of what's actually happening as far as workflow.
AINs use of triggers determines time efficiency	I was quite intrigued, the AIN that I watched, because she was waiting – she was like, well, look it's great because I know I don't have anything until 11 o'clock. And at 11 o'clock I need to change the batteries on his hearing aid. I was thinking well you can do that anytime. But she was going to wait until - — —11 o'clock.- - it triggered it. But she loved that because it was then so organised. I asked her if it had changed the way she delivers care. And she said if you know the wing it just confirms what you already know. And if it's busy it's a good reminder, and it's easy to get side-tracked when you have so much to remember. So she was actually finding it quite good as a sort of aid to her memory.
Time consuming to learn	So for each resident they could do 124 different entry points. 120 forms. Different forms. Whether it's a bowel chart, whether it's a behaviour assessment. But they're not all triggered at the same time. They're options.

	Yeah. Yeah, yeah, yeah. It's optional. But there's up to that many different forms. So if you wanted to learn how to use every single form in the system it's going to take you some time. And I think it's one of those things as you come across it, as you need it you come across that form and learn as you go. She was showing me the Smart Care thing again. And she said it prompts you, and it reminds you to look at the glasses, and the hearing aids. So enter onto the form rather than on to a paper form which then eventually goes onto a computer form.

Focus Groups Quotations that support theme: Efficiency

And another thing they have to check in the afternoon if we had opened our bowels. And then they come, and they put us straight in the RNs, what we call the registered nurses, they – when they have to check my blood pressure. Mine has to be checked once a week, and they put it straight in. In the past, they had to make a note, and then go to the little office they have there, and then put it on our cards. But - - - [now they don't] (Resident Focus Group)

I said to them, when they were still doing that paperwork at 3 o'clock, I said to them, you know when computers came on the market, we were told we would have no paperwork anymore. And since that time, we have *more* paperwork. (Resident Focus Group)

I may be wrong, but as far as I know, we have that little thing hanging at the wall on our floor, and they have to put in there, and then I think it goes to a central computer, is that right? (Resident Focus Group)
And that I think, is that – does that go to Jo, the director of nursing? Well, that would be good because he does everything straight away, instead of getting all pieces of paper, so, I think even that is a big improvement. And it will make life for Jo much easier too, because - - -- - - if she needed to check on a person, she had to go through all the paperwork. And now she can just press a button and she gets it, so that would help too. But as I said, most of them, they say, this is pretty good. But as I said just now, indeed, the – I forgot about that, but the nursing – the RNs, the registered nurses, in the past, they had to [check everything by walking] they can just put it in now, so that helps too. (Resident Focus Group)

then like the office staff up here can see who's been doing it, been done at what time and then they can allocate whether they need to allocate more staff or whether they have got too many staff at the moment in that area. (Junior Care Staff Focus Group)

The extra information (hair washing, shaving, tuibgrip on etc) is really good, especially for new
I reckon that is really good, especially when you have new staff or you have someone that's been away for the week and they can just look at it and see that this person needs their hair washed and needs to be wearing tubigrip on their knees or something. And then they can go and do it and they don't have to look back at all their progress notes or ask other staff what has been going on through the week or whatever. Because like we get handover but it's usually for the past 24 hours and not really for the past shift and not really you know the past week unless it was something major that has to be notified like if they went to hospital or something. (Junior Care Staff Focus Group)

'Cause, they actually come to me and say why is it always like time at this time, this resident doesn't go to that, to the toilet at a specific time and I said look at the care plan. Whatever is in the care plan is what we put there, so, now if there are changes then we will put out assessments and that's the time that we only change that and they will say, okay. They know they are supposed to look at the care plan, but they rely mostly on their experience and routines on the floor. (Management Focus Group)

The sling lift has now been added, this is going to tell them from the get go, and, so, it will take for the RNs the possibility that they weren't clear enough in explaining it or didn't pass it through filtered enough, it's one pathway for everyone to get it. (Management Focus Group)

It's good to keep on track of everything. Just so we don't obviously forget anything. Like sometimes with paperwork we forget something. Whereas the Smart Care obviously reminds you if it has been forgotten and then we can fix it up the next day or whatever. So that's always good because, yeah, obviously if you forget something and someone has to go up and look through then it is obviously an issue. (Junior Care Staff Focus Group)

Yeah. So head office, and usually like Joanna or the registered nurses, they all tend to be able to see what has and hasn't been done. And like, if we have a really busy morning and we haven't had a chance to come back and fill it all out and it's gotten to lunch time or something, then they will tend to come down and check on us. They are not overly worried but they can see it, which is good. It's handy. (Junior Care Staff Focus Group)

It means that we see a lot more specific needs to that specific resident easily rather than reading through pages and pages and pages of books. Definitely a lot easier on the computer, especially with a lot of younger staff who are a lot more computer savvy than paper savvy, like myself, who doesn't like reading books at all……definitely [prefer an online system]. (Junior Care Staff Focus Group)

[what is recorded is] probably a lot more accurate especially with the changes made now. Like in our books we don't know whether the resident has been shaved or had their hair washed or anything like that. Whereas on the Smart Care we can see that. And like when they are due and when they have been done and stuff. So some people aren't being done every day then and others aren't being left weeks or whatnot so that's really good. (Junior Care Staff Focus Group)

Appendix 6. Full table of theme: Quality (11% coverage), including quotation/s.

