

**EXAMINING THE IMPACT OF
HOME CARE NURSE STAFFING,
WORK ENVIRONMENTS AND
COLLABORATION ON PATIENT
OUTCOMES**



EXAMINING THE IMPACT OF HOME CARE NURSE STAFFING, WORK ENVIRONMENTS AND COLLABORATION ON PATIENT OUTCOMES: A SCOPING REVIEW OF THE LITERATURE

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Further information about this full study is available at:
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Key Messages

This literature review aims to examine existing research related to the structures, processes and outcomes of home-based nursing care with a focus on the delegation, teaching and supervision of nursing care activities by unregulated care providers (UCP). UCPs are not licensed or regulated by a professional or regulatory body and there is significant variation in the expectations of these care providers nationally and internationally. Increasingly, UCPs are being delegated, taught and assigned aspects of care traditionally performed by nurses. To address the broad, overarching aim of this review, seven specific research questions were posed and answered separately. Important findings and implications from these review questions are listed below.

Which nursing care activities are provided by RNs, RPNs and UCPs in home care?

- ✓ There is little consensus on what components of care constitutes “nursing care activities” due evolving provider roles. Care activities once considered nursing care are now being performed by UCPs.
- ✓ UCPs are increasingly performing controlled nursing acts in home care. In Ontario, this care is being delegated to UCPs or taught and assigned when care is considered an activity of daily living.
- ✓ In addition to nurses and UCPs, patient care activities as well as nursing care activities are performed by family members and other unpaid caregivers who also need to be considered when teaching and assigning care.

What is the relationship between care provider type and client outcomes and what is the relationship between care provider mix and client outcomes in home care?

- ✓ Home care patients cared for by baccalaureate prepared nurses demonstrated improved knowledge and behaviour regarding their health.
- ✓ There is benefit to offering increased intensity of care services with highly educated experienced nurses working in collaborative multi-disciplinary healthcare teams.
- ✓ There is limited research examining home care patient outcomes in relation to care provider type or skill mix.

What is the relationship between continuity of care provider and client outcomes in home care?

- ✓ Literature suggests that home care patient outcomes are positively associated with continuity of care provider.
- ✓ Continuity of care decreases utilization of additional health care services (i.e., hospitalization and emergency department visits).

What is the relationship between nurse substitution, health care cost, and patient outcomes?

- ✓ Evidence about the relationship between skill mix, cost, and patient outcomes was found to be limited and of poor quality.
- ✓ No conclusive evidence was found to support the cost effectiveness of nurse substitution.
- ✓ Existing evidence supports the use of a higher proportion of RNs to achieve improved patient outcomes.

How are nursing care activities delegated in home care and what are nursing and UCP perceptions around delegated care?

- ✓ No literature was found examining the process of how delegation occurs in the home care setting was located.
- ✓ Evidence about the perceptions of nurses and UCPs around delegated care was scarce and focused mainly on nurses.
- ✓ Evidence found was from international studies and may not be useful to draw direct conclusions about home care in Ontario.

Executive Summary

Context

In Canada, it is estimated that up to 80% of paid home care services are provided by unregulated care providers (UCP) (Berta et al., 2013). UCPs are not licensed or regulated by a professional or regulatory body and there is significant variation in the education and expectations of these providers nationally and internationally. Further, the home care work environment is unique, as providers usually work alone to provide care in the patients' home. Compared to institutional healthcare settings, home care is delivered in unpredictable, complex environments. Minimal research examining home care work environments in Ontario, Canada exists and little is known about the structures and processes of home care delivery, including how nursing care activities are delegated, taught and assigned to UCPs. This literature review aimed to examine existing research related to the structures, processes and outcomes of home-based nursing care with a focus on the delegation, teaching and supervision of nursing care activities by UCPs.

Methods

A scoping review was utilized to address three broad research questions:

1. What are the structures of care in the home care sector?
2. What are the processes of care in the home care sector?
3. What are important outcomes in the home care sector?

To address these broad questions, seven specific research questions were posed and answered separately. Key findings from each question are summarized below.

Results

Which nursing care activities are provided by Registered Nurses (RNs), Registered Practical Nurses (RPNs) and Unregulated Care Providers (UCPs) in home care?

The majority of home-based care provided by nurses falls into three categories 1) assessment, 2) intervention, and 3) teaching / patient education. Nurses were found to cover a wide range of activities in the home including highly technical activities such as dialysis and wound care as well as personal care such as bathing and toileting. Usually, nurses provide more complex care such as colostomy and wound care, monitoring blood glucose, administering injections, medication administration and management and palliative care. Patient education and training was found to occur in 80% of nursing visits (Allen et al., 1999).

As patients at home require increasingly complex care, the role of UCPs has expanded and frequently includes nursing care that is delegated or taught such as urinary catheterization, injections and medication administration. In addition to care being provided by nurses and UCPs, a large proportion of informal caregivers are providing help with increasingly complex nursing tasks such as care for pressure ulcers, urinary catheters and colostomies. Key findings from this synthesis include:

- ✓ There is little consensus on what components of care constitutes "nursing care activities" due evolving provider roles. Care activities once considered nursing care are now being performed by UCPs.
- ✓ UCPs are increasingly performing controlled nursing acts in home care. In Ontario, this care is being delegated to UCPs or taught and assigned when care is considered an activity of daily living.

- ✓ In addition to nurses and UCPs, patient care activities as well as nursing care activities are performed by family members and other unpaid caregivers who also need to be considered when teaching and assigning care.

What is the relationship between care provider type and patient outcomes in home care? and What is the relationship between care provider mix and patient outcomes in home care?

Much of the existing home care literature fails to focus on care provider type and mix related to patient outcomes. In one study, an association was established between provider type and decreased use of acute care services. Palliative patients receiving a greater amount of nursing services per week had decreased odds of hospitalization, emergency department visits and death in hospital (Seow et al., 2010). Patients using more than seven hours of personal support and homemaking services also had a lower risk of hospitalization, emergency department visits and death in hospital.

In general, home care patients showed improved health status when receiving increased care services from a combination of nurses and UCPs. Tentative conclusions drawn from this synthesis include:

- ✓ Findings suggest there is benefit to offering increased intensity of care services with highly educated experienced nurses working in collaborative multi-disciplinary healthcare teams.
- ✓ Literature suggest that increased service intensity results in improved patient health status however additional research is needed to better understand how the intensity of nurses versus UCPs impact home care patient outcomes.

What is the relationship between continuity of care provider and patient outcomes in home care?

Maintaining continuity of care can be especially challenging with the home care population as various care providers and organizations are responsible for the provision of integrated care. This review defined continuity of care as ongoing care provided by the same care providers to patients in their homes and examined how it related to patient outcomes. Literature found in this review most frequently examined utilization outcomes such as hospitalization and emergency room visits rather than end-result patient outcomes such as infection, falls and medication errors. Two studies were found to support a positive relationship between continuity of care and home care patient outcomes (Russel et al., 2011; D’Errico & Lewis, 2010). Patients receiving poor continuity of care were more likely to be hospitalized and to visit the emergency department than those with high levels of continuity of care. From the few publications identified, the following tentative conclusions have been made:

- ✓ Home care patient outcomes are positively associated with continuity of care provider.
- ✓ Continuity of care decreases utilization of additional health care services (i.e., hospitalization and emergency department visits).
- ✓ Existing literature focuses on continuity of nurses, continuity of other types of providers is not examined.

What is the relationship between nurse substitution, healthcare cost, and patient outcomes?

This review sought to examine the relationship between nurse substitution (by UCPs), healthcare costs, and patient outcomes in home care. However, no research was located examining these concepts in the context of home care. Rather, available literature focuses on nursing skill mix in institutional settings (e.g., hospitals, long-term care facilities, etc.). Increased use of UCPs in institutional settings has been associated with decreased quality of care, increased absenteeism, higher overtime,

increased RN workloads, and greater turnover of UCPs (Buchan & Dal Poz, 2002; McKenna, 1995). Additionally, employing a higher proportion of nurses has been found to increase patient satisfaction, improve recovery rates, increase quality of care, improve patient knowledge and compliance with treatment, increase staff productivity and reduce absenteeism as well as sick time, turnover, and overtime (McKenna, 1995). Conclusions from this synthesis include:

- ✓ No literature examining nurse substitution in relation to cost and patient outcomes in the home care context was located. Rather, available literature focuses on nursing skill mix in institutional settings (e.g., hospitals, long-term care facilities, etc.).
- ✓ Evidence about the relationship between skill mix, cost, and patient outcomes was found to be limited and of poor quality.
- ✓ No conclusive evidence was found to support the cost effectiveness of nurse substitution.
- ✓ Existing evidence supports the use of a higher proportion of RNs to achieve improved patient outcomes.

How are nursing care activities delegated in home care? and What are nursing and PSW perceptions around delegated care?

While there is ample literature to suggest that UCPs are performing delegated tasks in the home, we were unable to locate any literature that describes the process of how or how often this occurs. Few studies were found that directly examined nurses' perceptions around delegated care in the home. Nurses felt it was appropriate to delegate 'established' care to UCPs, yet they agreed this is not always easy to achieve as patient care needs are continuously evolving (Carr & Pearson, 2005). Nurses may feel forced to delegate and expressed concern over the level of competence and skill of UCPs to perform controlled nursing tasks.

Only one study was found that discussed UCPs perceptions of delegated care. Half of UCPs felt positively about the transfer of skills through delegation while a small number of UCPs felt delegation may negatively affect intention to remain employed, specifically due to reimbursement not reflecting the complexity of tasks they are asked to perform. Conclusions from this synthesis include:

- ✓ No literature was found examining the process of how delegation occurs in the home care setting was located.
- ✓ Evidence about the perceptions of nurses and UCPs around delegated care was scarce and focused mainly on nurses.
- ✓ Evidence found was from international studies and may not be useful to draw direct conclusions about home care in Ontario.

Full Review

Introduction

In Ontario, health care is delivered to patients in their homes by a variety of providers including both professionals and non-professionals. Professional health care workers provide care such as nursing and therapy while non-professional or unregulated health care workers generally provide personal support services such as personal care, housekeeping and transportation (Boyer, 2001; Denton et al., 2002). Registered Nurses (RNs) and Registered Practical Nurses (RPNs) deliver nursing care in Ontario. While both categories of nurses share the same legislated scope of practice, RNs have extended education and often practice with a higher degree of autonomy and leadership. RNs typically provide more technical aspects of care to patients with greater acuity, complexity and instability. However, as the demand for home care increases, nursing care is increasingly provided by unregulated care providers.

The purpose of this literature review was to examine the extent and range of existing research related to the structures, processes and outcomes of home-based nursing care with a focus on the delegation, teaching and supervision of nursing care activities by unregulated care providers.

Background and Context

In Canada, it is estimated that up to 80% of paid home care services are provided by unregulated care providers (Berta et al., 2013). The term unregulated care provider (UCP) is used synonymously with titles such as personal support worker (PSW), health care aide, nurse's aide, nursing attendant, patient care aide, and specific to home care, home health aide and home health worker. UCPs are not licensed or regulated by a professional or regulatory body

and there is significant variation in the education and expectations of these providers nationally and internationally.

Ontario Context

In Ontario, home care services are accessed through 14 Community Care Access Centers (CCACs). The CCACs are the single point of access for publicly funded home care and residential long-term care (LTC) in the province. Care coordinators, employed by CCACs, assess Ontario residents identified as potentially needing home care services. The role of care coordinators is to determine the frequency of home care services based on health need while remaining within the fixed budget of the CCAC. Care coordinators also play a role in deciding which type of nursing care provider (i.e., nurse or UCP) delivers patient care. In Ontario, UCPs, nurses, and allied health professionals are employed by private for-profit and not-for-profit home care organizations. These organizations hold contracts with the CCACs to provide specific types of care in specific geographic areas.

While informal care providers (i.e., family members and friends) often provide the majority of home-based care in Ontario, patients frequently receive care from a mix of formal care providers (i.e., nurses, UCPs, and allied health professionals). While nursing care (i.e., care activities encompassed under the Regulated Health Professionals Act [RHPA] as 'controlled acts') are primarily performed by nurses, UCPs do carry out delegated or assigned nursing tasks on stable patients. The delegation of nursing care to UCPs in Ontario is unique to the home care setting, and has raised some concern among home care provider organizations due to the autonomous nature of the home care work environment.

The home care work environment is unique, as providers usually work alone to provide care in the patients' home. Compared to institutional healthcare settings, home care is delivered in unpredictable, complex environments. Nurses and UCPs lack control over their work and work environments with family members or informal care providers who often supplement nursing and personal care. In addition, as a result of the structure of Ontario's home care system, it is possible that patients receive nursing care and personal care from two different home care organizations further complicating care coordination as providers may never interact. This system structure has implications for the continuity of care Ontario home care patients receive.

Minimal research examining home care work environments in Ontario, Canada exists. Further, little is known about the structures and processes of home care delivery, including how nursing care activities are delegated, taught and assigned to UCPs. Differences in the home care work environment make it challenging to apply knowledge of structures and processes of care, generated through institution-based research, to the home care setting.

Through this review of the literature, care provider skill mix, continuity of care, as well as teaching, delegating, assigning and supervising nursing care are examined in relation to home care patient outcomes. Below, these concepts are described to provide context for the literature review that follows.

Skill mix

In relation to health care, skill mix can be defined as 1) the mix of skills or competencies possessed by an individual, 2) the ratio of experienced to less experienced staff within a single profession (e.g., nursing), or 3) the or mix of different types of care providers (e.g., RNs, RPNs, UCPs) within a health care team (Sibbald et al., 2004). For the purposes of this review, skill mix refers to the mix of different types of

nursing care providers within a healthcare team.

Changing nursing skill mix can result through various mechanisms including 1) *role enhancement*: increasing the depth of a job by expanding the role of a group of workers, 2) *role substitution*: expanding the scope of a job by working across professional boundaries or by substituting one type of worker (e.g., UCP) for another (e.g. RN or RPN), 3) *delegation*: assigning a particular task to another level of care provider (i.e., from RN to RPN or UCP), and 4) *role innovation*: the creation of a new role or type of worker (Sibbald et al., 2004). This review will consider the first three mechanisms, role enhancement, role substitution, and delegation and will report on how they are structured in home care, how they relate to health care costs, and how they impact patient outcomes.

Teaching, Delegating, Assigning and Supervising

Increasingly, UCPs are being delegated aspects of care traditionally performed by nurses, including care activities encompassed under the RHPA as controlled acts. Delegation occurs through the transfer of authority from a nurse to a UCP to perform controlled nursing acts. Controlled nursing acts are activities considered to be potentially harmful if performed by unqualified persons. In Ontario, these include performing a prescribed procedure below the dermis / mucous membrane and administering a substance by injection or inhalation (CNO, 2013). Nurses who delegate to UCPs must do so in accordance with provincial regulation (CNO, 2013). When delegating tasks to a UCP, the nurse must be satisfied that the UCP has the knowledge, skill and judgement to perform the nursing act and that delegation of the task is appropriate for the patient (CNO, 2014).

In addition to delegating, nurses may be responsible for teaching, assigning and supervising the performance of nursing care provided by UCPs (CNO, 2013). Teaching involves providing instruction and determining

that a UCP is competent to perform a skill (CNO, 2013). While delegating involves transferring authority to perform a controlled nursing act, teaching, assigning and supervising apply to any procedure performed by a UCP, including RHPA controlled acts when they are considered a routine activity of living. For example, while assisting with the insertion and removal of a clean intermittent urinary catheter is a controlled nursing act and requires delegation to be performed, a UCP may be taught and assigned this skill without delegation when it is considered a routine activity of daily living for a specific patient. For the purpose of this review, *nursing care activities* refer to controlled nursing acts, while *personal care activities* will be used to encompass a more broad range of care activities carried out by nurses and UCPs.

Continuity of Care

Continuity of care is perceived differently across healthcare settings. According to Reid et al. (2002), continuity of care must be reflected in the individual experience of the patient and nurse as well as in the care provided. For patients, it is the experience of care as connected over time. For care providers, it is the experience of having sufficient information and knowledge about a patient to provide the best possible care (Reid et al., 2002). While continuity of care has been shown to reduce healthcare costs and improve patient safety, the majority of research focuses on acute care settings. Maintaining continuity of care can be especially challenging in home care settings as various professionals and organizations are responsible for the provision of integrated home healthcare. For the purpose of this review, continuity of care refers to ongoing care provided by the same care providers to patients in their homes and is examined in relation to patient outcomes.

Patient Outcomes

Home care patient outcomes are not consistently defined in the literature. In the literature utilization outcomes such as emergency department visits, hospitalization,

or admission to long-term care are the most frequently examined home care outcomes (Harris & Dugan, 1996). For this review, we were interested in examining the short-term outcomes of home care that lead to utilization of subsequent healthcare services. The outcomes included in this review were identified by home care provider organizations as important for home care patients likely to receive care from both nurses and UCPs, as well as for patients receiving delegated or assigned nursing care from an UCP. These outcomes include falls, pressure ulcers, medication errors, new infections, and feeding tube complications, all of which can be considered adverse events. Adverse events are negative outcomes of patient care, defined as “unintended injuries or complications resulting in death, disability or prolonged hospital stay” (Baker et al., 2004).

A recent Canadian home care study described adverse events experienced among Ontario home care patients (Doran et al., 2013). Falls, a medication related emergency department visit / hospitalization, sepsis / bacteremia (infection), and pressure ulcers were among the top ten adverse outcomes identified through analysis of Ontario health databases (Doran et al., 2013). A subsequent review of home care patient charts revealed similar results with fall related injuries, wound infections, adverse drug reactions, and pressure ulcers rating among the top five adverse events identified (Doran et al., 2013). Gastro-intestinal problems were also identified through chart review as an adverse event related to receiving home-based health care services (Doran et al., 2013). Although not specified, gastro-intestinal problems could reflect complications associated with feeding tubes.

Through this review we identify and synthesize literature that examines these short-term home care outcomes (i.e., falls, pressure ulcers, medication errors, new infections, and feeding tube complications) in relation to care provider type, skill mix, continuity of care and healthcare cost. However, the majority of identified studies

examine home-based care in relation to utilization outcomes (i.e., emergency department visits, hospitalization, and admission to long-term care). Further research is needed to examine care provider type, skill mix, continuity of care and health care costs and the relationship between these factors and short-term outcomes in home care.

Literature Review Questions and Methods

Scoping reviews are designed to examine the extent of research activity regarding a specific topic, provide an overview of what is known and to identify gaps in existing literature (Arksey & O'Malley, 2003). Rather than being guided by highly focused questions, scoping reviews use broad research questions to identify all relevant literature, without addressing the issue of study quality (Arksey & O'Malley, 2003). Broad research questions to be answered in this review included: 1) what are the structures of care in the home care sector? 2) What are the processes of care in the home care sector? and; 3) what are important outcomes in the home care sector? To address these broad questions, seven specific research questions were posed and answered separately.

1. Which nursing care activities are provided by RNs, RPNs and UCPs in home care?
2. What is the relationship between care provider type and patient outcomes in home care?
3. What is the relationship between care provider mix and patient outcomes in home care?
4. What is the relationship between continuity of care provider and patient outcomes in home care?
5. What is the relationship between nurse substitution, healthcare cost, and patient outcomes?
6. How are nursing care activities delegated in home care?
7. What are nurse and UCP perceptions around delegated care?

To answer each research question, the five-stage framework for conducting scoping reviews developed by Arksey and O'Malley (2003) was used: 1) identify the research question; 2) identify relevant studies; 3) study selection; 4) charting the data; and 5) collating, summarizing and reporting the results. This process was repeated for all seven questions.

This review was based on a comprehensive search of ten databases including: Cumulative Index for Nursing and Allied Health Literature (CINAHL), Ageline, Medline, EMBASE, HealthSTAR, Scopus, Econlit, Web of Science, Cochrane, and PsychInfo. Specific search strategies were developed for each of the seven questions. Question specific search strategies are outlined in the Appendices.

Across all searches and databases, the search was confined to English language articles published from 1990 onwards. Articles were included if 1) the patient population was 18 years of age and older; and 2) the care described was delivered by RNs, RPNs, or UCPs. Articles were excluded if an Advanced Practice Nurse or Nurse Practitioner provided the care described.

A common process was used to identify relevant publications for each of the seven research questions. The process used to search for, identify, and extract information from relevant publications was as follows:

1. The search strategy for each question was applied to each of the ten databases.
2. All articles identified through the search were exported to RefWorks.
3. Duplicates were removed.
4. The title and abstract of each article were reviewed for relevance.
5. Those articles identified as relevant through initial screening were reviewed in full to determine whether inclusion / exclusion criteria were met.
6. A full-text copy of each article was retrieved and all relevant information was extracted

and documented. Extracted information included: study aim, sample, location, methods, key concepts, key variables, measures, findings, and limitations.

7. The reference lists of all included articles were hand searched for additional relevant articles not identified through the database search.

Once all articles were retrieved and relevant information extracted, the findings from all studies were synthesized to address each of the seven research questions. The results of each synthesis are presented in the following sections of this report.

Question 1: Which nursing care activities are provided by Registered Nurses, Registered Practical Nurses and Unregulated Care Providers in home care?

Introduction

Increasingly, patient care is shifting from institutional settings to the community. As the demand for home care grows and the complexity of patients increases, the roles of home care providers have evolved and will continue to do so to meet these growing needs. The role of unregulated care providers was once purely supportive, involving assistance with activities of daily living (ADLs) such as bathing and dressing as well as other household tasks (Berta et al., 2013). As more patients are receiving increasingly complex care in the home, the role of unregulated care providers now includes delegated and assigned nursing care activities (Berta et al., 2013; Swedberg, Hammar Chiriak, Tornkvist & Hylander, 2013). Patients, in their homes, may be receiving care from Registered Nurses (RN), Registered Practical Nurses / Licensed Practical Nurses (RPN / LPN), unregulated care providers (UCPs) or some combination of these formal care providers, in addition to family and friends. It is possible that each of these care providers delivers care that could be considered nursing care.

In this first section of the review, literature is examined to describe the patient care activities being provided in home-based care by each care provider group. Although there is limited Canadian literature on this topic, a number of international studies were found that examine patient care activities in the home care setting.

Results

Using the search strategy outlined in [Appendix A1](#), nine articles were located meeting inclusion criteria (Allen et al., 1999; Axelsson & Elmstahl, 2004; Donelan et al., 2002; Modin & Furhoff,

2002; Moorman & Macdonald, 2003; Norell, Ziegert, & Kihlgren 2013; Ohlen, Forsberg & Broberger 2013; Pickard & Glendinning 2002; Schneider & Slowik, 2009). Further hand searching of reference lists resulted in the identification of two additional articles for inclusion (Berta et al., 2013; Swedberg et al., 2013). [Figure 1](#) outlines the process used to identify relevant articles, including reasons for exclusion. [Appendix A2](#) provides summary information about each article included in the review.

Synthesis

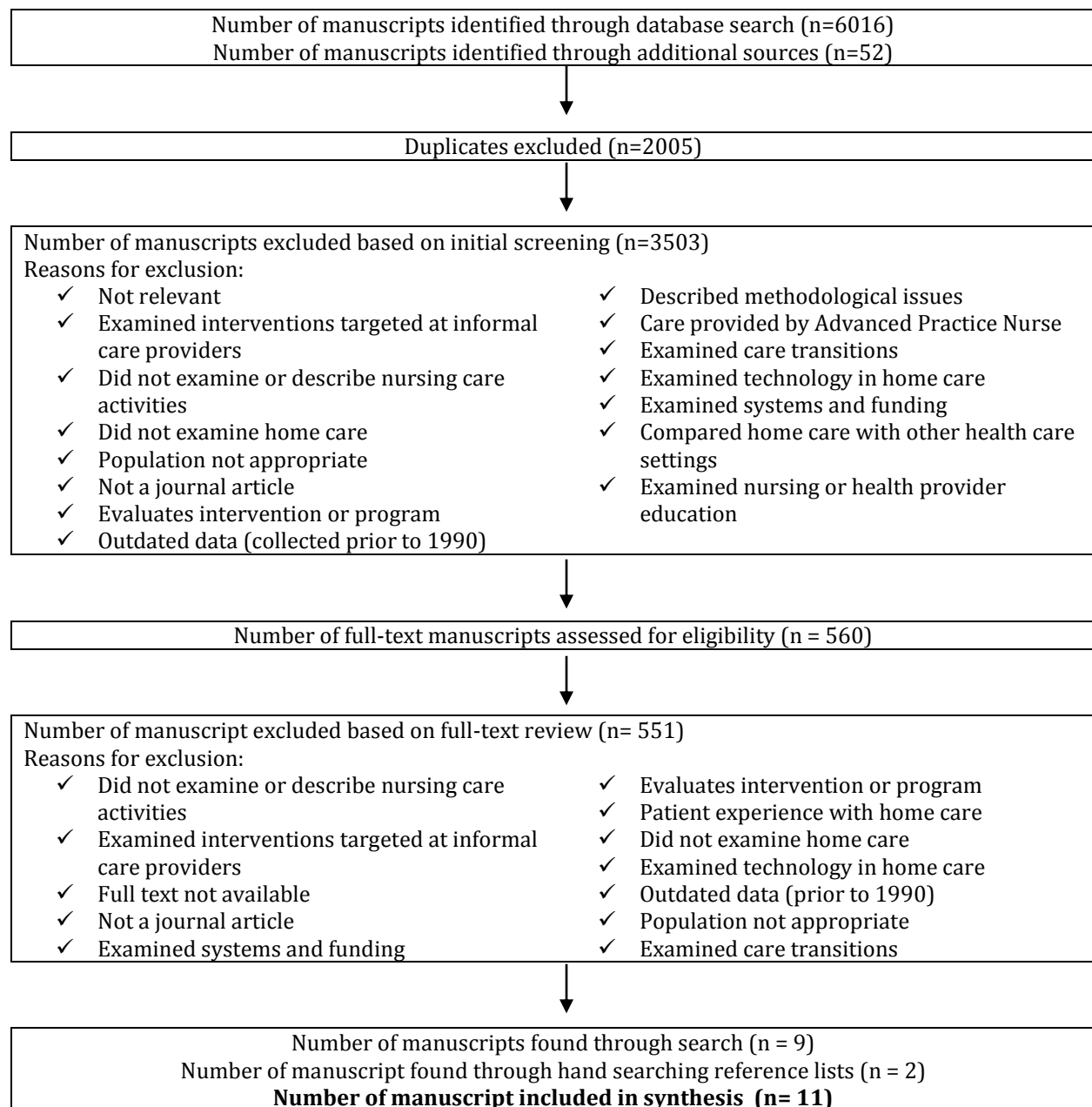
This review examines which patient care activities are provided in the home care setting by RNs, RPNs and UCPs. As an increasing amount of home-based patient care is provided by family members and informal caregivers, care delivered by this group of informal care providers is also described in this review.

Nursing Care Activities

No single definition of nursing care activities was discovered in the literature. Selected manuscripts defined nursing care activities by describing how these activities differ from personal care (Pickard & Glendinning, 2002; Swedberg et al., 2013). Personal or basic care includes bathing, dressing and assisting with nutrition (Pickard & Glendinning, 2002), while advanced or nursing care involves specific tasks such as tube feeding (Swedberg et al, 2013).

How nursing care was measured also varied across studies. In some studies, nursing care activities were measured by examining nursing interventions documented such as vital signs monitoring and medication administration (Norell et al., 2012; Schneider & Slowik, 2009).

Figure 1. Question 1: Relevant Manuscript Identification Flow Diagram



According to Scheider and Slowik (2009) a nursing intervention is a treatment that is based on clinical judgement and knowledge performed by a nurse to enhance patient outcomes. However, these interventions traditionally performed by nurses are now often performed by UCPs.

Care Activities Provided by Registered Nurses and Registered Practical Nurses

Historically, nurses in home care provided personal care for patients. Today home care nurses often provide complex, advanced care to very ill patients in their homes (Ohlen et al., 2013; Pickard & Glendinning, 2002). While no research was located examining the differences in care activities performed by RNs and RPNs.

RNs are expected to demonstrate greater breadth of knowledge and perform skills that include patient assessments, care coordination, developing care plans, teaching, counselling and care evaluation (Armstrong-Strassen & Cameron, 2005). RPNs, on the other hand, provide more direct patient care and labour-intensive activities (Williams, 2006).

Six studies were found that examined nursing care activities carried out by nurses in the home setting including four studies employing retrospective chart reviews (Allen et al., 1999; Modin & Furhoff, 2002; Norell et al., 2012; Ohlen et al., 2013). The majority of home-based care provided by nurses falls into three categories 1) assessment, 2) intervention, and 3) teaching / patient education (Allen et al., 1999; Ohlen et al., 2013). However, the care activities provided by nurses varied among studies.

Nurses completed some degree of patient assessment in over half their visits (Allen et al., 1999; Modin & Furhoff, 2002). Blood pressure monitoring was the most common patient assessment performed (Allen et al., 1999). Allen et al. (1999) found the most common nursing care activities provided by nurses included wound care / dressings, venipuncture, and blood glucose monitoring (Allen et al., 1999). Other studies found medication management and administration was among the care activities most commonly performed by nurses (Modin & Furhoff, 2002; Norell et al., 2012). Through interviews and observation, Pickard and Glendinning (2002) found the role of nurses in home care covered a wide range of activities, including highly technical activities such as dialysis and wound care as well as personal care activities such as bathing and toileting. The more complex aspects of nurses' care included performing dialysis, colostomy and wound care, administering enemas, monitoring blood glucose, giving injections, taking blood samples, medication administration and palliative care (Pickard & Glendinning, 2002).

The literature also suggests that a large part of care provided by nurses in the home is patient and family education. Allen et al. (1999) found patient education / training occurred in 80% of visits. In their study of nursing intervention classification, Schneider and Slowik (2009) found individual patient teaching to be the second most documented intervention, after vital sign monitoring.

Care Activities Provided by Unregulated Care Providers

Four manuscripts were found that describe patient care activities provided by unregulated care providers (UCPs) in the home setting. Traditionally, the role of UCPs was supportive, involving assistance with activities of daily living (ADLs) such as bathing, dressing and light household tasks (Berta et al., 2013). As patients at home require increasingly complex care, the role of UCPs has expanded and frequently includes nursing care that is delegated or taught and assigned such as urinary catheterization, injections, and medication administration (Berta et al., 2013). In their focus groups with industry experts, Berta et al. (2013) learned that UCPs are increasingly relied upon to step outside their role and perform *extra-role behaviours*. Similarly, in a small study of home healthcare assistants, Swedberg et al. (2013) found that in addition to basic care, UCPs were providing advanced care such as tube-feeding, injections and wound /stoma care often without formal training.

In the literature, medication administration was often mentioned as a delegated task performed by UCPs in the home setting (Axelsson et al. 2004; Moorman & Macdonald, 2013). Axelsson et al. (2004) surveyed home care aides in Sweden and found that 95% participated in medication administration and that 10% did so without the necessary delegation.

Care Activities Provided by Informal / Family Caregivers

While it is not the focus of this review, it is important to note the role of informal and family

caregivers in the home care setting as they provide the largest proportion of patient care and work closely with RNs, RPNs and UCPs. The care provided by family caregivers is similar to that of a UCP, and just like UCPs, family caregivers are providing increasingly complex care, often without focused teaching and education. Donelan et al. (2002) surveyed unpaid caregivers and found that more than half of caregivers who helped with activities of daily living, such as bathing, toileting or lifting received no formal instructions as to how to perform these tasks. Further, 18% of caregivers who assisted with medication administration and one-third who changed dressings or bandages reported receiving no instruction about how to do so (Donelan et al., 2002).

In their study of home caregivers, including family caregivers and paid home health aides, Moorman and Macdonald (2013) found that 83% of caregivers were providing help with one or more nursing task such as care for pressure ulcers, catheters, a colostomy or foot care. Thirteen percent of caregivers were providing care considered highly complex (Moorman & Macdonald, 2013).

Pickard and Glendinning (2002) compared the role of family caregivers and nurses caring for frail older people in home settings. Although the sample was small, they found family caregivers carried out a wide range of tasks from personal care to technical complex care such as parenteral feeding and colostomy care (Pickard & Glendinning, 2002).

In summary, there is considerable overlap between the tasks that are carried out by family members, UCPs and nurses. Increasingly, nursing care is delegated and provided by UCPs and family members, at times without necessary education and delegation. Future research is needed to better understand the evolving roles of healthcare providers in the home care setting. Conclusions from this synthesis include:

- ✓ There is little consensus on what components of care constitutes “nursing care activities” due evolving provider roles. Care activities once considered nursing care are now being performed by UCPs.
- ✓ UCPs are increasingly performing controlled nursing acts in home care. In Ontario, this care is being delegated to UCPs or taught and assigned when care is considered an activity of daily living.
- ✓ In addition to nurses and UCPs, patient care activities as well as nursing care activities are performed by family members and other unpaid caregivers who also need to be considered when teaching and assigning care.

Analysis

The results of this review suggest little research has been produced that focuses on the role of each care provider type in the home care setting. There is significantly less research regarding the roles of healthcare providers in home settings than in institution-based care. Compared to hospital-based nursing care, home-based nursing care is provided in unpredictable, complex environments by a variety of types of providers including informal caregivers. As such, it is challenging to apply what is known about provider roles in institution-based research to the home care setting.

Based on the literature included in this review, it is difficult to draw conclusions about nursing care activities and nursing care providers in home care settings in Ontario. The majority of existing research was conducted outside of Ontario, Canada. This is problematic as the structures and processes of home care in Ontario are unique.

While the results of this review may not apply directly to the Ontario context, it is clear that UCPs and informal caregivers are increasingly involved in providing complex nursing care for patients in their homes as such, role boundaries between caregivers are blurred.

Conclusion

Existing research has begun to describe the care activities performed by nurses and UCPs in home care settings. However, further research is needed to examine care provided in the home and the impact of evolving provider roles on patient outcomes.

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Question 2 and 3: What is the relationship between care provider type and patient outcomes in home care? What is the relationship between care provider mix and patient outcomes in home care?

Introduction

In the developing landscape of home care, informed decisions about nursing resource allocation are pertinent to meet “healthcare cost pressures and the need to ensure strategic use of all available human resources” (Meadows & Prociuk, 2012, p. 273). In Canada, Registered Nurses (RNs), Registered Practical Nurses (RPNs / LPNs), and other unregulated care providers (UCPs) (e.g. personal support workers, health care aids, etc.) are members of care teams in the home care setting. As home care patients become increasingly complex, there is a need to understand factors influencing patient outcomes of nursing work (O’Brien-Pallas, Doran, Murray, Cockerill, Sidani, Laurie-Shaw, & Lochhaas-Gerlach, 2002). Existing literature explores the relationship between care provider type / mix and scope of practice (Meadows & Prociuk, 2012) as well as staff satisfaction (Wong et al., 2009). However, limited research exists related to home care patient outcomes. In this section of the review, literature examining the relationship between care provider type, care provider mix, and patient outcomes in home care is explored.

Results

Initially, separate search strategies were used to locate literature addressing questions two and three. Using the search strategy outlined in [Appendix B1](#), only two manuscripts were located addressing question two (Cucinotta et al., 2004, Vetter et al., 2004). Further hand searching of reference lists resulted in the identification of two additional manuscripts for inclusion in this review (O’Brien-Pallas et al., 2002, Massotti et al., 2010). [Figure 2](#) outlines the process used to identify relevant articles to

address this question (what is the relationship between care provider type and patient outcomes in home care?). [Appendix B2](#) provides summary information about each article included in the review.

Using the search strategy outlined in [Appendix B3](#), one manuscript was located addressing question three. [Figure 3](#) outlines the process used to identify relevant articles to address this question (what is the relationship between care provider mix and patient outcomes in home care?). [Appendix B4](#) provides summary information about each article included in the review.

As the database search resulted in the identification of only five relevant articles across questions two and three and existing literature could be used to address either questions, all five articles were synthesized to address both questions.

Synthesis

Existing literature focuses on care provider type / mix in acute care settings, nursing homes, and in relation to informal caregivers (e.g. family and friends). While the home care literature examines the relationship between care and patient outcomes, much of the existing home care literature fails to focus on care provider type or skill mix (Massotti et al., 2010).

Care Provider Type / Skill Mix

Care provider type refers to the professional education and designation of the individual providing home care services. Care providers in home care nursing include: Registered Nurses (RNs), Registered Practical Nurses, (RPNs), unregulated care providers (UCPs),