Sub-theme	Quotation/s
Specific examples of staff including 'value-add' to resident care quality	Adding resident birthday alerts and things like that. They're having an impact on what will actually be included. And what will be helpful for them in their role. She thought it was really helpful, you know, things like cleaning glasses. You know you often forget perhaps to do that in the evenings. And so she thought it was a good trigger. The schedule lets you change so that you can do what the resident wants. So if they don't feel like a shower, then they don't have a shower. You know five a week is fine. So she felt that was good you could check or change things like that. And it doesn't do any harm to clean things twice. Morning and night if it's charted and scheduled. And she said, "You've got to watch Don in the evenings because when they take his glasses off he puts them in his top pocket, so he can end up dropping them." So you could add little comments she thought so that when you clean your glasses you then put them somewhere sensible.
Opportunities for improved quality documentation	And whether it was that they didn't actually do it, or whether they just didn't tick it off is - - - Nobody's testing it then in terms of whether it works for the care.

Improved access to options to help choose care specific to individual need	She did check some options about toileting with – oh because the family member wanted to know if there were other lifters because her mother didn't like the lifter. Because she was obviously whatever this unwellness was - I didn't delve into that – it had affected her mobility somehow. And so they were using the lifter to take her to the toilet. And the mother didn't like the lifter. So the AIN was scrolling through to see if there were any other options that she could depend on. Which was unusual given that she's got such a long – you know 12 years of experience……So scrolling in a Smart Ward App to see if there were options for different mobility aids.
Handheld device enables 'companionship' of staff to sit with restless residents	Yeah so there was another resident sitting there who – so I was having a conversation with the other resident because she was asking me questions about the weather and things. And the AIN was busily scrolling, and tapping, and entering. Yeah…..that was potentially kind of companionable. Because the other person, the resident, isn't necessarily an engagement but having someone nearby was a potential comfort - - —So it's quite good that we were sitting on the sofa, because - - - Because that kept her sitting.- - - that gave her – yeah – an opportunity to sit down for a minute.
Improves information quality and quantity to share with resident's loved ones	She said it's really helpful to record meals. And so it's easy to automatically give information to families. So if they've eaten something, if they haven't eaten something. And the family says, "Have they eaten their breakfast today?" She can automatically just take it out of her pocket and say yes she's eaten her breakfast today…..yes she had half her cereal and two pieces of toast.
Improved accuracy of care in line with the current care plan for the individual	Even if you've looked after that same person for 20 years, things can change. And she said that they wouldn't go back to the care plan and check, and they'd just use environmental cues. And so there'd be a set of dentures next to the bed, so they'd put the dentures in, but they could be somebody else's dentures. Toilet because they're incontinent will happen, but you might forget the cream for shingles six times a day. So now it's being triggered.
If staff were disinterested about care before SMARTCARE they can still be disinterested	Or you can sign them all in one go, you can see the signatures all line up so neatly that they've all done it at once. She said you could still see that in paper forms. And I did have some comments that that was still happening in the digital form because they'd just be ticking them off all at once. They can go back and change the times that they've done it, but it's harder for them to do it so often they just sort of don't. But I think some of that also is trying to get the documentation patterns right. So if they group them into allocations of tasks that usually happen together, then they're not in the habit of doing it even if it wasn't together.
How much is the right amount of information?	We had the conversation with Smart Ward too about whether you need an extra button that says approximately an hour ago, or no it was precisely 2.31 that that occurred. But so they can't use the current set up for ACV. It's not detailed enough so they need to go and do their own ACV assessments. Or there'll be new ACV assessments in the system. And so again I think that's that question about should the regular documentation be – can they prove the accuracy so that then it can just be used for an ACV assessment. Or whether that's too much detail for daily assessments. What do you think? It's a good old question, isn't it? Because I worked in lots of places where they don't even really record bowel and bladder except for – well bowel yes, but bladder not so much unless it's for ACV. They might put it in a progress note

	but there's not really a [00:40:28] so this person urinated this many times today. If someone actually documented someone's behaviour for a whole shift, they wouldn't actually be able to do anything on that shift. …..You need to be with them, not documenting it. ….If it doesn't affect anybody else then it's fine. ….Until she goes too fast. [in her pacing/wandering]. Or until somebody's in her way. That's right. That's right so you can't just document those occasions. Yeah, I think it's a really good point because I do – I mean because to me that's what, in terms of measuring outcomes of this thing, is whether you could use a documentation of behaviours as an outcome measure that they will reduce so people are able to spend more time with them. But whether we're actually able to accurately document incidents. Like and whether you just need increase in behaviours, decrease in behaviours, their usual behaviours, or a new behaviour. You know for that person it's the pacing. You know constant pacing. For somebody else it's the tapping. And again it was filled out 2 pm every single day. So it seemed to be more habitual rather than perhaps accurate. But then again maybe that's their routine.
Staff disinterested in care before can still be disinterested	She said if they were disinterested before they can still be disinterested. So I think the thing about the missing tasks, that just depends more on the workers.

Focus Groups Quotations that support theme: Quality

Anything that can improve the system, I say [is good]. The only thing here, generally, is that we have nursing staff, but, in fact, they are not really nursing staff. They are more like our family and friends, it's a real great setup here (Resident Focus Group)
It's been good. It means that we get a lot of hands-on time. (Junior Care Staff Focus Group)

Yeah, you can go over and then put it in and you just put in a reason, put in the progress note that they decided not to have a shower or they decided that they didn't want to shower at that time. (Management Focus Group)
I walk past a room and so and so, this happens now, so and so rings, I don't know that person very well. I'm thinking, gosh, do I need someone to help me here, do I take them on my own, what do they need? Pick up this, go to that person, go, oh, yep, no worries. Come on, let's go, I'll take you to the loo. (Management Focus Group)
one of the things I really like about it is the, or for the future, is the thought that it's going to make a big difference to people caring, for people coming in who don't know someone. (Management Focus Group)

'Cause it's generally teamwork, to work together. It doesn't mean that this is yours, you focus on that. (Management Focus Group)