Figure 2. Question 2: Relevant Manuscript Identification Flow Diagram

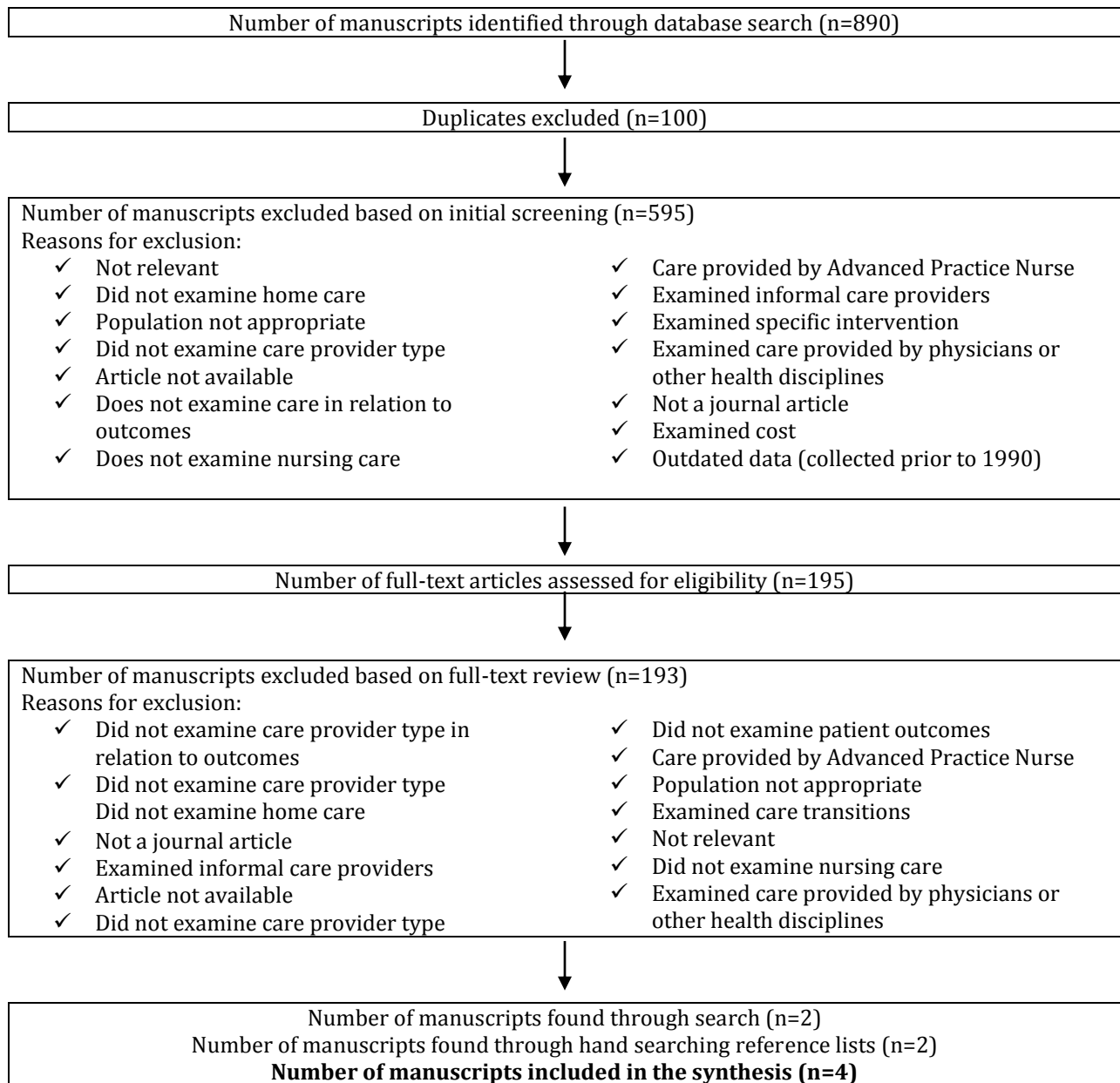
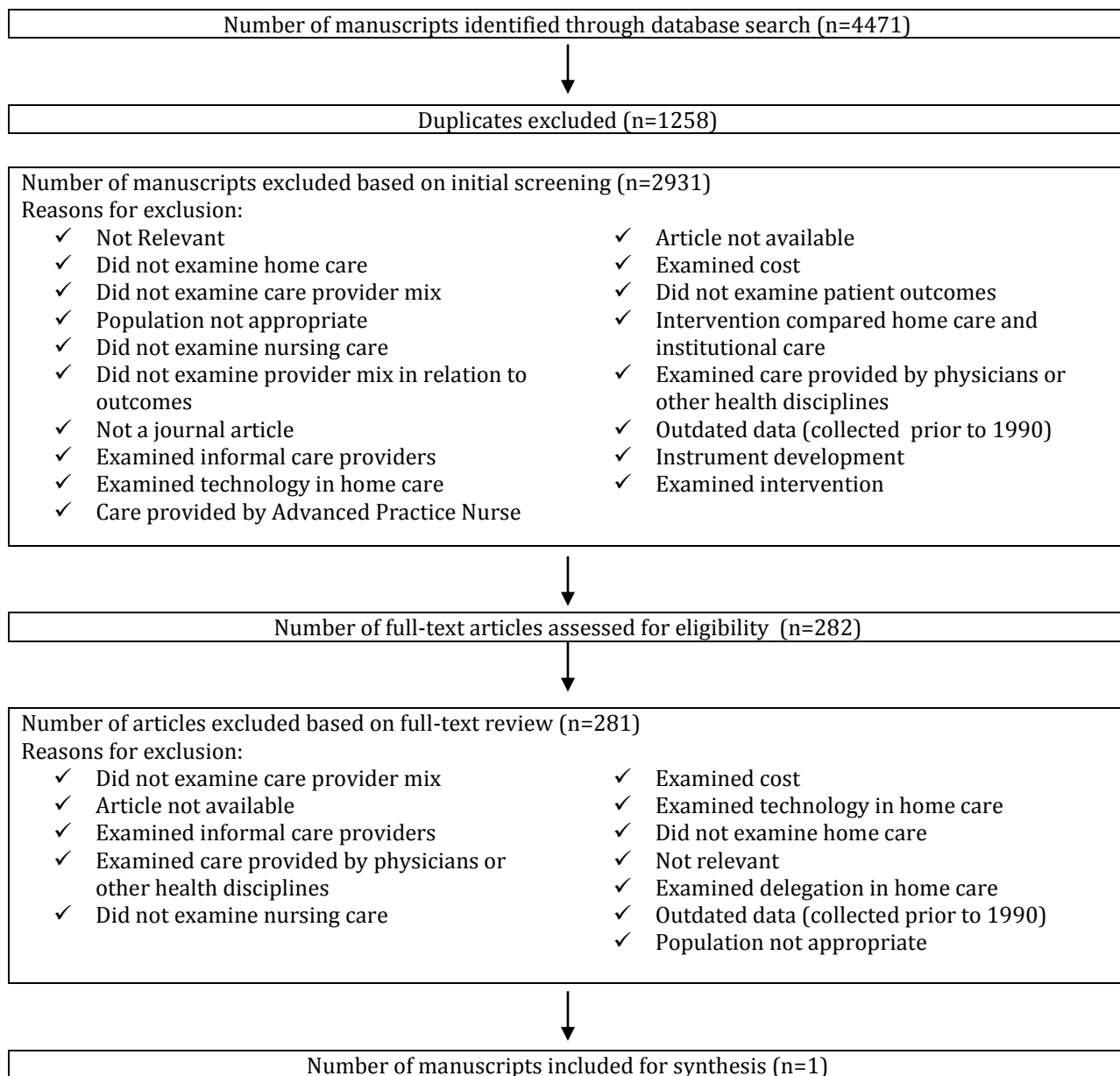


Figure 3. Question 3: Relevant Manuscript Identification Flow Diagram



health care aides', personal support workers and so on. Skill mix has been defined as the mix of different types of care providers within a health care team.

Patient Outcomes

In the existing literature examining patient outcomes in relation to care provider type / skill mix, patient outcomes are categorized into three categories: 1) intermediate-result outcomes (e.g. change in patient behaviour or knowledge),

2) utilization outcomes (e.g. hospital admissions), and 3) end-result outcomes (e.g. change in patient health status) (Harris & Dugan, 1996).

Intermediate-Result Outcomes.

Intermediate-result outcomes are defined as a change in the knowledge, behaviour or emotion of a patient that can influence the outcome of their care (Harris & Dugan, 1996). O'Brien-Pallas et al. (2002) examined the relationship

between educational preparation of care providers and the intermediate-result outcomes knowledge, behaviour, and health status upon discharge from home care. Patients cared for by baccalaureate degree prepared nurses demonstrated improved knowledge and behaviour scores regarding their health conditions. These findings highlight how “invisible cognitive nursing functions” (e.g. health assessment, care planning, and coordination of care) can impact patient outcomes (O’Brien-Pallas et al., 2002).

Utilization outcomes. Utilization outcomes are defined as the utilization of health care services resulting from a change in health status over time. Among palliative home care patients, an association was established between provider type and decreased use of acute care services (Seow et al., 2010). Seow et al. (2010) describe nurses’ roles to include symptom management and education, while the personal support and homemaking role includes assisting with activities of daily living and respite services (Seow et al., 2010). Seow et al. (2010) found a dose-gradient response. Patients receiving a greater amount of nursing services per week had decreased odds of hospitalization, emergency department visits, and death in hospital. Patient’s using more than seven hours of personal support and homemaking services had a lower risk of being hospitalized, of visiting the emergency department in the two weeks prior to death, and of dying in a hospital (Seow et al., 2010). Similarly, Cucinotta et al. (2004) found that increased home care services from a personal support worker resulted in lower rates of readmission to acute care hospitals and a reduction in institutionalization of elderly patients.

End-result outcomes. End-result outcomes reflect a change in patient health status across time. Vetter et al. (2004) examined end-result outcomes including A1C levels (average blood glucose level), lipid profiles, and blood pressure as well as diet and physical activity. Patients were randomly assigned to one of four groups

where care provider type varied: (1) usual medical care, (2) usual medical care with nurse case management, (3) usual medical care and home visits from a community health worker, and (4) usual medical care, nurse case management, and home visits from a community health worker (Vetter et al., 2004). The greatest improvement in diabetic control was found in patients who were seen by a combination of nurses and community health workers (Vetter et al., 2004). This study provides evidence that a collaborative, multi-disciplinary approach is needed in home care. Cucinotta et al. (2004) found similar improved health status (e.g. lower mortality) among patients receiving increased care services from a home care attendant in addition to nursing care.

Analysis

It is difficult to draw definitive conclusions around the relationships between care provider type / skill mix and home care patient outcomes as limited research exists examining this topic. Findings suggest there is benefit to offering increased intensity of care services utilizing a home care staffing model with highly educated experienced nurses working in collaborative multi-disciplinary healthcare teams. The positive impact of nurse level of education and years of experience on patient outcomes has implications for the allocation of nursing resources for home care patients. As home care providers usually work alone, the literature suggests that it may be important for all patients to be cared for by a combination of RNs and RPNs as well as new and experienced nursing care providers. Further, the positive impact of multi-disciplinary healthcare teams emphasizes the importance of care provider collaboration as opposed to the delegation or substitution of one type of care provider for another. While the existing research begins to address care provider type, further research examining skill mix in the home care setting is needed. Finally, the literature suggests that increased service intensity results in improved patient

health status (Vetter et al., 2004, Cucinotta et al., 2004). However, while the overall intensity of home care services was examined, additional research is required to better understand how the intensity of nurses versus UCPs impacts home care patient outcomes.

Conclusion

It is challenging to apply existing literature to the Ontario home care context due to differences in patient population, care providers types / mix, care environments, and outcome measures. Future research should focus on patient outcomes sensitive to home-based nursing care (O'Brien-Pallas *et al.*, 2002). Understanding how provider type and skill mix impact home care patient outcomes will allow provider organization to more efficiently allocate nursing and personal support resources to optimize patient care.

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Question 4: What is the relationship between continuity of care provider and patient outcomes in home care?

Introduction

Continuity of care is a term used by health services researchers to describe “patient-provider relationships that are connected and coordinated across time and settings” (Russell, Rosati, Rosenfeld & Marren, 2011, pg. 33). Continuity of care is especially important for home care patients who rely heavily on healthcare practitioners’ ability to observe and interpret subtle changes in behaviour or appearance in order to improve outcomes. A care provider’s ability to detect subtle differences can be greatly enhanced or hindered by varying levels of continuity of care (Russell et al., 2011). Maintaining continuity of care can be especially challenging with the home care patient population, as various professionals and organizations are responsible for the provision of integrated care. Home care patients are especially sensitive to inconsistent or uncoordinated care which can negatively affect the patient’s overall health status and outcomes (Russell et al., 2011). While continuity of care has been shown to reduce healthcare costs, improve patient safety and decrease rates of emergency department utilization, the majority of studies have focused on acute care and psychiatric settings. Relatively little research has examined continuity of care in the home healthcare sector (Russell et al., 2011).

In this section of the review, literature exploring the relationship between continuity of care in the home health sector and corresponding patient outcomes is examined. Although there is limited literature regarding this topic in Canada specifically, a small number of studies provide insight on this topic from an international perspective.

Results

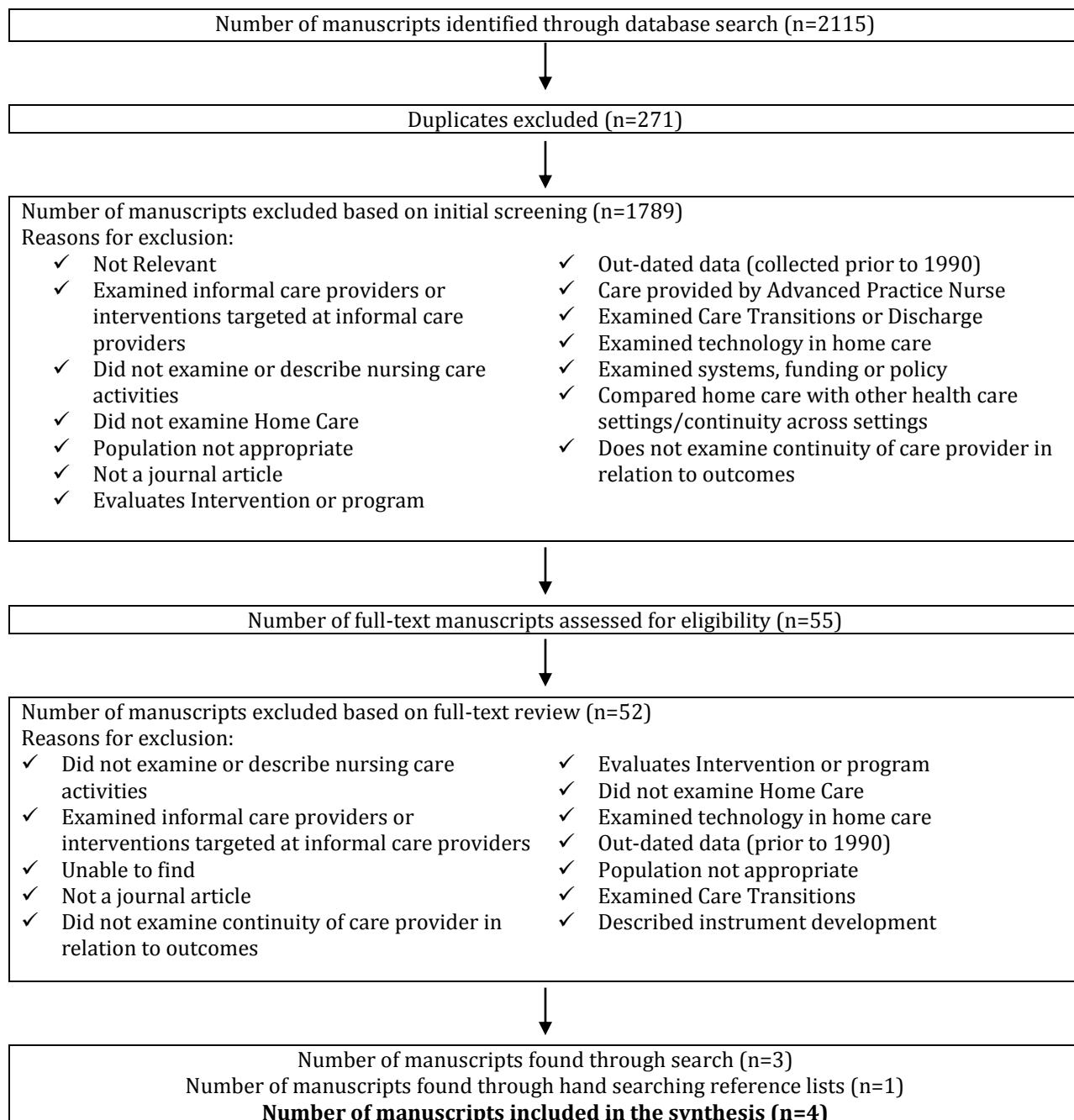
Using the search strategy outlined in [Appendix C1](#), three manuscripts were located (Russell et al., 2011; D’Errico & Lewis, 2010; Lorimer, 2004). Further hand searching of reference lists resulted in the identification of one additional manuscript for inclusion in this review (White & Ragland, 1995). [Figure 4](#) outlines the process used to identify relevant articles, including reasons for exclusion. [Appendix C2](#) provides summary information about each article included in the review.

Synthesis

Through this review of the literature, we sought to examine the relationship between continuity of care and patient outcomes in home health care. All studies were conducted in North America, with one study specifically taking place in Ontario, Canada. The plan was to examine end-result patient outcomes such as infections, falls and medication errors. However, the included studies most frequently examined utilization outcomes such as hospitalization, emergency room visits, and healthcare cost (Russell et al., 2011; D’Errico and Lewis, 2010; Lorimer, 2004).

Russell et al. (2011) and D’Errico and Lewis (2010) directly addressed the relationship between continuity of care and patient outcomes, conceptualizing continuity of care as the delivery of health services, specifically nursing visits, in a coordinated and consistent manner (Russell et al., 2011). Both studies used consistency of nursing personnel as a measure for continuity of care by employing quantitative methods, specifically Bice & Boxerman’s continuity of care formula (1977).

Figure 4. Question 4: Relevant Manuscript Identification Flow Diagram



This formula accounts for the number of different providers, the number of interactions with each provider as the total number of providers. A continuity of care score ranges from 0 to 1 (Russell et al., 2011). Russell et al. (2011), classified patients as receiving low, moderate, or high levels of continuity of care; the higher the continuity of care score, the

higher the level of continuity provided. Low continuity of care was defined as a score of 0-0.39, moderate levels scored 0.4-0.79, and high levels scored 0.8-1 (Russell et al., 2011). D’Errico and Lewis (2010) also used this measure but classified a high level of continuity as having at least 50% of all nursing visits provided by the same nurse (e.g., continuity of

care score ≥ 0.5). The existing literature supports a positive relationship between continuity of care and home care patient outcomes. Among home care patients requiring urinary catheter care, the risk of developing a urinary tract infection increased with the number of different nurses providing patient care (White & Ragland, 1995). Similarly, Lorimer (2004) reported improved patient outcomes following the implementation of a continuity of nursing care intervention. The continuity of care intervention consisted of an all-RN leg-ulcer team providing care to patients in a specific geographical region that was divided into quadrants. Each quadrant was assigned a primary nurse to oversee all leg-ulcer care, enhancing continuity. Healing rates of patients with leg ulcers who received the continuity of care intervention dramatically improved. However, there was no quantitative analysis included in this study to substantiate the study findings (Lorimer, 2004).

In two studies, functional status was examined in relation to continuity of care. Russell et al. (2011) determined that patients with poor continuity of care are 20% less likely to have improved function in activities of daily living (ADL) when discharged from home care as compared to patients receiving high levels of continuity of care. D'Errico and Lewis (2010) also examined the impact of continuity of care on performance of ADLs and instrumental activities of daily living. However, no correlation was found between RN continuity and improved functioning (D'Errico & Lewis, 2010).

Utilization outcomes were also examined. Both Russell et al. (2011) and D'Errico and Lewis (2010) examined the effect that continuity of care has on patients' need for emergent care or hospitalization. Patients receiving poor continuity of care were 40 % more likely to be hospitalized and 30% more likely to visit the emergency department than those who received a high level of continuity of care (Russell et al., 2011). Additionally, patients receiving a moderate level of continuity were

ten percent more likely to be hospitalized or require emergency care than those receiving a high level of continuity of care (Russell et al., 2011). Again, D'Errico and Lewis (2010) did not find a significant association between RN continuity and use of emergent care.

In summary, limited evidence exists examining continuity of care and home care patient outcomes. Additionally, while the existing literature examines continuity of nursing care, continuity of other care provider types such as personal support workers was not located. There is some evidence to make the following tentative conclusions:

- ✓ Home care patient outcomes are positively associated with continuity of care provider.
- ✓ Continuity of care decreases utilization of additional health care services (i.e., hospitalization and emergency department visits).
- ✓ Existing literature focuses on continuity of nurses, continuity of other types of providers is not examined.

Analysis

Although the existing literature begins to provide some insight into the relationship between continuity of home health services and subsequent healthcare utilization, the results may not generalize to specific patient outcomes in the current Canadian home healthcare setting for a variety of reasons. First, no research could be located that examined continuity of care provided by non-RN care providers such as RPNs or UCPs. As RPNs and UCPs are currently the most frequent providers of home care services in the Canadian setting, it is important to know the impact continuity or lack of continuity of these care providers has on patient outcomes. Second, the length of time for data collection in the study by D'Errico and Lewis (2010) may not have been sufficient to capture improvement or decline in patients' health status. Finally, as few studies were conducted in the Canadian setting, differences in health

system structures and patient populations may exist.

Conclusions

Definitive conclusions regarding the relationship between continuity of care provider and home care patient outcomes cannot be made at this point. Existing research has begun to link high levels of continuity of care to improved functional capacity and decreased need for hospitalization or urgent care (Russel et al., 2011). However, more research is needed to confirm this relationship and to determine the effect that continuity of various care providers (RNs, RPNs and UCPs) has on patient outcomes. Research examining the link between continuity of care provider and patient outcomes such as infections, falls, and pressure ulcer development is vital as these are costly complications for both the patient and healthcare system.

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Question 5: What is the relationship between nurse substitution, healthcare cost, and patient outcomes?

Introduction

According to Cavanagh and Bamford, “a substitute is a product which fulfills (or performs) similar or identical functions as another” (1997, p. 333). In the context of healthcare, the substitution of Registered Nurses (RNs) by less qualified care providers is becoming more common, especially in home care settings. In the Ontario context, Registered Practical Nurses (RPNs) are seen as capable of delivering much of the same care as RNs. Likewise, when appropriately taught and supervised, unregulated care providers (e.g., personal support workers, healthcare aids, etc.) are seen as capable of delivering care traditionally delivered by nurses (e.g., urinary catheter care, tracheostomy care, bowel care, etc.). Substitution of nurses (RNs and RPNs) by unregulated care providers (UCPs) occurs for many reasons including: staffing shortages, cost containment, health sector reform, or changes in legislation / regulation of health care providers (Buchan & Dal Poz, 2002).

In this section of the review, literature examining nurse substitution in relation to health care cost and patient outcomes is examined. While the initial intent was to focus on nurse substitution in home care settings, no literature examining nurse substitution in relation to cost and patient outcomes in the home care context was located. As such, the search was expanded to include literature examining nurse substitution, costs, and patient outcomes across health care sectors.

Results

Using the search strategy outlined in [Appendix D1](#), three manuscripts were located (Cavanagh & Bamford, 1997; Robinson, Griffiths, & Maben,

2009; Sibbald, Shen, & McBride, 2004). Further hand searching of reference lists resulted in the identification of four additional manuscripts for inclusion in this review (Buchan & Dal Poz, 2002; Hendrix & Foreman, 2001; Krapohl & Larson, 1996; McKenna, 1995). [Figure 5](#) outlines the process used to identify relevant articles, including reasons for exclusion. [Appendix D2](#) provides summary information about each article included in the review.

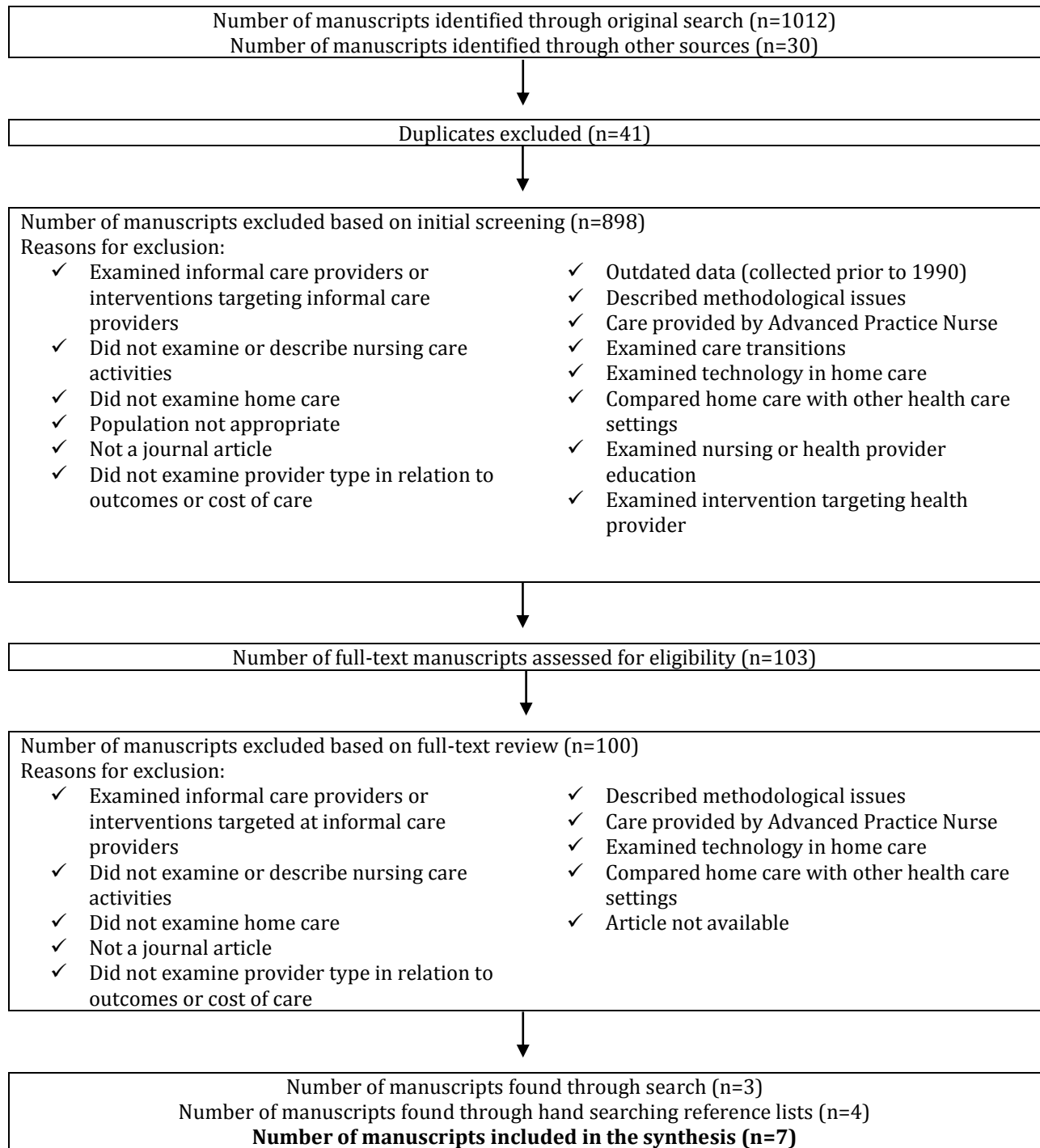
Synthesis

Through this review of the literature, we sought to examine the relationship between nurse substitution (by UCPs), healthcare costs, and patient outcomes in home care. However, no research was located examining these concepts in the context of home care. Rather, available literature focuses on nursing skill mix in institutional settings (e.g., hospitals, long-term care facilities, etc.). Five literature reviews, one discussion paper, and one primary research study were located meeting inclusion criteria and examining skill mix in relation to health care cost and patient outcomes.

Unregulated Care Providers, Cost of Care, and Health Care Outcomes

Cost of care is a primary factor associated with increased use of UCPs in institutional settings (Buchan & Dal Poz, 2002; Cavanagh & Bamford, 2000; Krapohl & Larson, 1996; McKenna, 1995; Robinson et al., 2009; Sibbald et al., 2004). However, in several literature reviews, evidence about the relationship between skill mix, cost, and patient outcomes was found to be limited and of poor quality (Buchan & Dal Poz, 2002; Cavanagh & Bamford, 2000; Krapohl & Larson, 1996; Robinson et al., 2009). Evidence related to the impact of employing a higher proportion of UCPs was found to be

Figure 5. Question 5: Relevant Manuscript Identification Flow Diagram



inconclusive across reviews. Sibbald et al. (2004) identified and discussed published literature reviews examining changing skill mix.

While the majority of the reviews examined the substitution of physicians by nurses, two reviews were located that examined the substitution of nurses by UCP in institutional settings (Buchan & Dal Poz, 2002; McKenna,

1995). Overall, Sibbald et al. (2004) found that a higher ratio of nurses to UCP is associated with higher direct costs. However, evidence as to whether these higher costs are offset by improved patient outcomes was inconclusive (Sibbald et al., 2004).

The two literature reviews examining nurse substitution by UCPs (Buchan & Dal Poz, 2002; McKenna, 1995) also reported conflicting evidence related to the benefits of increasing the ratio of UCPs to nurses. While limited evidence exists supporting the substitution of nurses by UCPs as a cost effective strategy with no negative impact on patient satisfaction, conflicting evidence was also located (Buchan & Dal Poz, 2002; McKenna, 1995). The increased use of UCPs has been associated with decreased care quality, increased absenteeism, higher overtime, increased RN workloads, and greater turnover of UCPs (Buchan & Dal Poz, 2002; McKenna, 1995), as well as increased healthcare costs, decreased staff morale, and reduced staff satisfaction (McKenna, 1995). The benefits of employing a higher proportion of nurses as compared to UCPs was more clear and found to be associated with higher reported quality of care (Buchan & Dal Poz, 2002) as well as reduced patient length of stay, mortality, costs, and complications (McKenna, 1995). Employing a higher proportion of nurses has also been found to increase patient satisfaction, improve recovery rates, increase quality of care, improve patient knowledge and compliance with treatment, increase staff productivity and reduce absenteeism as well as sick time, turnover, and overtime (McKenna, 1995).

Cavanagh and Bamford (2000) also examined evidence around increasing the ratio of UCPs to nurses in institutional settings. When used alongside nurses, UCPs were not found to impact the quality of care provided. Minimal evidence is available to support the use of UCPs to improve patient care while reducing health care costs (Cavanagh & Bamford, 2000). Krapohl and Larson (1996) reached a similar conclusion through their review of the

literature, noting that no empirically strong evidence was located to support the use of UCPs in the improvement of care quality. Further, Krapohl and Larson (1996) conclude that studies evaluating the cost effectiveness of UCPs lack sufficient rigor to draw firm conclusions.

A single primary research study (Hendrix & Foreman, 2001) was located that was not included in a published review, which examines skill mix in the nursing home setting. Hendrix and Foreman (2001) examined the impact of skill mix on the cost of decubitus ulcer treatment. Increased spending on RNs and UCPs was found to decrease costs related to decubitus ulcers, while increased spending on Licensed Practical Nurses (LPN, equivalent to RPNs) was found to increase costs associated with decubitus ulcers. According to Hendrix and Foreman (2001), these findings reflect the fact that LPNs are substituted for RNs, decreasing overall nursing expertise and increasing costs associated with decubitus ulcer treatment. In contrast, increased spending on RNs and UCPs maintains a high level of nursing expertise (RN care) while increasing the intensity of care provided (UCP care).

In summary, little conclusive evidence exists to support the cost effectiveness of substitution of nurses by UCPs across healthcare settings. Indeed, decreasing the proportion of nurses and increasing the proportion of UCPs will reduce direct care cost. However, without considering the impact on patient outcomes, cost effectiveness cannot be comprehensively evaluated. Future research is needed to examine the cost effectiveness of UCPs across health care settings. Conclusions from this synthesis include:

- ✓ No literature examining nurse substitution in relation to cost and patient outcomes in the home care context was located. Rather, available literature focuses on nursing skill mix in institutional settings (e.g., hospitals, long-term care facilities, etc.).

- ✓ Evidence about the relationship between skill mix, cost, and patient outcomes was found to be limited and of poor quality.
- ✓ No conclusive evidence was found to support the cost effectiveness of nurse substitution.
- ✓ Existing evidence supports the use of a higher proportion of RNs to achieve improved patient outcomes.

Analysis

The existing literature provides little support for or against the cost effectiveness of substituting UCPs for nurses across care settings. The existing evidence is inconclusive and examines mix of providers, not the direct substitution of one type of provider for another. Further, the existing evidence is challenging to apply to the home care context.

Providing care in patients' homes is inherently different than providing care in institutional settings. Home care providers most often work alone or in collaboration with informal caregivers. As such, nurses and UCPs are rarely providing care to the same patient at the same time. Unlike in institutional settings, UCPs are not under the direct supervision of a nurse while providing care. In home care, UCPs are alone in the patients' home providing care independently. Delegated or assigned care activities that are traditionally performed by nurses are taught to UCPs who are intermittently supervised by a nurse. This practice reflects the direct substitution of one care provider type (nurse) for another (UCP). No evidence was located to support the cost effectiveness of this practice.

While the cost effectiveness of the mix of providers was examined in institutional settings (Hendrix & Foreman, 2001), it is difficult to apply these findings to the home care context as there are several other factors that must be considered in the calculation of the cost of home care. For example, informal and unpaid caregivers provide the majority of care to

patients in their homes. The cost of family provided care must be considered in terms of cost and outcomes. In addition, the patient or family absorbs the cost of living (e.g., rent, food, etc.) as well as the cost of additional supplies such as hospital beds, specialty mattresses, and other assistive devices. These costs must also be considered. Finally, the quality of informal care factors into home care patient outcomes and must be considered when examining cost effectiveness in home care. These are factors that were not considered in the existing research examining skill mix, cost of care and patient outcomes in institutional settings.

Conclusions

In general, additional research is needed to examine the cost effectiveness of nurse substitution across health care settings. In particular, further research is needed to 1) describe nurse substitution in home care, and 2) examine the costs of nurse substitution in relation to home care patient outcomes.

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Question 6 and 7: How are nursing care activities delegated in home care? What are nursing and PSW perceptions around delegated care?

Introduction

In the nursing context, delegation is the transfer of authority to perform a controlled nursing act from a person who is authorized to perform the procedure to a person who is not authorized to perform the procedure (CNO, 2013; Zeytinoglu et al., 2014). To address the growing demand for home care services, nursing care is increasingly delegated to unregulated care providers (UCPs) in the home setting (Zeytinoglu et al., 2014). While delegating nursing care activities to UCPs may offer additional support to those managing chronic conditions at home, it is important to understand the structures and processes surrounding how this care is taught and delegated. Policies and legislation surrounding delegation of nursing activities vary across Canada and internationally. Nurses who delegate tasks to UCPs must do so in accordance with provincial legislation.

In this section of the review, literature examining delegation of nursing care activities in the home care setting is explored. Few manuscripts were identified that focus on how nursing care is delegated in the home care setting. Further, literature that does examine delegation in home care focuses on perceptions around delegated care. For this reason, questions six and seven of this review are synthesized together.

Results

Initially, separate search strategies were used to locate literature addressing questions six and

seven. Using the search strategies outlined in [Appendix E1](#), only one manuscript was located addressing question six (Zeytinoglu, Denton, Brookman & Plenderleith, 2014). [Figure 6](#) outlines the process used to identify relevant articles to address this question. [Appendix E2](#) provides summary information about each article included in the review.

Using the search strategy outlined in [Appendix E3](#), three manuscripts were located that describe the process of delegation or perceptions around delegated care (Carr & Pearson, 2005; Craftman, Strauss, Rudberg & Westerbotn, 2012; Zeytinoglu, Denton, Brookman & Plenderleith, 2014). Further hand searching of reference lists resulted in the identification of one additional manuscript included in this review (Bystedt, Eriksson, Wilde-Larson, 2011). As the manuscript by Zeytinoglu et al. (2014) was identified through both searches, a total of four manuscripts were used for synthesis. [Figure 7](#) outlines the process used to identify relevant articles to address question seven. [Appendix E4](#) provides summary information about each article included in the review.

Synthesis

Through review of the literature, we sought to examine how nursing care activities are delegated in home care and what perceptions nurses and UCPs have regarding this care. Very few published research reports were located that examined these concepts in the context of home care. The manuscripts that were found

focused on the perceptions of care providers, mostly of nurses.

Delegation

In the manuscripts identified for this review, delegation within nursing is defined as the transferring of tasks from a licensed person with formal education and training to an unlicensed person (Craftman et al., 2012). In the Ontario context, care delegated to UCPs has been labelled “task shifting” (Zeytinoglu et al.,

2014). In any case, delegation involves a delegator (usually a nurse), a delegate (usually an UCP), structural factors (i.e., policies and procedures), and patient need for care (Carr & Pearson, 2005). The ways in which these facets of delegation are carried out in home care are not well understood as described in the literature.

Figure 6. Question 6: Relevant Manuscript Identification Flow Diagram

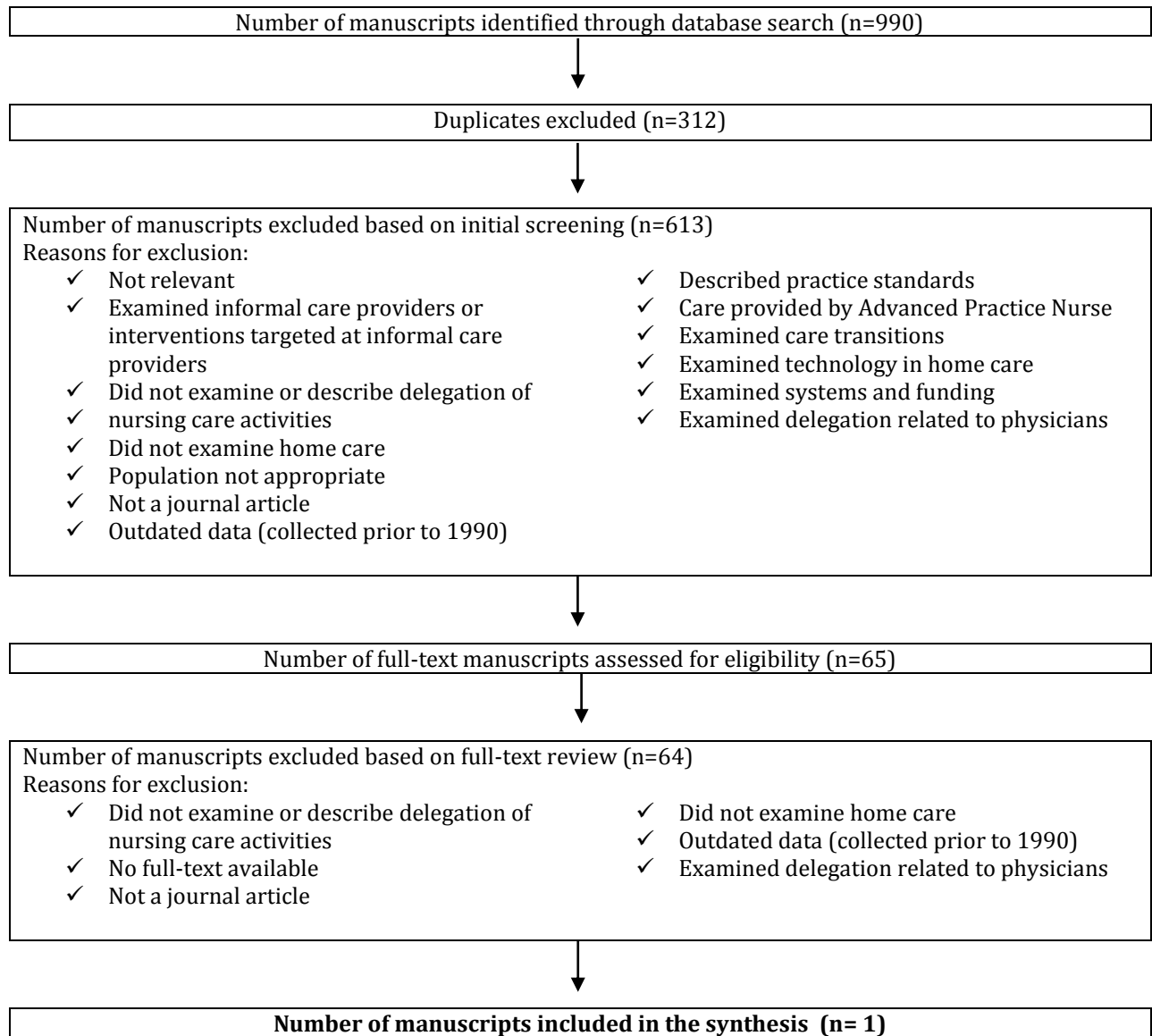
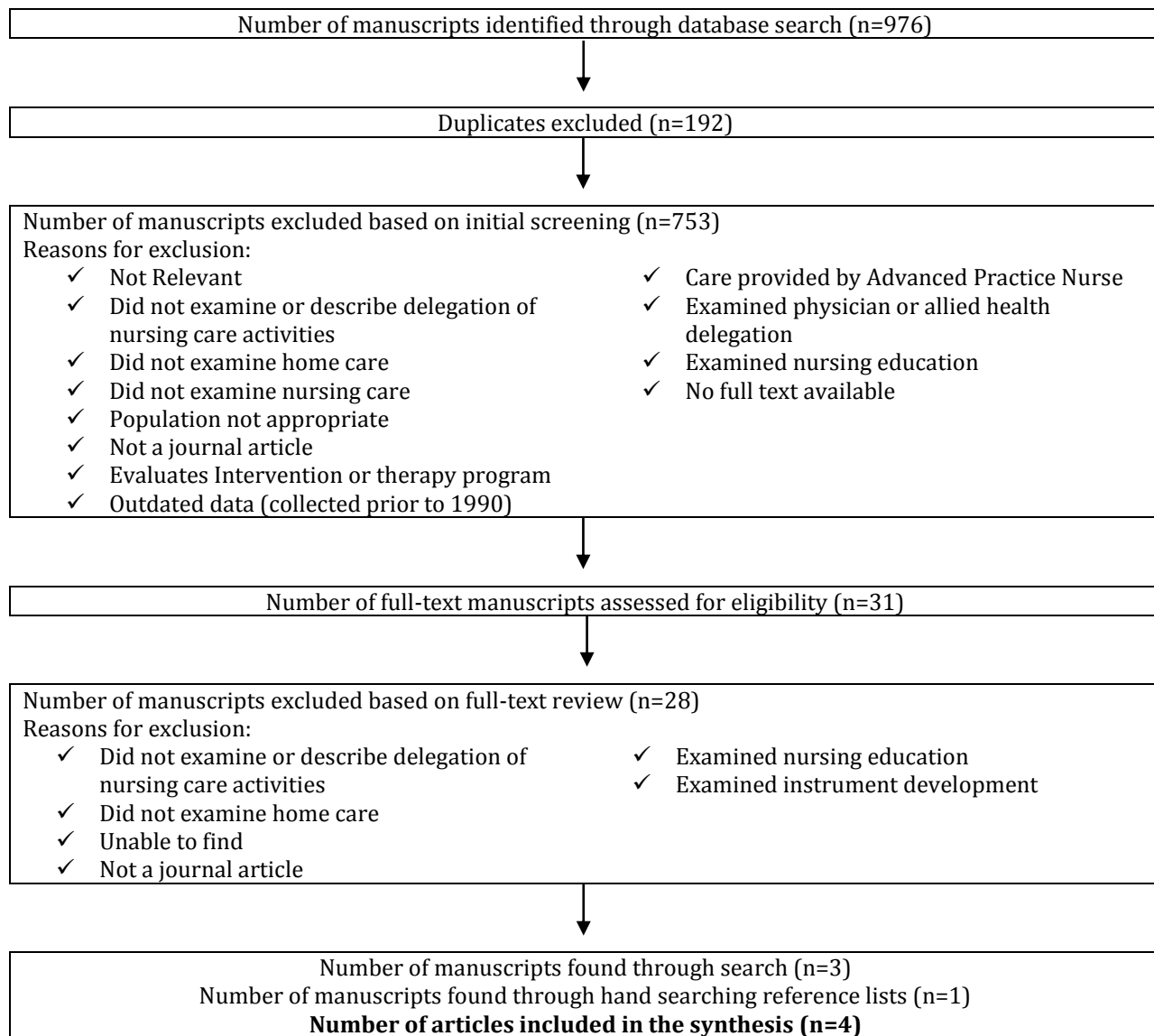


Figure 7. Question 7: Relevant Manuscript Identification Flow Diagram



How are nursing care activities delegated in home care?

In hospital settings, delegation from nurses to UCPs is direct and ongoing, as both work in the same location at the same time to provide patient care. In the home setting, the process of delegation is much more complex as nurses and

UCPs work alone in complex environments that are not designed for the delivery of healthcare. While there is ample literature to suggest that UCPs are performing delegated tasks in the home, we were unable to locate any literature that describes the process of how or how often this occurs. There are clear provincial

regulations (O. Reg 268/13) and professional practice guidelines (CNO, 2013) surrounding when and how nursing care activities can be delegated in Ontario. However, how these policies translate into practice in the home care setting is largely unknown.

According to Carr and Pearson (2005), there are two broad rationales driving delegation of nursing care to UCPs. The first reason for delegating care relates to staff availability, where the type of care and skills are not central to the decision to delegate. When nursing care is delegated under these circumstances, the potential for compromised patient care increases (Carr & Pearson, 2005). The second type of delegation involves care being reassigned to a UCP because it was perceived that another worker could provide care for particular patient needs more effectively, economically, or according to their knowledge and skill (Carr & Pearson, 2005).

What are nursing perceptions around delegated care?

Three studies were found that directly examined nurses' perceptions around delegated care in the home setting (Bystedt et al., 2011; Carr & Pearson 2005; Craftman et al., 2012) with similar findings being reported across studies. Craftman et al. (2012) interviewed home care nurses to describe their perceptions surrounding delegating medication administration to UCPs. Nurses felt that while delegating to UCPs is an important task, it can also be taxing, especially when UCPs lack knowledge and awareness of medication administration and changes in patients' health (Craftman et al., 2012). Carr and Pearson (2005) conducted focus groups with home care nurses to discuss their experience and perceptions of delegating nursing care to UCPs. Nurses in this study felt it was appropriate to delegate 'established' or simple care to UCPs, yet they agreed this is not always easy to achieve as patient care needs are continuously evolving (Carr & Pearson, 2005).

Nurses acknowledge the importance of delegation as a necessary component of a functioning organization (Bystedt et al., 2011; Craftman et al., 2012). However, nurses also report delegation to be contributing to lack of control, vagueness regarding responsibility and at times burdensome (Bystedt et al., 2011; Carr & Pearson 2005; Craftman et al., 2012). Bystedt et al. (2011) interviewed RNs and found that nurses may feel forced to delegate, express concern over the level of competence and skill of UCPs, and at times, are delegating outside of the law.

While these studies provide some insight into nurses' perceptions of delegated nursing care, they may not be directly generalizable to the Ontario context due to international differences in the organization and structures of home care.

What are PSW perceptions around delegated care?

Only one study was found that discussed UCPs perceptions of delegated care. However, the focus of the study was intention to remain employed. Half of personal support workers (PSWs) interviewed in this study felt the transfer of skills through delegation increased job satisfaction, broadened knowledge, allowed them to feel included in the team and made their jobs more challenging and interesting (Zeytinoglu et al., 2014). A smaller number of PSWs felt that task shifting may negatively affect intention to remain employed, specifically due to reimbursement not reflecting the complexity of tasks they are being asked to perform (Zeytinoglu et al., 2014).

There is considerable literature to suggest that UCPs are relied upon to carry out increasingly complex nursing care activities across health care settings. As this trend continues, it is imperative to gain a better understanding of how delegation occurs in the home care setting. Future research is required to examine the structures and processes involved in the provision of nursing care activities by UCPs and

the role of nurses in delegating this care. Conclusions from this synthesis include:

- ✓ No literature was found examining the process of how delegation occurs in the home care setting was located.
- ✓ Evidence about the perceptions of nurses and UCPs around delegated care was scarce and focused mainly on nurses.
- ✓ Evidence found was from international studies and may not be useful to draw direct conclusions about home care in Ontario.

Analysis

Nurses and UCPs in the community are dispersed by geography and time. These conditions have unique implications for delegation. Contextual differences make it challenging to draw conclusions from research based in institutional settings as delegation practices used in hospitals do not readily translate to the community setting. Further, the structures and processes surrounding delegation differ internationally and across Canada, making it difficult to draw conclusions from international research.

Care activities traditionally performed by nurses are increasingly being performed by UCPs and family members. This change in practice has redefined the UCP role in providing community-based care and increased expectations placed on these care providers. As UCPs step outside their traditional roles, the risk for compromised care increases unless teaching, delegation and supervision by nurses is being provided effectively.

There is little evidence that examines how nurses and UCPs perceive delegation and how delegation is structured in home care. International literature suggests that nurses are comfortable delegating routine care to UCPs, but are not always able to differentiate what is routine and what is not (Carr & Pearson, 2005). The literature suggests that nurses understand

the importance of delegating care to meet the growing needs of home care patients, but are nervous about delegating complex care to UCPs. Literature examining how UCPs perceive delegated care is lacking. Understanding the perceptions care providers have around delegating is essential to understanding how care is being delegated in home care.

Conclusion

Additional research is needed to examine how care is delegated in the home care setting. Very little is known about the provision of nursing care activities by UCPs and the role that nurses play in delegating and supervising these activities in home care. As the healthcare needs of Ontario's home care patients' increase in acuity and complexity, it is important to understand how care providers in the home are meeting the needs of patients.

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Conclusion

Limited literature was located to address each of the seven research questions posed for this review. While ample literature exists examining skill mix, continuity of care, and delegation of nursing care in institutional settings, few studies were located examining these concepts in home care. Further, skill mix, continuity of care and delegation were seldom examined in relation to important home care patient outcomes. This review of the literature highlights the need for additional research examining home care patient outcomes in Ontario and the impact of changing skill mix, increasing delegation, and continuity of care.

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Appendix A

Question 1: which nursing care activities are provided by Registered Nurses, Registered Practical Nurses and Unregulated Care Providers in home care?

A1.

Table 1. Question 1: Search Strategy

Database	Search Strategy	# of hits
CINAHL	((MH Home Health Care) OR ("community care")) AND ((MH Registered Nurses) OR (MH Baccalaureate Nurses) OR (MH Practical Nurses) OR (MH Diploma Nurses OR Associate Degree Nurses) OR (MH Nursing Assistants) OR (MH Home Health Aides) OR (MH Health Personnel, Unlicensed) OR (MH Community Health Workers))	490
Ageline	((home care) OR (home healthcare) OR (community care) OR (community-based care)) AND ((registered practical nurs* OR licensed practical nurs* OR nurses' aide) OR (unregulated care provider OR personal support worker OR health care aide OR community support worker OR home health aide) OR (registered nurs* or nurs*)) AND (nursing care)	182
Medline	((exp *Home Care Services/) OR (Home Health Nursing/) OR (Home Care Agencies/) OR (community adj care).mp.)) AND ((exp Nursing, Practical/ or exp Nurses' Aides/ or registered nurs*.mp.) OR (nurs*.mp.) OR (Home Health Aides/)) AND (nursing care/ or exp home nursing/)	1749
EMBASE	((home care.mp. Or exp *home care/) OR (community care.mp. Or exp community care/) OR (community-based care.mp)) AND ((exp nurse/ or exp registered nurse/) OR (registered practical nurs*.mp.) OR (licensed practical nurs*.mp.) OR (exp nursing assistant/)) OR ((exp health care personnel/ or unregulated care provider.mp.) OR (personal support worker.mp.) OR (health care aide.mp.) OR (community support worker.mp.) OR (home health aide.mp.)) AND (nursing care.mp./ or exp nursing care/)	134
HealthSTAR	((exp *Home Care Services/) OR (home healthcare.mp or exp Home Care Agencies/) OR (community care.mp.) OR (community-based care.mp)) AND ((registered nurs*.mp.) OR (nurs*) OR (exp Nursing, Practical/ or registered practical nurs*.mp.) OR (exp Nurses' Aide/ or licensed practical nurs*.mp.) OR (unregulated care provider.mp.) OR (personal support worker.mp.) OR (exp Home Health Aides) OR (community support worker.mp.)) AND (exp Nursing Care/)	2073
Scopus	((TITLE-ABS-KEY("home healthcare") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("home care") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("community care") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("community-based care") AND PUBYEAR > 1989)) AND ((TITLE-ABS-KEY("registered nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("registered practical nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("licensed practical nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("nurses aide") AND PUBYEAR > 1989)) OR (((TITLE-ABS-KEY("unregulated care provider") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Personal support worker") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Health care aide") AND PUBYEAR > 1989) OR (TITLE-ABS-	1202

Database	Search Strategy	# of hits
	KEY("community support worker") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("home health aide") AND PUBYEAR > 1989)) AND (TITLE-ABS-KEY("Nursing care") AND PUBYEAR > 1989)	
Econlit	("Home care" OR "Home healthcare" OR "community care" OR "community-based care") AND (registered nurse OR "nurse" OR "registered practical nurse" OR "licensed practical nurse" OR "nurses aide" OR "unregulated health care provider" OR "personal support worker" OR "community support worker" OR "home health aide") AND ('nursing care')	2
Web of Science	TOPIC: ("home care") OR TOPIC:("home healthcare") OR TOPIC: ("community care") OR TOPIC: ("community-based care") Refined by: LANGUAGES: (English) AND TOPIC: ("registered nurs*") OR TOPIC: ("registered practical nurs*") OR TOPIC: ("licensed practical nurse") OR TOPIC: ("nurses aide") OR TOPIC ("nurs*") Refined by: LANGUAGES: (English) OR TOPIC: ("unregulated care provider") OR TOPIC: ("personal support worker") OR TOPIC: ("health care aide") OR TOPIC: ("community support worker") OR TOPIC: ("home health aide") AND TOPIC: ("nursing care")	14
Cochrane	((Community Care) OR (Community-based care) OR (MeSH descriptor: [Home Care Services] explode all trees) OR (MeSH descriptor: [Home Care Services] explode all trees)) AND ((MeSH descriptor: [Nurses] explode all trees) OR (MeSH descriptor: [Nursing, Practical] explode all trees) OR (Unregulated care provider) OR (personal support worker) OR (community support worker) OR (MeSH descriptor: [Home Health Aides] explode all trees)) AND ((MeSH descriptor: [Nursing Care] explode all trees) OR (MeSH descriptor: [Home Nursing] explode all trees) OR (MeSH descriptor: [Home Health Nursing] explode all trees) OR (MeSH descriptor: [Nursing Services] explode all trees))	53
PsychInfo	((exp *Home Care/) OR (community care.mp.) OR (Community-based care.mp.)) AND ((practical adj nurs*).mp. OR (nurses' aid*.mp.) OR (unregulated care provider.mp.) OR (personal support worker.mp.) OR (health care aid*.mp.) OR (community support worker.mp.) OR (home health aid*.mp.) OR (exp Paraprofessional Personnel/)) AND (nursing care.mp.)	117

A2.

Table 2. Question 1: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Definition of Nursing Care Activities	Sample	Methods	Key Concepts, Variables & Measures	Findings
Allen et al. (1999) USA	To determine what proportion of home visits could be replaced with telemedicine.	Interventions / Hands on actions conducted by home health nurses after assessment had been done.	Clinical records of individual home nursing visits for 906 different subjects.	Retrospective chart reviews using Home Health Activities Assessment Instrument HHAAI (developed for this study).	53 item instrument that measured: assessments, teaching and interventions.	82% of visits were made by RNs. Patient education/training occurred in 80% of visits. Of the 23 types of interventions assessed, 47% received no interventions, 42% received one and 11% received two or more. Wound care was the most common intervention (17%) followed by venipuncture (15%) and BG monitoring (12%). All vital signs were taken in 53% of visits, BP was taken in 71% of visits. 45% of visits were deemed to be possible by telemedicine.

Author, publication date	Study Aim	Definition of Nursing Care Activities	Sample	Methods	Key Concepts, Variables & Measures	Findings
Axelsson et al. (2004) Sweden	To assess to what extent home care aides were engaged in medication administration, their knowledge of how to perform this work and knowledge of pharmacology.	N/A	340 Home Care Aides (HCA) and HCA supervisors.	Questionnaires completed by HCAs regarding medication administration. Results were also compared to a similar study from 5 years prior.	Knowledge of medication administration measured.	95% of HCAs participated in medication administration. 10% reported engaging in this without delegation. 67% answered yes when asked if they had received any education in medication administration.
*Berta et al. (2013) Ontario, CAN	To discuss the evolving role of healthcare aides and factors that impact how and where they work.	N/A	6 industry experts in organizations that represent healthcare aides.	Two hour focus groups with industry experts to better understand the type and scope of work that healthcare aides do for older persons in Ontario.	N/A	Role required behaviours include ADL's and are assumed activities of HCAs. There is an increasing reliance on HCAs especially in the home setting to perform delegated acts of healthcare professionals as well as IADLs. HCA are also increasingly relied upon for extra role behaviours including providing emotional support.
Donelan et al. (2002) USA	To shed light on issues that are critical to caregiver need based on survey of informal caregivers.	Medical caregiver tasks that have historically not been captured in caregiver activity.	1,002 unpaid caregivers across US.	National telephone survey including screening interview and full interview (average 24 minutes).	Caregivers assistance with ADLs and IADLs, caregiver assistance with medical tasks.	20% of caregivers were providing full-time or constant care. 54% of caregivers who helped with ADLs said they received no formal training. 43% performed at least one medical task (changing dressing, help with medical equipment, medication administration). 18% who helped with medications reported they received no instruction. One third reported no instructions received to change dressings. 12% of caregivers who assisted with medications were reported they were aware of a mistake they had made.
Modin et al. (2002) Sweden	To determine the content of care given to home care patients by GPs, district nurses and assistant nurses in primary healthcare.	N/A	116 patients (from 158 randomly selected from 486) living in homes and receiving home nursing in Oct 1996.	Questionnaires were answered by district nurses concerning the status of patients, functional problems and symptoms. Questions about nursing procedures were answered using information from nursing records.	Care procedures performed by nurses, procedures performed by GPs.	The most common nursing procedures were assessments and medication related procedures (dispensing tablets, injections, infusions and inhalations and helping to take medications). Most patients were seen by nurses 2-5 times a month.

Author, publication date	Study Aim	Definition of Nursing Care Activities	Sample	Methods	Key Concepts, Variables & Measures	Findings
Moorman et al. (2013)	To examine whether the content of and complexity of caregiving and nursing tasks contributes to variation in caregivers strain.	Caregiving tasks were ranked low, moderate, or high in complexity.	All Medicaid beneficiaries in Arkansas, Florida and New Jersey who expressed interest.	Series of telephone interviews.	Caregivers reported whether they completed nine specific nursing tasks or any other routine healthcare at home.	13% of sample reported that they monitored care recipients vital signs, 3.1% monitored blood sugar. 18.7% reported caring for pressure sores, 36% foot care, 59% reported helping with medications
Norell et al. (2013) Sweden	To investigate how RNs prioritize interventions in their clinical work, What are the interventions performed and how many interventions are performed by non-certified staff?	Nursing interventions by RNs or nursing interventions performed by non-certified staff by delegation .	RNs working with elderly patients in municipal care settings.	6138 web-based forms that were filled out by 62 RNs for patient visits.	RN interventions, time spent, nursing interventions performed by non-certified staff.	RNs allocated more time to patients in sheltered housing than in ordinary housing. Elderly patients in sheltered housing also received more delegated nursing time. They found that 38% of overall nursing interventions were performed by RNs while other healthcare professionals provided the remaining 62%.
Ohlen et al. (2013) Sweden	Descriptive qualitative study of nurse documentation from two acute home care units.	Nursing care according to predetermined care plan or by subscription from physician – mainly medical technical interventions.	Computerized nursing records from 60 patients.	Analysis of computerized nursing records. Preparing, organization and reporting on nurse documented care activities.	N/A	Data analysis revealed that nurses performed either planned or acute care. Planned care was most often performed, including IV infusions, blood transfusions, sampling, dressing / bandaging, management of lines, catheter care, and infusion pumps. Other planned care included information / education, coordination, administration. Acute care was also noted in documentation which included emergency calls from clients and family members.
Pickard et al. (2002) UK	To present data from a project which examined the experiences of older carers of older people and their interfaces with	Caregiving activities that included a range of processes including highly technical. Different from personal care	Groups of carer/care-recipients where carer was giving substantial amounts of care. 24	In depth interviews were carried out with both carers and nurses, supplemented by observations of care-giving episodes.	Professional roles, caring activities, carers feelings toward care-giving activities, professional support for carer, impact of caring.	RN roles included both the giving of hands on care, education and advice, or counselling and organizational roles. Hands on care including complex tasks included aspects of dialysis, colostomy care, dressing wounds, giving enemas, monitoring BG, injections, taking blood samples, giving tablets and palliative care. Managerial roles included liaising with other services/agencies, ordering equipment, referrals. Family caregivers also

Author, publication date	Study Aim	Definition of Nursing Care Activities	Sample	Methods	Key Concepts, Variables & Measures	Findings
	nurses within the home.	which includes bathing and dressing.	Carers and 24 nursing professionals.			carried out a wide range of less complex aspects of personal caregiving to complex care such as dialysis, parenteral feeding, and colostomy care (overlapping with the care provided by nurses).
Schneider et al. (2009) USA	To identify nursing interventions classification interventions commonly provided to cardiac home care patients.	Nursing interventions specifically for cardiac patients defined as “any treatment, based upon clinical judgement and knowledge that a nurse performs to enhance patient outcomes.”	103 patients receiving intermittent skilled home health nursing care.	RNs were recruited to collect data on eligible patients who consented to participate. RNs selected NIC interventions at each visit to describe the nursing care provided.	Nursing Outcomes Classification (NIC).	The most frequent NICs for all cardiac home care patients were vital signs monitoring, followed by individual teaching, medication management, disease process teaching and cardiac care.
*Swedberg et al. (2013) Sweden	To explore how healthcare assistants manage their tasks of caring for patients in the home.	Basic care: assisting with personal hygiene, mobilisation and nutrition Advanced care: assisting with specific care needs such as medication administration, tube feeding, safe handling of home care technology.	19 municipal healthcare assistants.	12 HC assistants were interviewed and observed in practice while 7 HC assistants were only observed. Study settings were the homes of four patients in a medium sized Swedish city.	HC assistants were asked to describe: Patient care needs, relation to patients and colleagues, work situation, contact with supervisors. HC assistants were observed in care situations.	HC assistants were found to perform advanced care without formal training in home settings.

*Publications were identified through hand search

Appendix B

Questions 2: what is the relationship between care provider type and client outcomes in home care? And question 3: what is the relationship between care provider mix and client outcomes in home care?

B1.

Table 3. Question 2: Search Strategy

Database	Search Strategy	# of hits
CINAHL	MH Home Health Care OR "community care" AND MH Registered Nurses OR MH Baccalaureate Nurses OR MH Practical Nurses OR MH Diploma Nurses OR Associate Degree Nurses OR MH Nursing Assistants OR MH Home Health Aides OR MH Health Personnel, Unlicensed OR MH Community Health Workers AND MH Accidental Falls OR "fall" OR MH Pressure Ulcer+ OR MH Medication Errors OR MH "Community-Acquired Infections") OR (MH "Opportunistic Infections") OR (MH "Respiratory Tract Infections") OR (MH "Sepsis") OR (MH "Urinary Tract Infections") OR (MH "Wound Infection") OR (MH "Infection") OR (MH Enteral Nutrition and "obstruction") OR MH "Outcomes(Health Care)") OR (MH "Nursing Outcomes") OR (MH "Fatal Outcome") OR MH "Adverse Health Care Event") OR (MH "Medication Errors") OR (MH "Adverse Drug Event") OR (MH "Sentinel Event")	22
Ageline	home care OR home healthcare OR community care OR community-based care AND unregulated care provider OR personal support worker OR health care aide OR community support worker OR home health aide OR nursing care AND registered practical nurs* OR licensed practical nurs* OR nurses' aide OR registered nurs* or nurs* AND fall OR accidental fall OR pressure ulcer OR decubitus ulcer OR medication error OR infection OR feeding tube complication OR "enteral nutrition and obstruction" OR outcomes OR treatment outcomes OR healthcare outcomes OR adverse event OR medical error	12
Medline	exp *Home Care Services/ OR Home Health Nursing/ OR Home Care Agencies/ OR community adj care).mp OR exp Home Nursing/ AND Home Health Aides/ OR (unregulated adj care).mp. OR personal support worker.mp. AND exp Accidental Falls/ or fall.mp. OR Pressure Ulcer/ or decubitus ulcer.mp.OR exp Medication Errors/ OR catheter-related infections/ or community-acquired infections/ or respiratory tract infections/ or sepsis/ or skin diseases, infectious/ or soft tissue infections/ or urinary tract infections/ or wound infection/ OR (Enteral Nutrition/ and obstruction) OR treatment outcome/ OR (adverse adj event).mp. OR medical errors/ or medication errors/	373
EMBASE	home care.mp. Or exp home care/ OR community care.mp. Or exp community care/ OR community-based care.mp OR exp community health nursing/ or home healthcare.mp AND exp nurse/ or exp registered nurse/ OR registered practical nurs*.mp. OR licensed practical nurs*.mp. OR nurses' aide.mp. Or exp nursing assistant/ OR exp health care personnel/ or unregulated care provider.mp. OR personal support worker.mp. OR health care aide.mp. OR community support worker.mp. OR home health aide.mp. AND exp falling/ OR exp decubitus/ OR exp medication error/ OR exp respiratory tract infection/ or exp soft tissue infection/ or exp wound infection/ or exp urinary tract infection/ or ex infection OR (exp enteric feeding AND exp obstruction) OR (exp nasogastric tube/ AND exp obstruction) OR exp outcomes research/ or exp nursing outcomes classification OR exp treatment outcome/ OR health care outcomes.mp. OR adverse event.mp. OR exp medical error/	208

Database	Search Strategy	# of hits
HealthSTAR	exp *Home Care Services/ OR home healthcare.mp or exp Home Care Agencies/ OR community care.mp. OR community-based care.mp AND registered nurs*.mp. OR nurs* OR exp Nursing, Practical/ or registered practical nurs*.mp. OR exp Nurses' Aide/ or licensed practical nurs*.mp. OR unregulated care provider.mp. OR personal support worker.mp. OR exp Home Health Aides OR community support worker.mp. AND exp Accidental Falls/ or fall.mp. OR exp Pressure Ulcer. OR decubitus ulcer.mp. OR exp Medication Errors/ OR exp Infection/ or exp Wound Infection/ or exp Surgical Wound Infection OR feeding tube complication.mp. OR (exp Enteral Nutrition/ and obstruction.mp.) OR exp Treatment Outcome/ or exp "Outcome Assessment (Health care) or exp "Outcome and Process Assessment (Health Care)"/ OR adverse event.mp. OR exp Medical Errors/	5
Scopus	(TITLE-ABS-KEY("home healthcare") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("home care") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("community care") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("community-based care") AND PUBYEAR > 1989) AND (TITLE-ABS-KEY("registered nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("registered practical nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("licensed practical nurs*") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("nurses aide") AND PUBYEAR > 1989) AND ((TITLE-ABS-KEY("Fall") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("accidental fall") AND PUBYEAR > 1989)) OR ((TITLE-ABS-KEY("Pressure ulcer") OR TITLE-ABS-KEY("decubitus ulcer")) AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Medication error") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Infection") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Feeding tube complication") AND PUBYEAR > 1989) OR ((TITLE-ABS-KEY("Enteral nutrition") AND TITLE-ABS-KEY("Obstruction")) AND PUBYEAR > 1989) OR ((TITLE-ABS-KEY("outcome") OR TITLE-ABS-KEY("treatment outcome") OR TITLE-ABS-KEY("health care outcomes) OR TITLE-ABS-KEY("adverse event") OR TITLE-ABS-KEY("medical error")) AND PUBYEAR > 1989)	38
Econlit	("Home care" OR "Home healthcare" OR "community care" OR "community-based care")AND ("licensed practical nurse" OR "registered nurse" OR "nurse" OR "registered practical nurse") AND ("home health aide" OR "nurses aide" OR "unregulated health care provider" OR "personal support worker" OR "community support worker") AND (outcome OR "treatment outcome" OR "health care outcome" OR "adverse event" OR "medical error") OR (TITLE-ABS-KEY("unregulated care provider") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Personal support worker") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("Health care aide") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("community support worker") AND PUBYEAR > 1989) OR (TITLE-ABS-KEY("home health aide") AND PUBYEAR > 1989)	0
Web of Science	TOPIC: ("home care") OR TOPIC:("home healthcare") OR TOPIC: ("community care") OR TOPIC: ("community-based care") Refined by: LANGUAGES: (English)AND TOPIC: ("registered nurs*") OR TOPIC: ("registered practical nurs*") OR TOPIC: ("licensed practical nurse") OR TOPIC: ("nurses aide") OR TOPIC ("nurs*") Refined by: LANGUAGES: (English) AND TOPIC: ("unregulated care provider") OR TOPIC: ("personal support worker") OR TOPIC: ("health care aide") OR TOPIC: ("community support worker") OR TOPIC: ("home health aide") AND TOPIC: ("fall") OR TOPIC: ("accidental fall") OR TOPIC: ("pressure ulcer") OR TOPIC: ("decubitus ulcer") OR TOPIC: ("medication error") OR TOPIC: ("infection") OR TOPIC: ("outcome") OR TOPIC: ("treatment outcome") OR TOPIC: ("health care outcome") OR TOPIC: ("adverse event") OR TOPIC: ("medical error") OR TOPIC: ("feeding tube complication") OR TOPIC: ("enteral nutrition") AND TOPIC: ("obstruction")	0
	Community Care OR community-based care OR MeSH descriptor: [Home Care Services] explode all trees OR MeSH descriptor: [Home Care Services, Hospital-Based] explode all trees AND MeSH descriptor: [Nurses] explode all trees OR MeSH descriptor: [Nursing,	

Database	Search Strategy	# of hits
Cochrane	Practical] explode all trees OR MeSH descriptor: [Home Health Nursing] explode all trees OR MeSH descriptor: [Nursing Care] explode all trees OR unregulated care provider OR personal support worker OR community support worker OR MeSH descriptor: [Home Health Aides] explode all trees OR MeSH descriptor: [Home Nursing] explode all trees AND MeSH descriptor: [Accidental Falls] explode all trees OR MeSH descriptor: [Pressure Ulcer] explode all trees OR MeSH descriptor: [Medication Errors] explode all trees OR MeSH descriptor: [Bone Diseases, Infectious] explode all trees OR MeSH descriptor: [Respiratory Tract Infections] explode all trees OR MeSH descriptor: [Urinary Tract Infections] explode all trees OR MeSH descriptor: [Wound Infection] explode all trees OR MeSH descriptor: [Soft Tissue Infections] explode all trees OR MeSH descriptor: [Sepsis] explode all trees MeSH descriptor: [Catheter-Related Infections] explode all trees OR (MeSH descriptor: [Enteral Nutrition] explode all trees and MeSH descriptor: [Catheter Obstruction] explode all trees) OR MeSH descriptor: [Treatment Outcome] explode all trees OR MeSH descriptor: [Outcome Assessment (Health Care)] explode all trees OR MeSH descriptor: [Drug-Related Side Effects and Adverse Reactions] explode all trees OR MeSH descriptor: [Medical Errors] explode all trees	79
PsychInfo	exp *home care/ or community care.mp. or community-based care.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] AND (nurs* or (practical adj nurs*) or nurses' aid*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] OR exp paraprofessional personnel/ or unregulated care provider.mp. or personal support worker.mp. or health care aid*.mp. or community support worker.mp. or home health aid*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] AND falls/ or accidents/ or injuries/ or pressure ulcer*.mp. or sepsis.mp. or respiratory tract infection*.mp. or wound infection*.mp. or urinary tract infection*.mp. or skin disease*.mp. or community-acquired infection*.mp. or catheter-related infection*.mp. or medication error*.mp. or medical error*.mp. or decubitus ulcer*.mp. or soft tissue infection*.mp. or feeding tube complication*.mp. or (enteral nutrition or obstruction) exp Treatment Outcomes/ or health care outcome*.mp. or adverse event*.mp. or infection*.mp.	74

B2.

Table 4. Question 2: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
Cucinotta et al. (2004) Italy	To verify whether the proposed model of home assistance could be cost-effective and efficient, could improve quality of life, or counteract institutionalization or readmission to hospital.	127 patients living at home with a primary caregiver.	Patients randomly assigned to one for two groups: control group having usual home care and intervention group receiving additional home care attendance.	Mini mental state exam (MMSE), activities of daily living (ADL), geriatric depression scale (GDS), cumulative illness rating scale (CIRS).	Increased care services from a home care attendant resulted in lower rates of readmission to acute care hospitals, and a reduction in institutionalization of the elderly clients.
*Masotti et al. (2010)	To summarize the results of a scoping review that focused on the occurrence of adverse events experienced by homecare patients.	International research on adverse events in home care.	Scoping Literature Review	Adverse events: events or occurrences which become apparent during the delivery of home care services, and which have a negative impact on	*No apparent commonly accepted standardized definition for adverse events that occur in homecare *Eight thematic categories were identified to address specific adverse event types: adverse drug events, line related, technology related,

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
				patient care, patient outcomes, family or support care and resource utilization.	infections and urinary catheters, wounds, falls, studies reporting multiple overall rates and other. *adverse drug events and line-related adverse events were the most frequently reported *Causes for adverse events could be grouped into two broad categories: patient level characteristics and healthcare organization and system level characteristics.
*O'Brien-Pallas et al. (2002)	To provide an empirical examination of the mechanisms by which clinical, provider, organizational and environmental complexity (EC) variables influence client improvement in OMAHA and 36 outcomes at discharge from home nursing service.	Through a convenience sample of 38 RNs and 11 RPNs, a sample of 751 participating clients were accessed.	Longitudinal study	Client outcomes – The OMAHA problem rating scale was used to determine the extent to which client knowledge, behaviour, and status for each nursing diagnosis changed from admission to discharge.	Clients cared by degree prepared nurses demonstrate improved knowledge and behaviour scores regarding their health conditions.
Vetter et al. (2004) USA	To determine whether multifaceted, culturally sensitive, primary-based behavioural interventions implemented by a nurse case manager or community health worker could improve diabetes control.	186 African American adults with type 2 diabetes.	Randomized clinical trial where patients were assigned to one of four groups: usual, usual + nurse case management (NCM), usual + community home worker visits (CHW), usual care + NCM + CHW.	Outcomes variables included A1C, lipid profiles and blood pressure.	All three experimental groups experienced improved diabetes control. NCM + CHW experienced greatest improvement.

*Publications were identified through hand search

B3.

Table 5. Question 3: Search Strategy

Database	Search Strategy	# of hits
CINAHL	MH Home Health Care OR "community care" AND MH Registered Nurses OR MH Baccalaureate Nurses OR MH Practical Nurses OR MH Diploma Nurses OR Associate Degree Nurses OR MH Nursing Assistants OR MH Home Health Aides OR MH Health Personnel, Unlicensed OR MH Community Health Workers OR MH Skill Mix OR "substitution" AND MH Accidental Falls OR "fall" OR MH Pressure Ulcer+ OR MH Medication Errors OR MH "Community-Acquired Infections") OR (MH "Opportunistic Infections") OR (MH "Respiratory Tract Infections") OR (MH "Sepsis") OR (MH "Urinary Tract Infections") OR (MH "Wound Infection") OR (MH "Infection") OR (MH Enteral Nutrition and "obstruction") OR MH "Outcomes(Health Care)") OR (MH "Nursing Outcomes") OR (MH	24

Database	Search Strategy	# of hits
	"Fatal Outcome") OR MH "Adverse Health Care Event") OR (MH "Medication Errors") OR (MH "Adverse Drug Event") OR (MH "Sentinel Event")	
Ageline	home care OR home healthcare OR community care OR community-based care AND OR unregulated care provider OR personal support worker OR health care aide OR community support worker OR home health aide OR nursing care OR registered practical nurs* OR licensed practical nurs* OR nurses' aide OR registered nurs* or nurs* OR skill mix OR substitution AND fall OR accidental fall OR pressure ulcer OR decubitus ulcer OR medication error OR infection OR feeding tube complication OR "enteral nutrition and obstruction" OR outcomes OR treatment outcomes OR healthcare outcomes OR adverse event OR medical error	214
Medline	exp *Home Care Services/ OR Home Health Nursing/ OR Home Care Agencies/ OR community adj care).mp AND "Personnel Staffing and Scheduling"/ OR Nursing Staff/ OR (registered nurs* or nurs*) OR Nursing, Practical/ OR Nurses' Aides/ OR (skill adj mix).mp. OR substitution.mp AND exp Accidental Falls/ or fall.mp. OR Pressure Ulcer/ or decubitus ulcer.mp. OR exp Medication Errors/ OR catheter-related infections/ or community-acquired infections/ or respiratory tract infections/ or sepsis/ or skin diseases, infectious/ or soft tissue infections/ or urinary tract infections/ or wound infection/ OR (Enteral Nutrition/ and obstruction) OR treatment outcome/ OR (adverse adj event).mp. OR medical errors/ or medication errors/	1016
EMBASE	home care.mp. Or exp home care/ OR community care.mp. Or exp community care/ OR community-based care.mp OR exp community health nursng/ or home healthcare.mp AND exp nurse/ or exp registered nurse/ OR registered practical nurs*.mp. OR licensed practical nurs*.mp. OR nurses' aide.mp. Or exp nursing assistant/ OR exp health care personnel/ or unregulated care provider.mp. OR personal support worker.mp. OR health care aide.mp. OR community support worker.mp. OR home health aide.mp. OR exp skill mix/ OR substitution.mp. AND exp falling/ OR exp decubitus/ OR exp medication error/ OR exp respiratory tract infection/ or exp soft tissue infection/ or exp wound infection/ or exp urinary tract infection/ or ex infection OR (exp enteric feeding AND exp obstruction) OR (exp nasogastric tube/ AND exp obstruction) OR exp outcomes research/ or exp nursing outcomes classification OR exp treatment outcome/ OR health care outcomes.mp. OR adverse event.mp. OR exp medical error/	779
HealthSTAR	exp *Home Care Services/ OR home healthcare.mp or exp Home Care Agencies/ OR community care.mp. OR community-based care.mp AND registered nurs*.mp. OR nurs* OR exp Nursing, Practical/ or registered practical nurs*.mp. OR exp Nurses' Aide/ or licensed practical nurs*.mp. OR unregulated care provider.mp. OR personal support worker.mp. OR exp Home Health Aides OR community support worker.mp. OR skill mix.mp. OR substitution.mp. AND exp Accidental Falls/ or fall.mp. OR exp Pressure Ulcer. OR decubitus ulcer.mp. OR exp Medication Errors/ OR exp Infection/ or exp Wound Infection/ or exp Surgical Wound Infection OR feeding tube complication.mp. OR (exp Enteral Nutrition/ and obstruction.mp.) OR exp Treatment Outcome/ or exp "Outcome Assessment (Health care) or exp "Outcome and Process Assessment (Health Care)"/ OR adverse event.mp. OR exp Medical Errors/	621
Scopus	((TITLE-ABS-KEY("home healthcare") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("home care") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("community care") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("community-based care") AND PUBYEAR > 1995)) AND (((TITLE-ABS-KEY("Skill mix") OR TITLE-ABS-KEY("Staff mix")))) OR ((TITLE-ABS-KEY("registered nurs*") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("nurs*") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("registered practical nurs*") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("licensed practical nurs*") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("nurses aide") AND PUBYEAR > 1995)) OR ((TITLE-ABS-KEY("unregulated care provider") AND PUBYEAR > 1995) OR	1554

Database	Search Strategy	# of hits
	(TITLE-ABS-KEY("Personal support worker") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("Health care aide") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("community support worker") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("home health aide") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY(substitution))) AND (((TITLE-ABS-KEY("Fall") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("accidental fall") AND PUBYEAR > 1995)) OR ((TITLE-ABS-KEY("Pressure ulcer") OR TITLE-ABS-KEY("decubitus ulcer"))) AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("Medication error") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("Infection") AND PUBYEAR > 1995) OR (TITLE-ABS-KEY("Feeding tube complication") AND PUBYEAR > 1995) OR ((TITLE-ABS-KEY("Enteral nutrition") AND TITLE-ABS-KEY("Obstruction"))) AND PUBYEAR > 1995) OR ((TITLE-ABS-KEY("outcome") OR TITLE-ABS-KEY("treatment outcome") OR TITLE-ABS-KEY("health care outcomes") OR TITLE-ABS-KEY("adverse event") OR TITLE-ABS-KEY("medical error"))) AND PUBYEAR > 1995)))	
Econlit	(("Home care" OR "Home healthcare" OR "community care" OR "community-based care")) AND (("registered nurse" OR "nurse" OR "registered practical nurse" OR "licensed practical nurse" OR "nurses aide" OR "unregulated health care provider" OR "personal support worker" OR "community support worker" OR "home health aide") OR "Skill mix" OR Substitution)	12
Web of Science	TOPIC: ("home care") OR TOPIC:("home healthcare") OR TOPIC: ("community care") OR TOPIC: ("community-based care") Refined by: LANGUAGES: (English) AND TOPIC: ("fall") OR TOPIC: ("accidental fall") OR TOPIC: ("pressure ulcer") OR TOPIC: ("decubitus ulcer") OR TOPIC: ("medication error") OR TOPIC: ("infection") OR TOPIC: ("outcome") OR TOPIC: ("treatment outcome") OR TOPIC: ("health care outcome") OR TOPIC: ("adverse event") OR TOPIC: ("medical error") OR TOPIC: ("feeding tube complication") OR TOPIC: ("enteral nutrition") AND TOPIC: ("obstruction") AND TOPIC: ("skill mix") OR TOPIC: ("staff mix") Refined by: LANGUAGES: (English) OR TOPIC: ("substitution") OR TOPIC: ("registered nurs*") OR TOPIC: ("registered practical nurs*") OR TOPIC: ("licensed practical nurse") OR TOPIC: ("nurses aide") OR TOPIC ("nurs*") Refined by: LANGUAGES: (English) OR TOPIC: ("unregulated care provider") OR TOPIC: ("personal support worker") OR TOPIC: ("health care aide") OR TOPIC: ("community support worker") OR TOPIC: ("home health aide")	45
Cochrane	Community Care OR community-based care OR MeSH descriptor: [Home Care Services] explode all trees OR MeSH descriptor: [Home Care Services, Hospital-Based] explode all trees AND MeSH descriptor: [Nurses] explode all trees OR MeSH descriptor: [Nursing, Practical] explode all trees OR MeSH descriptor: [Home Health Nursing] explode all trees OR MeSH descriptor: [Nursing Care] explode all trees OR unregulated care provider OR personal support worker OR community support worker OR MeSH descriptor: [Home Health Aides] explode all trees OR MeSH descriptor: [Home Nursing] explode all trees OR MeSH descriptor: [Nursing, Team] explode all trees OR MeSH descriptor: [Personnel Staffing and Scheduling] explode all trees OR Skill mix OR substitution AND MeSH descriptor: [Accidental Falls] explode all trees OR MeSH descriptor: [Pressure Ulcer] explode all trees OR MeSH descriptor: [Medication Errors] explode all trees OR MeSH descriptor: [Bone Diseases, Infectious] explode all trees OR MeSH descriptor: [Respiratory Tract Infections] explode all trees OR MeSH descriptor: [Urinary Tract Infections] explode all trees OR MeSH descriptor: [Wound Infection] explode all trees OR MeSH descriptor: [Soft Tissue Infections] explode all trees OR MeSH descriptor: [Sepsis] explode all trees MeSH descriptor: [Catheter-Related Infections] explode all trees OR (MeSH descriptor: [Enteral Nutrition] explode all trees and MeSH descriptor: [Catheter Obstruction] explode all trees) OR MeSH descriptor: [Treatment Outcome] explode all trees OR MeSH descriptor: [Outcome Assessment (Health Care)] explode all trees OR MeSH descriptor: [Drug-Related Side Effects and Adverse Reactions] explode all trees OR MeSH descriptor: [Medical Errors] explode all trees	137

Database	Search Strategy	# of hits
PsychInfo	exp *home care/ or community care.mp. or community-based care.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] AND (nurs* or (practical adj nurs*) or nurses' aid*).mp. or exp Paraprofessional Personnel/ or unregulated care provider.mp. or personal support worker.mp. or Home health aid*.mp. or community support worker.mp. or home health aid*.mp. or skill mix.mp. or substitution.mp. AND falls/ or accidents/ or injuries/ or pressure ulcer*.mp. or sepsis.mp. or respiratory tract infection*.mp. or wound infection*.mp. or urinary tract infection*.mp. or skin disease*.mp. or community-acquired infection*.mp. or catheter-related infection*.mp. or medication error*.mp. or medical error*.mp. or decubitus ulcer*.mp. or soft tissue infection*.mp. or feeding tube complication*.mp. or (enteral nutrition and obstruction).mp. or exp Treatment Outcomes/ or health care outcome*.mp. or adverse event*.mp. or infection*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]	74

B4.

Table 6. Question 3: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
Seow et al. (2010)	To investigate whether admission time to homecare and the amount of services, as measured by average nursing and personal support and homemaking (PSH) hours/week are associated with using acute care services at end of life.	9,018 end of life homecare patient decedents	Retrospective observational cohort study.	Odds ratio (OR) of having a hospitalization or emergency room visit in the two weeks before death and dying in hospital.	Patients admitted to homecare earlier than 4 weeks before death were significantly less likely to experience any of the three outcomes. As the average amount of nursing care per week increased, the odds of having any of the three outcomes decreased. This was also seen in patients receiving more than 7 hours a week of PSH.

Appendix C

Question 4: what is the relationship between continuity of care provider and client outcomes in home care?

C1.

Table 7. Question 4: Search Strategy

Database	Search Strategy	# of hits
CINAHL	MH Home Health Care OR "community care" AND Continuity of patient care AND MH Accidental Falls OR "fall" OR MH Pressure Ulcer+ OR MH Medication Errors OR MH "Community-Acquired Infections") OR (MH "Opportunistic Infections") OR (MH "Respiratory Tract Infections") OR (MH "Sepsis") OR (MH "Urinary Tract Infections") OR (MH "Wound Infection") OR (MH "Infection") OR (MH Enteral Nutrition and "obstruction") OR MH "Outcomes(Health Care)") OR (MH "Nursing Outcomes") OR (MH "Fatal Outcome") OR MH "Adverse Health Care Event") OR (MH "Medication Errors") OR (MH "Adverse Drug Event") OR (MH "Sentinel Event")	43
Ageline	home care OR home healthcare OR community care OR community-based care AND continuity OR continuity of patient care AND fall OR accidental fall OR pressure ulcer OR decubitus ulcer OR medication error OR infection OR feeding tube complication OR "enteral nutrition and obstruction" OR outcomes OR treatment outcomes OR healthcare outcomes OR adverse event OR medical error	32
Medline	exp *Home Care Services/ OR Home Health Nursing/ OR Home Care Agencies/ OR community adj care).mp AND "Continuity of Patient Care"/ OR continuity.mp. AND exp Accidental Falls/ or fall.mp. OR Pressure Ulcer/ or decubitus ulcer.mp.OR exp Medication Errors/ OR catheter-related infections/ or community-acquired infections/ or respiratory tract infections/ or sepsis/ or skin diseases, infectious/ or soft tissue infections/ or urinary tract infections/ or wound infection/ OR (Enteral Nutrition/ and obstruction) OR treatment outcome/ OR (adverse adj event).mp. OR medical errors/ or medication errors/	110
EMBASE	home care.mp. Or exp home care/ OR community care.mp. Or exp community care/ OR community-based care.mp OR exp community health nursng/ or home healthcare.mp AND continuity.mp. OR exp patient care/ AND exp falling/ OR exp decubitus/ OR exp medication error/ OR exp respiratory tract infection/ or exp soft tissue infection/ or exp wound infection/ or exp urinary tract infection/ or ex infection OR (exp enteric feeding AND exp obstruction) OR (exp nasogastric tube/ AND exp obstruction) OR exp outcomes research/ or exp nursing outcomes classification OR exp treatment outcome/ OR health care outcomes.mp. OR adverse event.mp. OR exp medical error/	1339
HealthSTAR	exp *Home Care Services/ OR home healthcare.mp or exp Home Care Agencies/ OR community care.mp. OR community-based care.mp AND exp "Continuity of Patient Care"/ AND exp Accidental Falls/ or fall.mp. OR exp Pressure Ulcer. OR decubitus ulcer.mp. OR exp Medication Errors/ OR exp Infection/ or exp Wound Infection/ or exp Surgical Wound Infection OR feeding tube complication.mp. OR (exp Enteral Nutrition/ and obstruction.mp.) OR exp Treatment Outcome/ or exp "Outcome Assessment (Health care) or exp "Outcome and Process Assessment (Health Care)"/ OR adverse event.mp. OR exp Medical Errors/	59

Database	Search Strategy	# of hits
Scopus	((TITLE-ABS-KEY("home care") OR TITLE-ABS-KEY("home health care") OR TITLE-ABS-KEY("community care") OR TITLE-ABS-KEY("community-based care")) AND ((TITLE-ABS-KEY("continuity of care") OR (TITLE-ABS-KEY("continuity of patient care")) AND (((TITLE-ABS-KEY("fall") OR TITLE-ABS-KEY("accidental fall")) OR ((TITLE-ABS-KEY("pressure ulcer") OR TITLE-ABS-KEY("decubitus ulcer")) OR (TITLE-ABS-KEY("medication error")) OR (TITLE-ABS-KEY("infection")) OR (TITLE-ABS-KEY("feeding tube complication")) OR ((TITLE-ABS-KEY("enteral nutrition") AND TITLE-ABS-KEY(complication))) OR ((TITLE-ABS-KEY("outcome") OR TITLE-ABS-KEY("treatment outcome") OR TITLE-ABS-KEY("health care outcome") OR TITLE-ABS-KEY("adverse event") OR TITLE-ABS-KEY("medical error")))))	508
Econlit	((("Home care" OR "Home healthcare" OR "community care" OR "community-based care")) AND ((Continuity of patient care) OR Continuity)	0
Web of Science	TOPIC: ("home care") OR TOPIC:("home healthcare") OR TOPIC: ("community care") OR TOPIC: ("community-based care") Refined by: LANGUAGES: (English) AND TOPIC: ("registered nurs*") OR TOPIC: ("registered practical nurs*") OR TOPIC: ("licensed practical nurse") OR TOPIC: ("nurses aide") OR TOPIC ("nurs*")OR TOPIC: ("nursing care") OR TOPIC: ("nursing care") AND TOPIC: ("continuity ") OR TOPIC: ("continuity of care") OR TOPIC: ("continuity of patient care")	0
Cochrane	Community Care OR community-based care OR MeSH descriptor: [Home Care Services] explode all trees OR MeSH descriptor: [Home Care Services, Hospital-Based] explode all trees OR MeSH descriptor: [Home Health Nursing] explode all trees OR MeSH descriptor: [Home Nursing] explode all trees AND MeSH descriptor: [Continuity of Patient Care] explode all trees AND MeSH descriptor: [Accidental Falls] explode all trees OR MeSH descriptor: [Pressure Ulcer] explode all trees OR MeSH descriptor: [Medication Errors] explode all trees OR MeSH descriptor: [Bone Diseases, Infectious] explode all trees OR MeSH descriptor: [Respiratory Tract Infections] explode all trees OR MeSH descriptor: [Urinary Tract Infections] explode all trees OR MeSH descriptor: [Wound Infection] explode all trees OR MeSH descriptor: [Soft Tissue Infections] explode all trees OR MeSH descriptor: [Sepsis] explode all trees MeSH descriptor: [Catheter-Related Infections] explode all trees OR (MeSH descriptor: [Enteral Nutrition] explode all trees and MeSH descriptor: [Catheter Obstruction] explode all trees) OR MeSH descriptor: [Treatment Outcome] explode all trees OR MeSH descriptor: [Outcome Assessment (Health Care)] explode all trees OR MeSH descriptor: [Drug-Related Side Effects and Adverse Reactions] explode all trees OR MeSH descriptor: [Medical Errors] explode all trees	21
PsychInfo	exp *home care/ or community care.mp. or community-based care.mp. AND Continuum of care/ or continuity.mp. or continuity of patient care.mp. AND falls/ or accidents/ or injuries/ or pressure ulcer*.mp. or sepsis.mp. or respiratory tract infection*.mp. or wound infection*.mp. or urinary tract infection*.mp. or skin disease*.mp. or community-acquired infection*.mp. or catheter-related infection*.mp. or medication error*.mp. or medical error*.mp. or decubitus ulcer*.mp. or soft tissue infection*.mp. or feeding tube complication*.mp. or (enteral nutrition and obstruction).mp. or exp Treatment Outcomes/ or health care outcome*.mp. or adverse event*.mp. or infection*.mp	3

C2.

Table 8. Question 4: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
D'Errico et al. (2010) USA	Purpose of this study was to examine the delivery of home health nursing care to elderly patients with chronic illnesses and what role, if any, RN continuity of care (RN COC) may have had in the achievement of quality/outcomes.	Retrospective cohort study. Sample population: patients 65 years of age and older with at least one chronic illness. Any racial group or ethnic group and gender, had a greater than 6-month life expectancy, were first time users of the study agency's home health services and had received four or more visits from an RN.	Examined association of COC RN in relation to 3 categories of end-result outcomes: ADLs/IADLs, Neuro-emotional behavioural status (NEB) and Emergent care. Used scores for 2/3 outcome variables selected (ADL/IADL, NEB) and continuity of care score. Descriptive statistics and statistical tests were used to discover characteristics of study sample and to determine presence of a positive relationship between COC RN and variables.	OASIS variables: 1. ADL/IADL; 2. Neuro-emotional behavioural status (NEB) 3. Emergent Care..	Having the same RN for higher numbers of home care visits was associated with less NEB indicators at discharge in some cohort patients.
Lorimer (2014) Ontario	To describe improved service for home care patients with leg ulcers.	N/A	Description of care pre-implementation and post-implementation of new service.	N/A	Pre-implementation care included: *No standard assessment or follow-up *Wide variation in physician orders *Care provided by RNs and RPNs *Geographical assignment of cases *Nurses reporting to a manager responsible for a geographical region *Lengthy delays for specialist referral Post-implementation care included: *Standard assessment and follow-up *Evidenced-based protocol for venous leg-ulcer care *All-RN service *Designated nurse team *Primary nurse service model *Specially trained RNs *Led by clinical leader who is an APN *Streamlined links to specialist physicians for consultation and referral The new service was designed to facilitate continuity. Results after the first year revealed that care was more effective and more efficient for all types of leg ulcers
Russel et al. (2011)	To describe the level of continuity in home health patient care and examine the	Retrospective data. Patients who received two or more skilled nursing visits and patients who were admitted and	COC score based on patients receiving a total of 15 nursing visits.	Measured 3 patient outcomes: 1. hospitalization, 2. emergency room visits, 3. improved functioning in	Patients with a low level of continuity are more likely to be hospitalized and more likely to visit the emergency room than patients with a higher level of continuity. Patients with low continuity of care are less likely to have improved functioning in ADL at discharge from home health care compared with patients with high continuity of

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
	relationship between continuity of care and patient outcomes.	discharged during the 2008 calendar year. Care limited to nursing services provided by RNs and excluded other types of professional or paraprofessional services.		activities of daily living.	care. Patients with a moderate level of continuity are more likely than those with high continuity in their providers of home care to be hospitalized or visit the ER, but are not significantly different in their likelihood of improved functioning in ADL. Providing home healthcare patients with consistent nursing personnel may reduce the rate of episodes ending in hospitalization or a visit to ER. A low level of consistency in the provider of care clearly compromises the stability and therapeutic benefits of the relationship between nurse and patient.
*White & Ragland (1995) USA	To describe urinary catheter-related infections that occurred among home care patients.	106 home care patients from a single agency for whom a urinary catheter was inserted of catheter care was delivered.	Historical cohort design. Chart reviews were completed for all patients from the time home care started for each through whichever of the following came first: the end of home care, hospitalization, death, or a set date.	Infection rates: number of infections per 100 catheters inserted (procedure based) and number of infections per 10,000 device-days (person based)	23.6% of the sample had a UTI at the start of home care or at the start of catheterization. During the study period 35 acquired a UTI (33% of the total and 43% of the patients who were infection free at the start of home care). Procedure rate of 3.5 UTIs /100 insertions. Those whose catheters were changed more frequently (<4weeks) was estimated to be 11.9 times that of those whose were changed less frequently. The number of different nurses changing a catheter was also significant.

*Publications were identified through hand search

Appendix D

Question 5: what is the relationship between nurse substitution, health care cost, and patient outcomes?

D1.

Table 9. Question 5: Search Strategy

Database	Search Strategy	# of hits
CINAHL*	((MH "Health Care Costs") OR(MH "Health Care Costs")) AND ((MH "Registered Nurses") OR (MH "Baccalaureate Nurses") OR (MH "Practical Nurses") OR (MH "Associate Degree Nurses") OR (MH "Diploma Nurses") OR (MH "Nursing Assistants") OR (MH "Health Personnel, Unlicensed") OR (MH "Home Health Aides")) AND ((MH "Delegation of Authority") OR (MH "Scope of Practice") OR (MH "Scope of Nursing Practice") OR ("task shifting") OR ("Nurse substitution") OR ("role expansion"))	12
Ageline	(registered nurs* OR nurs* OR registered practical nurs* OR licensed practical nurs* OR nurses' aide OR unregulated care provided OR personal support worker OR healthcare aide OR community support worker OR home health aide) AND (outcomes OR treatment outcomes OR healthcare outcomes OR adverse event OR medical error) AND (cost of care OR Health care cost) AND (delegated care OR task-shifting OR scope of practice OR substitution OR role expansion)	3
Medline	((exp Nursing, Practical/ or exp Nurses' Aides/ or registered nurs*.mp.) OR (nurs*.mp.) or (Home Health Aides/)) and ((health care costs/ or direct service costs/ or drug costs/ or employer health costs/) or (Cost-Benefit Analysis/) or (Cost Savings/)) and ((treatment outcome/) or ((adverse adj event).mp.) or (medical errors/ or medication errors/) or (outcome*.mp.)) and ((Delegation, Professional/) or (exp Personnel Delegation/) or ((task adj shifting).mp.) or ((delegation or delegating).mp.))	7
EMBASE	((exp nurse/ or exp registered nurse/) or (registered practical nurs*.mp.) or (licensed practical nurs*.mp.) or (nurses' aide.mp. or exp nursing assistant/) or (exp health care personnel/ or unregulated care provider.mp.) or (personal support worker.mp.) or (health care aide.mp.)) and (exp "health care cost"/ or cost of care.mp.) and ((exp outcomes research/ or exp nursing outcomes classification/) or (exp treatment outcome/) or (health care outcomes.mp.) or (adverse event.mp.) or (exp medical error/)) and ((exp professional delegation/ or delegated care.mp.) or (task-shifting.mp.) or (scope of practice.mp.) or (role expansion.mp.))	10
HealthSTAR	((registered nurs*.mp.) or (nurs*.mp.) or (exp Nursing, Practical/ or registered practical nurs*.mp.) or (exp Nurses' Aide/ or licensed practical nurs*.mp.) or (unregulated care provider.mp.) or (personal support worker.mp.)) and (exp Health care costs/) and ((exp Medical Errors/) or (exp Treatment Outcome/ or exp "Outcome Assessment (Health care)"/ or exp "Outcome and Process Assessment (Health Care)"/)) and ((delegated care.mp.) or (task-shifting.mp.) or (scope of practice.mp.) or (role expansion.mp.))	3
Scopus	((TITLE-ABS-KEY("registered nurs*") OR TITLE-ABS-KEY("nurs*") OR TITLE-ABS-KEY("registered practical nurs*") OR TITLE-ABS-KEY("licensed practical nurs*") OR TITLE-ABS-KEY("nurses aide") OR TITLE-ABS-KEY("unregulated care provider") OR TITLE-ABS-KEY("personal support worker") OR TITLE-ABS-KEY("health care aide") OR TITLE-ABS-KEY("community support worker") OR TITLE-ABS-KEY("home health aide")) AND PUBYEAR > 1989) AND ((TITLE-ABS-KEY("cost of care") OR TITLE-ABS-KEY("health care cost")) AND PUBYEAR > 1989) AND (((TITLE-ABS-KEY("fall") OR TITLE-ABS-KEY("accidental fall")) OR ((TITLE-ABS-KEY("pressure ulcer") OR TITLE-ABS-KEY("decubitus ulcer")) OR (TITLE-ABS-KEY("medication error")) OR	8

Database	Search Strategy	# of hits
Econlit*	(TITLE-ABS-KEY("infection")) OR (TITLE-ABS-KEY("feeding tube complication")) OR ((TITLE-ABS-KEY("enteral nutrition") AND TITLE-ABS-KEY(complication))) OR ((TITLE-ABS-KEY("outcome") OR TITLE-ABS-KEY("treatment outcome") OR TITLE-ABS-KEY("health care outcome") OR TITLE-ABS-KEY("adverse event") OR TITLE-ABS-KEY("medical error")))) AND (TITLE-ABS-KEY("delegated care")) OR (TITLE-ABS-KEY("task-shifting")) OR (TITLE-ABS-KEY("scope of practice")) OR (TITLE-ABS-KEY("substitution")) OR (TITLE-ABS-KEY("role expansion")) ("registered nurse" OR "nurse" OR "registered practical nurse" OR "licensed practical nurse" OR "nurses aide" OR "unregulated health care provider" OR "personal support worker" OR "community support worker" OR "health aide") AND ((health care cost) OR (cost of care))	70
Web of Science	(TOPIC: ("registered nurs*") OR TOPIC: ("registered practical nurs*") OR TOPIC: ("licensed practical nurse") OR TOPIC: ("nurses aide") OR TOPIC ("nurs*") Refined by: LANGUAGES: (English) OR TOPIC: ("unregulated care provider") OR TOPIC: ("personal support worker") OR TOPIC: ("health care aide") OR TOPIC: ("community support worker") OR TOPIC: ("home health aide")) AND (TOPIC: ("fall") OR TOPIC: ("accidental fall") OR TOPIC: ("pressure ulcer") OR TOPIC: ("decubitus ulcer") OR TOPIC: ("medication error") OR TOPIC: ("infection") OR TOPIC: ("outcome") OR TOPIC: ("treatment outcome") OR TOPIC: ("health care outcome") OR TOPIC: ("adverse event") OR TOPIC: ("medical error") OR TOPIC: ("feeding tube complication") OR TOPIC: ("enteral nutrition") AND TOPIC: ("obstruction") Refined by: LANGUAGES: (English)) AND (TOPIC: ("cost of care") OR TOPIC: ("health care cost") Refined by: LANGUAGES: (English)) AND TOPIC: ("delegated care") OR TOPIC: ("task-shifting") OR TOPIC: ("scope of practice") OR TOPIC: ("substitution") OR TOPIC: ("role expansion"))	0
Cochrane	((MeSH descriptor: [Nurses] explode all trees) or (MeSH descriptor: [Nursing, Practical] explode all trees) or (MeSH descriptor: [Nursing Care] explode all trees) or (unregulated care provider) or (personal support worker)) AND (MeSH descriptor: [Health Care Costs] this term only) AND ((MeSH descriptor: [Accidental Falls] explode all trees) or (MeSH descriptor: [Pressure Ulcer] explode all trees) or (MeSH descriptor: [Medication Errors] explode all trees) or (MeSH descriptor: [Medication Errors] explode all trees) or (MeSH descriptor: [Respiratory Tract Infections] explode all trees) or (MeSH descriptor: [Urinary Tract Infections] explode all trees) or (MeSH descriptor: [Wound Infection] explode all trees) or (MeSH descriptor: [Soft Tissue Infections] explode all trees) or (MeSH descriptor: [Sepsis] explode all trees) or (MeSH descriptor: [Catheter-Related Infections] explode all trees) or ((MeSH descriptor: [Enteral Nutrition] explode all trees) AND (MeSH descriptor: [Catheter Obstruction] explode all trees)) or (MeSH descriptor: [Treatment Outcome] explode all trees) or (MeSH descriptor: [Outcome Assessment (Health Care)] explode all trees) or (MeSH descriptor: [Drug-Related Side Effects and Adverse Reactions] explode all trees) or (MeSH descriptor: [Medical Errors] explode all trees))	18
PsychInfo	((nurs* or (practical adj nurs*) or nurses' aid*).mp. or exp Paraprofessional Personnel/ or unregulated care provider.mp. or personal support worker.mp. or Home health aid*.mp. or community support worker.mp. or home health aid*.mp.) and (exp Health Care Costs/ or cost of care.mp.) and (lls/ or accidents/ or injuries/ or pressure ulcer*.mp. or sepsis.mp. or respiratory tract infection*.mp. or wound infection*.mp. or urinary tract infection*.mp. or skin disease*.mp. or community-acquired infection*.mp. or catheter-related infection*.mp. or medication error*.mp. or medical error*.mp. or decubitus ulcer*.mp. or soft tissue infection*.mp. or feeding tube complication*.mp. or (enteral nutrition and obstruction).mp. or exp Treatment Outcomes/ or health care outcome*.mp. or adverse event*.mp. or infection*.mp.) and ((delegated care or delegation or task-shifting or scope of practice or substitution or role expansion).mp.)	2

D2.

Table 10. Question 5: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
*Buchan & Dal Poz (2002)	To provide an overview of factors that determine skill-mix of changes to skill-mix and to review the literature related to skill mix	All available literature examining skill mix in health care between 1986 and 2000	literature review - summary of the evidence - scoping review	Skill mix: the mix of posts, grades or occupations in an organization	Reasons for changing skill-mix: staff shortage, cost containment, quality improvement, technological innovation, new medical interventions, new health sector programs, health sector reform or changes in the legislative/regulatory environment. *9 studies were located examining the substitution of care assistants for nurses. *Many papers are descriptive and written from the perspective of qualified nurse. These papers argue that cheaper skills mix (i.e., more unqualified care providers) may not be more cost effective as there are hidden cost associated with skill dilution, including absenteeism, turnover of less qualified staff, higher levels of unproductive time because care assistants have less autonomy and capacity to act independently, and concerns about quality of care when unqualified staff are required to work beyond their capacity. *Some papers have found a positive impact of substitution with costs savings and no negative impact on patient satisfaction, other studies have found the opposite, citing decreased quality, increased on-call work, sick leave and overtime, higher workload for RNs and higher turnover of care assistants. *other studies have found that a larger proportion of more qualified nurses is related to higher reported quality of care
Cavanagh & Bamford (1997)	To describe what skills, knowledge and experiences can be substituted by nursing and which of nursing's functions can be substituted by others.	Literature examining unlicensed personnel in the hospital setting	Literature review - synthesis	Substitute: a product which fulfills (or performs) similar or identical functions as another (economic terms)	*Substitution of nurses by unlicensed personnel can be explained by: cost and productivity, patient length of stay and level of illness, and changes in skills requirements for nurses *Nurses make up the largest component of hospital and community services budget, therefore nursing services are often targeted when the need exists to find cost savings. *In the late 1980's and 1990's there was an increase in the number of unlicensed personnel providing care which had previously been provided by qualified nurses. Examples of the types of care include: ECGs, oxygen administration, blood drawing, medication administration, oral suctioning, and ostomy / tracheostomy care. *A number of studies have examined the financial impact of introducing UCP in acute care settings. These studies suffer from methodological issues (e.g. difficulties in measuring cost of services, short data collection time frames, and lack of a common framework for analysis). However, the findings of these studies suggest that financial savings result when UCPs are used alongside nurses. In addition, employing UCPs instead of nurses a savings of 20-40% can be expected. *Little is known about how the use of UCPs affects the quality of patient care outcomes, although no difference in quality was found when UCPs were used alongside RNS

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
*Hendrix & Foreman (2001) USA	To examine the effect of nursing inputs (intensity and mix) on the production of care in nursing homes	12,128 American nursing homes (all federally certified skilled and intermediate nursing facilities)	Cost optimization analysis	Intensity: the quantity of nurse hires Mix: the ratio of hires for each nurse category Decubitus ulcer cost (stages 2-4 only): Inflation adjusted decubitus ulcer cost per resident Nursing cost per resident: Normalized FTE X adjusted annual wage rates Case mix: severity of illness continuum (0-4)	*Per-resident annual RN wage was negatively associated with annual facility DU cost - increased spending on RN inputs decreased DU cost - facilities operate a greater levels of nursing expertise *Per-resident annual wages paid to LPNs was positively associated with DU cost - increased LPN spending is associated with increased DU cost - may be explained as LPN being substitute for RN, decreasing nursing expertise *Per-resident annual wages paid to NAs was negatively associated with DU cost - while NAs do not increase nursing expertise they provide intensity for relatively low cost
*Krapohl & Larson (1996)	To describe the evolution of nursing delivery systems in acute care, present a review of the literature describing the use and evaluation of UCPs and make recommendations for the future	International literature examining the use of UCP in hospital settings	Scoping Review	N/A	*Studies examined nurse satisfaction, quality of care, productivity/costs and patient satisfaction *studies were anecdotal, conducted at single institutions, lack comparison groups, used instruments with untested reliability and validity, and had small sample sizes *no empirically strong evidence was found to confirm that nursing support personnel improved quality of care of increased nurse and patient satisfaction. *No studies were sufficiently rigorous in nature to measure costs, since a number of costs variables were not included or addressed.
*McKenna (1995)	Examine three assumptions related to the relationship between skill mix substitutions and quality / cost of nursing care	American and British literature	Literature review - type not specified - methods not specified	Skill mix: not defined Qualified staff: not defined Unqualified staff: not defined Quality: not defined	Found support for three assumptions: 1. A skill mix of mostly qualified staff is often an inefficient and ineffective way to run a health service - Qualified staff cost more and can be replaced by less costly unqualified staff without affecting quality. 2. A skill mix of mostly unqualified staff is often and inefficient and ineffective way to run a health services - Use of more unqualified staff leads to absenteeism, increased sick time, increased costs, reduced morale, reduced staff satisfaction and reduced quality of care. 3. A rich skill mix of mostly qualified staff is a highly efficient and highly effective way to run a health services - having a rich skill mix of mostly qualified staff reduces patient LOS, mortality, costs, and complications; increases patient

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
					satisfaction, recovery rates, quality of care, and patient knowledge/compliance; increases staff productivity, and reduces staff absenteeism, staff sick time, turnover, overtime and costs.
Robinson et al. (2009)	To discuss systematically reviewed international evidence examining the implications of the inclusion of LPNs in the nursing workforce in the UK	N/A	Discussion paper	N/A	*Literature exists examining the combinations of different provider types against costs and outcomes (this work is mostly US based). *Hendrix and Foreman (2005) LPNs were associated with higher levels of pressure ulcers and higher costs of care as compared to RNs and HCAs *Using RNs decreased the incidence of pressure ulcers and therefore the overall costs of treatment
Sibblad et al. (2004)	To summarize available research into the success or failure of skill-mix change in achieving planned outcomes	review papers examining skill mix change published between 1990 and 2002	Systematic summary of reviews	Skill mix: mix of skills or competencies possessed by an individual; ratio of senior to junior grade staff within a single discipline; or mix of different types of staff within a multidisciplinary team. Skill mix change may be result from enhancement, substitution, delegation, or innovation or the transfer / relocation or care, or the use of a liaison (see article for definitions of each of the above).	*2 reviews were located examining the substitution of nurses by UCPs *findings suggest that a higher ratio of qualified to unqualified nursing staff is associated with higher direct costs * There is conflicting evidence as to whether these higher costs are offset by improved efficiency of quality of care

*Publications were identified through hand search

Appendix E

Question 6: how are nursing care activities delegated in home care? And question 7: what are nursing and unregulated care provider perceptions around delegated care?

E1.

Table 11. Question 6: Search Strategy

Database	Search Strategy	# of hits
CINAHL	MH Home Health Care OR "community care" AND MH Delegation of Authority OR "task shifting" OR MH Scope of Practice+ OR MH Scope of Nursing Practice OR "substitution OR "role expansion"	59
Ageline	home care OR home healthcare OR community care OR community-based care AND delegated care OR task-shifting OR scope of practice OR substitution OR role expansion	62
Medline	exp *Home Care Services/ OR Home Health Nursing/ OR Home Care Agencies/ OR community adj care).mp AND Delegation, Professional/ OR exp Personnel Delegation/ OR (task adj shifting).mp. OR (delegation or delegating).mp.	22
EMBASE	home care.mp. Or exp home care/ OR community care.mp. Or exp community care/ OR community-based care.mp OR exp community health nursng/ or home healthcare.mp AND exp professional delegation/ or delegated care.mp. OR task-shifting.mp. OR scope of practice.mp. OR substitution.mp. role expansion.mp.	218
HealthSTAR	exp *Home Care Services/ OR home healthcare.mp or exp Home Care Agencies/ OR community care.mp. OR community-based care.mp AND delegated care.mp. OR task-shifting.mp. OR scope of practice.mp. OR substitution.mp. OR role expansion.mp.	37
Scopus	((TITLE-ABS-KEY("home care") OR TITLE-ABS-KEY("home health care") OR TITLE-ABS-KEY("community care") OR TITLE-ABS-KEY("community-based care"))) AND (((TITLE-ABS-KEY("delegated care")) OR (TITLE-ABS-KEY("task-shifting")) OR (TITLE-ABS-KEY("scope of practice"))) OR (TITLE-ABS-KEY("substitution"))) OR (TITLE-ABS-KEY("role expansion")))	455
Econlit	((("Home care" OR "Home healthcare" OR "community care" OR "community-based care")) AND (((delegated care) OR (task shifting) OR (delegated tasks)) OR "scope of practice" OR "substitution" OR (Role expansion)))	5
Web of Science	TOPIC: ("home care") OR TOPIC:("home healthcare") OR TOPIC: ("community care") OR TOPIC: ("community-based care") AND TOPIC: ("delegated care") OR TOPIC: ("task-shifting") OR TOPIC: ("scope of practice") OR TOPIC: ("substitution") OR TOPIC: ("role expansion")	85
Cochrane	Community Care OR Community-based care OR MeSH descriptor: [Home Care Services] explode all trees OR MeSH descriptor: [Home Care Services, Hospital-Based] explode all trees OR MeSH descriptor: [Home Nursing] explode all trees OR MeSH	30

Database	Search Strategy	# of hits
PsychInfo	descriptor: [Home Health Nursing] explode all trees AND MeSH descriptor: [Delegation, Professional] explode all trees OR MeSH descriptor: [Personnel Delegation] explode all trees OR Task-shifting OR scope of practice OR substitution OR role expansion exp *home care/ or community care.mp. or community-based care.mp. AND (delegated care or delegation or task-shifting or scope of practice or substitution or role expansion).mp.	20

E2.

Table 12. Question 6: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
Zeytinoglu et al. (2014) Ontario	To analyze the impact of task shifting policy on personal support workers (PSWs) intention to stay in home care.	20 PSWs, 9 supervisors, 9 therapists and 8 nurses. Participants were recruited through organization managers.	Telephone interviews were conducted with each participant. PSWs were asked "has the transferring of skills affected your intention to stay in home care or leave?" Supervisors, therapists and nurses were asked a similar question about PSWs.	Intention to stay or leave employment in home care.	Half of study participants felt task shifting would increase PSWs job satisfaction, broaden their knowledge and make them feel included in the health care team. Close to a quarter of participants felt task shifting would affect PSWs intention to leave, specifically, reimbursement not reflecting the complexity of delegated care.

E3.

Table 13. Question 7: Search Strategy

Database	Search Strategy	# of hits
CINAHL	MH Registered Nurses OR MH Baccalaureate Nurses OR MH Practical Nurses OR MH Diploma Nurses OR Associate Degree Nurses OR MH Nursing Assistants OR MH Home Health Aides OR MH Health Personnel, Unlicensed OR MH Community Health Workers AND delegated care.mp. OR task-shifting.mp. OR scope of practice.mp. OR substitution.mp. OR role expansion.mp. AND MH Job Experience OR MH Evaluation OR "experience"	56
Ageline	unregulated care provider OR personal support worker OR health care aide OR community support worker OR home health aide OR nursing care OR registered practical nurs* OR licensed practical nurs* OR nurses' aide OR registered nurs* or nurs* AND delegated care OR task-shifting OR scope of practice OR substitution OR role expansion AND experience OR evaluation	21
Medline	exp Nursing, Practical/ or exp Nurses' Aides/ or registered nurs*.mp. OR nurs*.mp. OR Home Health Aides/ AND Delegation, Professional/ OR Personnel Delegation/ OR (delegation or delegating).mp. AND experience.mp. OR evaluation.mp. OR "Attitude of Health Personnel"/	54

Database	Search Strategy	# of hits
EMBASE	exp nurse/ or exp registered nurse/ OR registered practical nurs*.mp. OR licensed practical nurs*.mp. OR nurses' aide.mp. Or exp nursing assistant/ OR exp health care personnel/ or unregulated care provider.mp. OR personal support worker.mp. OR health care aide.mp. OR community support worker.mp. OR home health aide.mp. AND exp professional delegation/ or delegated care.mp. OR task-shifting.mp. OR scope of practice.mp. OR substitution.mp. role expansion.mp. AND exp experience/ or exp personal experience or experience.mp. OR evaluation.mp. Or exp evaluation study/	245
HealthSTAR	registered nurs*.mp. OR nurs* OR exp Nursing, Practical/ or registered practical nurs*.mp. OR exp Nurses' Aide/ or licensed practical nurs*.mp. OR unregulated care provider.mp. OR personal support worker.mp. OR exp Home Health Aides OR community support worker.mp. AND delegated care.mp. OR task-shifting.mp. OR scope of practice.mp. OR substitution.mp. OR role expansion.mp. AND experience.mp. OR evaluation. Mp.	621
Scopus	((TITLE-ABS-KEY("registered nurs*") OR TITLE-ABS-KEY("nurs*") OR TITLE-ABS-KEY("registered practical nurs*") OR TITLE-ABS-KEY("licensed practical nurs*") OR TITLE-ABS-KEY("nurses aide") OR TITLE-ABS-KEY("unregulated care provider") OR TITLE-ABS-KEY("personal support worker") OR TITLE-ABS-KEY("health care aide") OR TITLE-ABS-KEY("community support worker") OR TITLE-ABS-KEY("home health aide")) AND PUBYEAR > 1995) AND ((TITLE-ABS-KEY("delegated care")) OR (TITLE-ABS-KEY("task-shifting")) OR (TITLE-ABS-KEY("scope of practice")) OR (TITLE-ABS-KEY("substitution"))) OR (TITLE-ABS-KEY("role expansion"))) AND ((TITLE-ABS-KEY(experience) OR TITLE-ABS-KEY(evaluation)) AND PUBYEAR > 1989)	14
Econlit	((delegated care) OR (task shifting) OR (delegated tasks)) OR "scope of practice" OR "substitution" OR (Role expansion)) AND ("licensed practical nurse" OR "registered nurse" OR "nurse" OR "registered practical nurse") OR ("home health aide" OR "nurses aide" OR "unregulated health care provider" OR "personal support worker" OR "community support worker"))	6
Web of Science	TOPIC: ("delegated care") OR TOPIC: ("task-shifting") OR TOPIC: ("scope of practice") OR TOPIC: ("substitution") OR TOPIC: ("role expansion") AND TOPIC: ("experience") OR TOPIC: ("evaluation")	0
Cochrane	MeSH descriptor: [Nurses] explode all trees OR MeSH descriptor: [Nursing, Practical] explode all trees OR MeSH descriptor: [Home Health Nursing] explode all trees OR MeSH descriptor: [Nursing Care] explode all trees OR unregulated care provider OR personal support worker OR community support worker OR MeSH descriptor: [Home Health Aides] explode all trees OR MeSH descriptor: [Home Nursing] explode all trees AND MeSH descriptor: [Personnel Delegation] explode all trees OR MeSH descriptor: [Delegation, Professional] explode all trees OR task-shifting OR scope of practice OR substitution OR role expansion AND experience OR evaluation.	15
PsychInfo	(nurs* or (practical adj nurs*) or nurses' aid*).mp. or exp Paraprofessional Personnel/ or unregulated care provider.mp. or personal support worker.mp. or Home health aid*.mp. or community support worker.mp. or home health aid*.mp. AND (delegated care or delegation or task-shifting or scope of practice or substitution or role expansion).mp. AND job experience level/ or experience.mp. or exp Evaluation/ or evaluation.mp. or exp Health Personnel Attitudes/ or attitude of personnel.mp.	93

E4.

Table 14. Question 7: Manuscripts Included for Synthesis

Author, publication date	Study Aim	Sample	Methods	Key Concepts, Variables & Measures	Findings
*Berta et al. (2013) Ontario, CAN	To discuss the evolving role of health care aides and factors that impact how and where they work.	6 industry experts in organizations that represent health care aides.	Two hour focus groups with industry experts to better understand the type and scope of work that health care aides do for older persons in Ontario.	Role of health care aides, factors that influence what health care aides do.	Role required behaviours include ADL's and are assumed activities of HCAs. There is an increasing reliance on HCAs especially in the home setting to perform delegated acts of health care professionals as well as IADLs. HCA are also increasingly relied upon for extra role behaviours including providing emotional support.
*Bystedt et al. (2011) Sweden	To describe how registered nurses perceive delegation to unlicensed personnel (UP) in municipal health care.	12 RNs recruited through supervisors	Phenomenological approach using the interview question, "how do you perceive delegation to unlicensed personnel?"	N/A	3 main categories were found: RNs focus on their own works situation, RNs focus on UP and RNs focus on the patient. 14 descriptive categories were found within the main categories. RN's perceived a lack of control and felt forced to delegate. RNs use delegation as a means to provide mentorship but expressed concern of competence level of UP. RNs described delegation to UP as increasing the continuity of care delivery.
Carr & Pearson (2005) UK	To explore the perceptions of health visitors (HV) and district nurses (DN) related to delegation and their reported delegation practice.	Four groups of Health visitors (HV) and district nurses (DN) with varying degrees of experience.	Focus groups of 5-8 HVs and DNs where participants were asked about their perceptions and experiences of delegation.	Perceptions and experiences around delegation, delegation decision rationale, delegation decision components.	Both HVs and DNs expressed doubts about the impact of delegation on their own roles. Both HVs and DNs referred to delegating established and non-complex care. Decisions to delegate were found to be driven by staff availability or because it was perceived another staff member could perform care more effectively.
Craftman et al. (2012) Sweden	To describe district nurses perceptions of the concept of delegated medication management to UCPs.	20 district nurses	60 minute interviews with district nurses where open ended questions around delegating medication	Organizational and legal regulations, responsibility and	Most DNs responded that delegating the administration of medication was an important task but often felt uncomfortable about the responsibility.

administration to UCPs
was discussed.

safety, knowledge and
education.

*Publications were identified through hand search